

667-675 Yonge Street

City of Barrie

Traffic Impact Study for Tran Group

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Executive Summary

This report summarizes the traffic impact study for the proposed mixed-use development municipally known as 667–675 Yonge Street located in the northeast corner of the Yonge Street / Montgomery Drive intersection in the City of Barrie [City]. The report assesses the impact of traffic related to the development on the adjacent roadway and provides recommendations to accommodate this traffic in a safe and efficient manner.

The proposed development is anticipated to include an eight-storey building with 227 residential units, 768 sq.m. (8,267 sq.ft.) ground floor retail space and a 466 sq.m. (5,016 sq.ft.) private amenity area.

The proposed development is anticipated to include a full-movement access driveway onto Montgomery Drive [Site Access].

The scope of this analysis includes a review of the following intersections:

- Yonge Street / Big Bay Point Road;
- Yonge Street / Ashford Drive & Madelaine Drive;
- Yonge Street / Montgomery Drive; and
- Site Access / Montgomery Drive.

Conclusions

1. The proposed development is anticipated to generate a total of 101 AM and 118 PM peak hour primary trips and 14 PM peak hour pass-by trips.
2. Detailed turning movement traffic and pedestrian counts for the Yonge Street / Big Bay Point Road and Yonge Street / Montgomery Drive intersections were commissioned by JD Engineering. Detailed turning movements traffic and pedestrian counts for Yonge Street / Big Bay Point Road were also retrieved from the City. Detailed turning movement traffic and pedestrian counts for the Yonge Street / Ashford Drive & Madelaine Drive intersection were obtained from the 681–685 Yonge Street traffic impact study.
3. An intersection operational analysis was completed at the study area intersections, using the existing (2022) and background (2024, 2029 and 2034) traffic volumes, without the proposed development traffic. This enabled a review of existing and future traffic deficiencies that would be present without the influence of the proposed development. The following infrastructure improvements are recommended:

Yonge Street and Big Bay Point Road Corridor

- Prioritize transit and active transportation infrastructure along the Yonge Street and Big Bay Point Road corridors.

Yonge Street / Big Bay Point Road

Background (2024) Traffic Volumes

- Signal timing optimization during the AM and PM peak hours while maintaining the existing cycle length.

Background (2034) Traffic Volumes

- Monitor intersection operation to determine if further improvements are required.

Yonge Street / Ashford Drive & Madelaine Drive;
Background (2024) Traffic Volumes

- Signal timing optimization during the AM and PM peak hours while maintaining the existing cycle length.
4. An estimate of the amount of traffic that would be generated by the subject site was prepared and assigned to the study area streets and intersections.
 5. An intersection operation analysis was completed under total (2024, 2029 and 2034) traffic volumes with the proposed development operational at the study area intersections. No additional geometric lane improvements or traffic signal improvements are recommended within the study area.
 6. The Site Access will operate efficiently as a full-movement access, with one-way stop control for northbound movements. A single northbound and southbound lane for the Site Access will provide the necessary capacity to service the proposed development.
 7. The sight distance available for the Site Access is suitable for its intended use.
 8. The proposed parking supply for the subject site meets the parking requirements specified in the City Zoning By-law 2009-141.
 9. In summary the proposed development will not cause any operational issues and will not add significant delay or congestion to the local roadway network.

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1 Introduction

1.1 Background

Tran Group [the Developer] is proposing a mixed-use development municipally known as 667 – 675 Yonge Street located in the northeast corner of the Yonge Street / Montgomery Drive intersection in the City of Barrie [City].

The proposed development is anticipated to include an eight-storey building with 227 residential units, 768 sq.m. (8,267 sq.ft.) ground floor retail space and a 466 sq.m. (5,016 sq.ft.) private amenity area.

The proposed development is anticipated to include a full-movement access driveway onto Montgomery Drive [Site Access].

The Developer has retained **JD Northcote Engineering Inc.** [JD Engineering] to prepare this traffic impact study in support of the proposed development.

1.2 Study Area

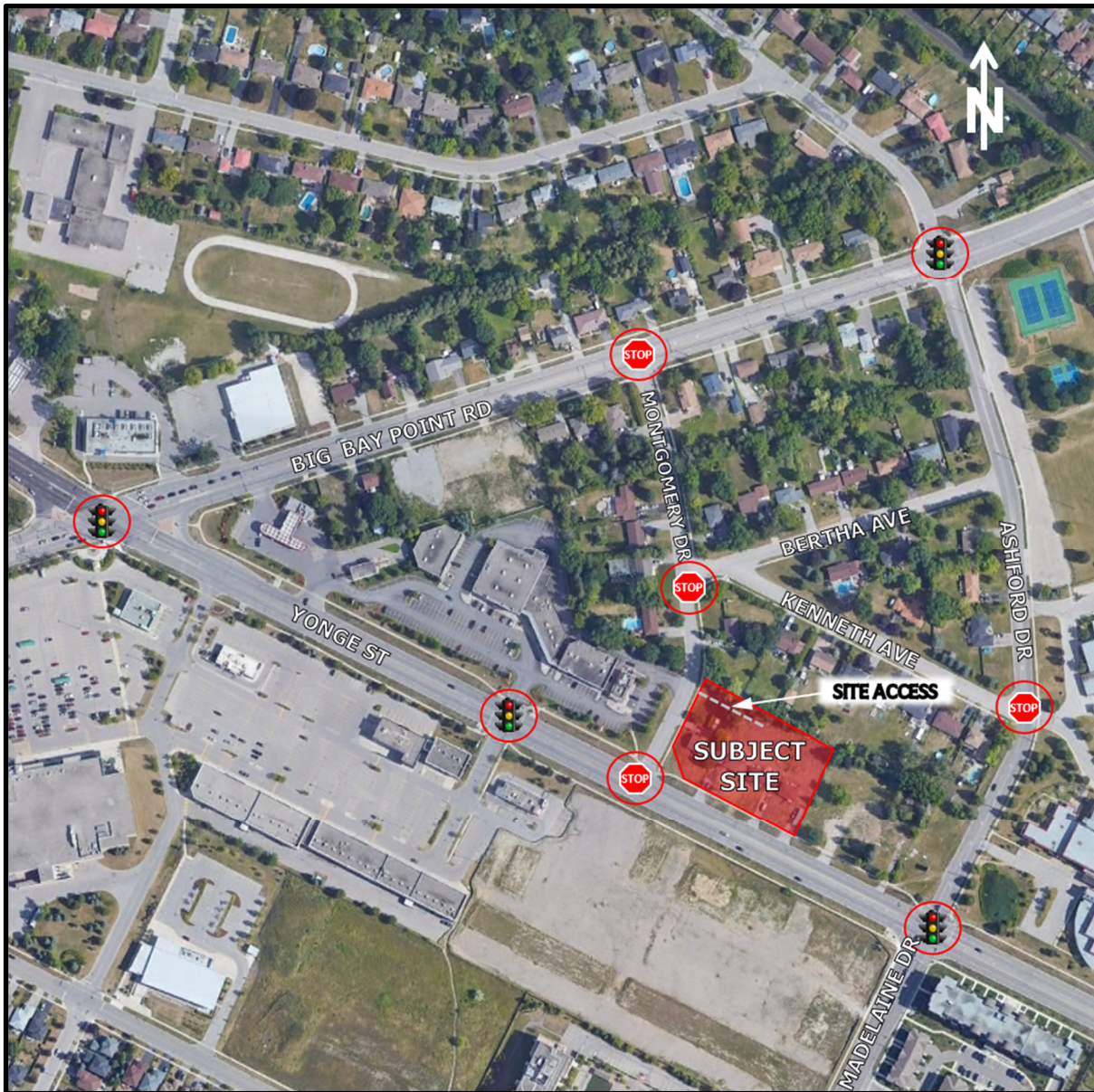
Figure 1 shows the location of the subject site and study area intersections, in relation to the surrounding area. The site plan provided by Architecture Unfolded is included in **Appendix A**.

The subject site is bound by Montgomery Drive to the west, Yonge Street to the south and existing residential lands to the east and north.

The following intersections will be analysed as part of the study:

- Yonge Street / Big Bay Point Road;
- Yonge Street / Ashford Drive & Madelaine Drive;
- Yonge Street / Montgomery Drive; and
- Site Access / Montgomery Drive.

Figure 1 – Proposed Site Location and Study Area



1.3 Study Scope and Objectives

The purpose of this study is to identify the potential impacts to traffic flow at the site access and on the surrounding roadway network. The study analysis includes the following tasks:

- Determine existing traffic volumes and circulation patterns;
- Estimate future traffic volumes if the proposed development was not constructed, including the impact of additional proposed developments in the area;
- Estimate the amount of traffic that would be generated by the proposed development and assign to the roadway network;

- Complete level-of-service [LOS] analysis of horizon year (without the proposed development) traffic conditions and identify operational deficiencies;
- Estimate the amount of traffic that would be generated by the proposed development and assign to the roadway network;
- Complete LOS analysis of horizon year (with the proposed development) traffic conditions and identify additional operational deficiencies;
- Identify improvement options to address operational deficiencies; and
- Document findings and recommendations in a final report.

1.4 Horizon Year and Analysis Periods

Traffic scenarios for the existing (2022) year, build-out year (2024), 5-year post build-out year (2029) and 10-year post-build-out year (2034) were selected for analysis of traffic operations in the study area. The weekday morning [AM] and afternoon [PM] peak hours have been selected as the analysis periods for this study.

2 Information Gathering

2.1 Street and Intersection Characteristics

Big Bay Point Road is an arterial road with an urban cross section and a sidewalk on both sides of the road, within the study area. Big Bay Point Road is a four-lane road west of Yonge Street and a five-lane road east of Yonge Street within the study area. Big Bay Point Road has a posted speed limit of 50km/h and is under the jurisdiction of the City within the study area.

Yonge Street is a five-lane arterial road with an urban cross-section and a sidewalk on both sides of the road. Yonge Street has a posted speed limit of 50km/h; however, also includes a school zone maximum speed when flashing sign of 40 km/h within the study area. Yonge Street is under jurisdiction of the City within the study area.

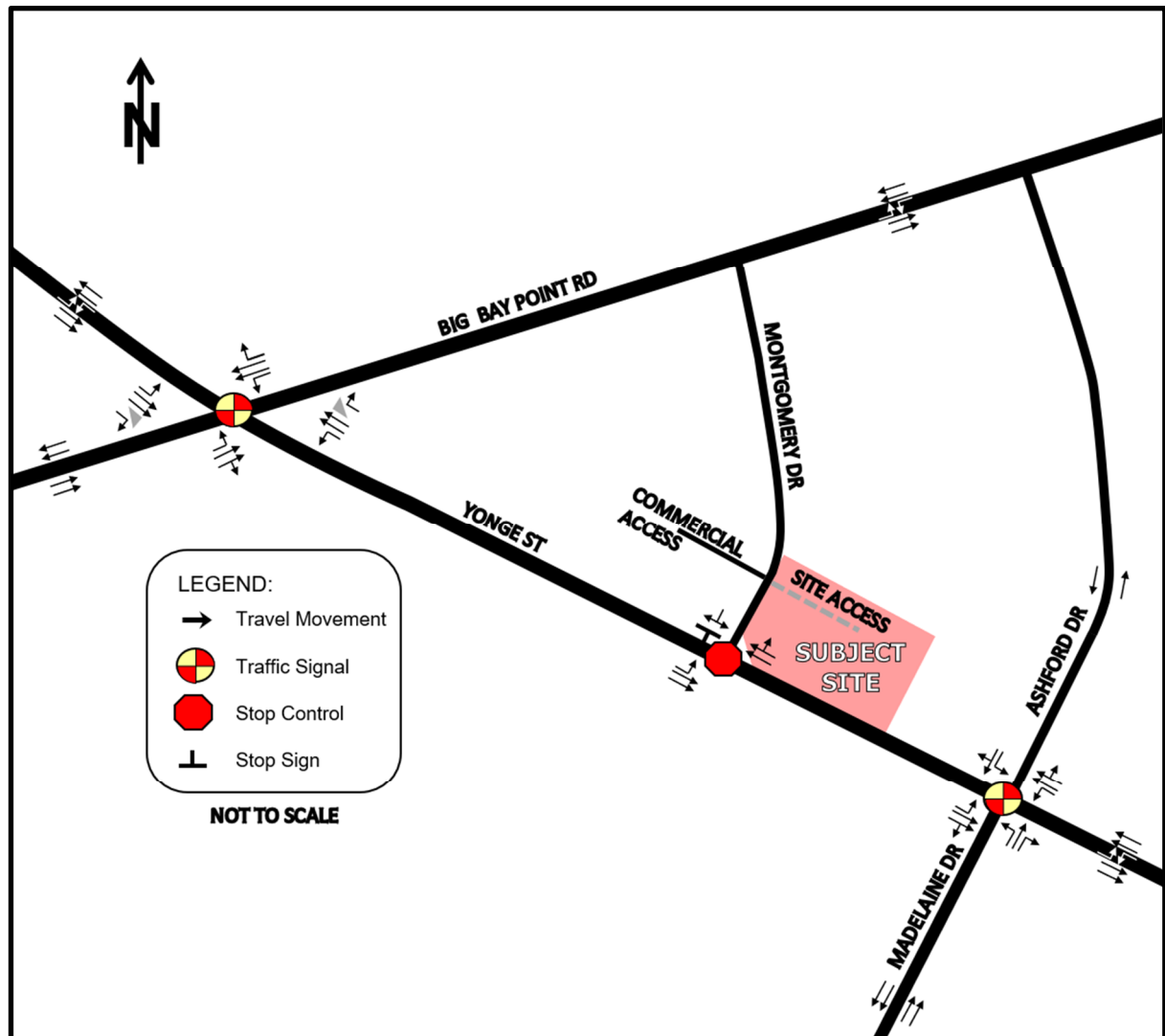
Montgomery Drive is a two-lane local road with an urban cross-section and a sidewalk on the east side of the road. Montgomery Drive has an unposted (assumed) speed limit of 50km/h. Montgomery Drive is under jurisdiction of the City.

Madelaine Drive is a four-lane major collector road with an urban cross-section and a sidewalk on both sides of the road. Madelaine Drive has a posted speed limit of 50km/h; however, also includes a school zone maximum speed when flashing sign of 40 km/h within the study area. Madelaine Drive is under jurisdiction of the City.

Ashford Drive is a two-lane local road with an urban cross-section and a sidewalk on the east side of the road. Ashford Drive has a posted speed limit of 40km/h and is under jurisdiction of the City.

The existing intersection spacing and lane configuration within the study area is illustrated in **Figure 2**.

Figure 2 – Existing Intersection Lane Configuration within Study Area



*It is noted that there is a commercial access opposite of the Site Access; however, for the purpose of this study, we have analyzed the Montgomery Drive / Site Access intersection as a three-legged intersection as there is anticipated to be no interaction between the commercial access and the Site Access

2.2 Local Transportation Infrastructure Improvements

Based on the City's Transportation Master Plan (April 2019) [TMP] and the City's 2022-2031 Capital Plan, the following improvements are anticipated to be completed within the study area:

- Madelaine Drive
 - o Removal of an existing lane in each direction to include a two way left turn lane [TWLTL] and bike lanes.
- Yonge Street
 - o Conversion of the curb lane to a high occupancy vehicle [HOV] lane; and
 - o Addition of cycle tracks.

- Big Bay Point Road (west of Yonge Street within the study area)
 - o Addition of a TWLTL (west of Yonge Street within the study area); and
 - o Addition of cycle tracks (within study area).

Based on our review of the City's 2022-2031 Capital Plan, the above noted improvements are anticipated to be completed after 2031, with the exact timing of improvements between 2031 and 2041 currently unknown. Consequently, for the purpose of this report, we have assumed the above noted improvements will occur after the 2034 horizon year.

There are no other planned infrastructure improvements within the study area.

2.3 Transit Access

The subject site is serviced by Barrie Transit and GO transit. Barrie Transit provides three bus routes within the study area; the No. 3 (Bayview / Painswick) bus route, the No. 4 (East Bayfield / South Go) bus route and the 8 Route (Split into 8A (RVH / Yonge) and 8B (Crosstown / Essa)) bus route. GO transit provides the 68 bus route (Aurora GO) on Yonge Street, within the study area.

The Route No. 3 bus route operates between 05:30– 23:42 on weekdays with service alternating every 30 and 60 minutes, between 06:30 – 21:55 on Saturdays with service alternating every 30 and 60 minutes and between 08:30 – 21:25 on Sundays with service alternating every 30 and 60 minutes. The closest bus stop to the proposed development for the Route No. 3 bus is located in the southwest and northwest corners of the Yonge Street / Big Bay Point intersection for the eastbound and westbound directions respectively.

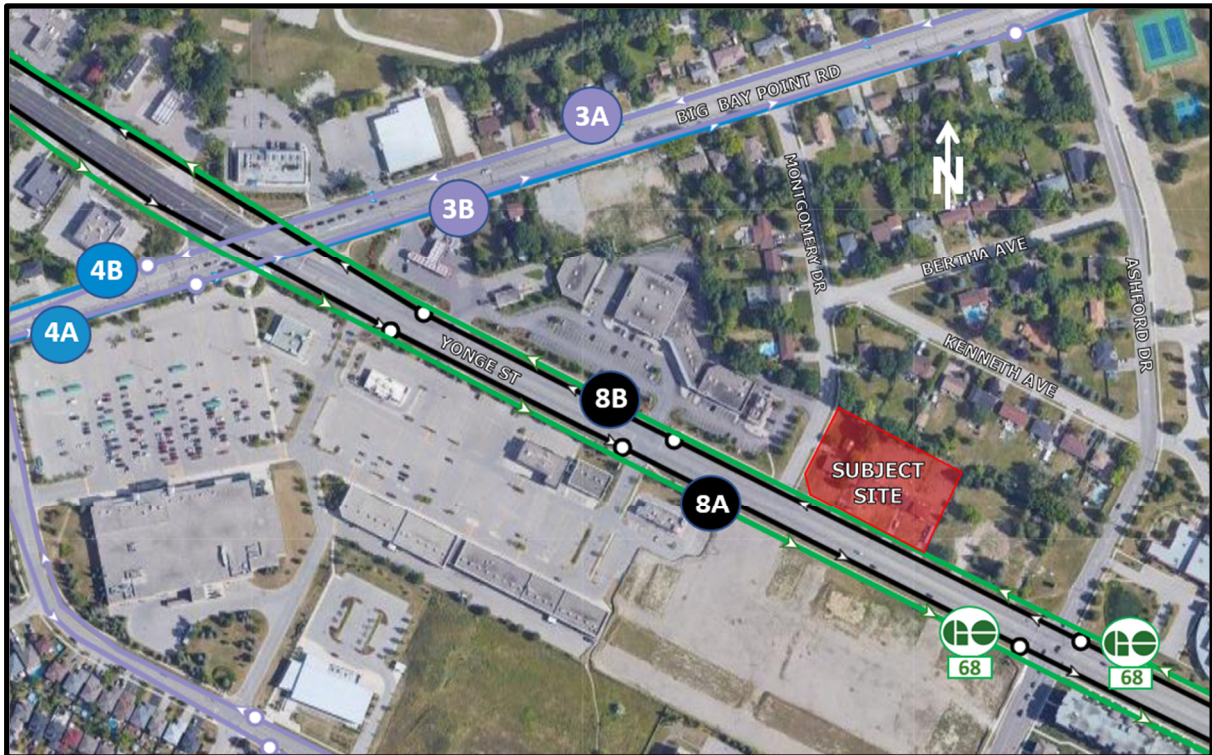
The Route No. 4 bus route operates between 05:33– 23:27 on weekdays with service approximately every 50-60 minutes, between 07:24 – 23:27 on Saturdays with service approximately every 50-60 minutes and between 09:15 – 22:35 on Sundays with service approximately every 50-60 minutes. The closest bus stop to the proposed development for the Route No. 4 bus is located in the southwest and northwest corners of the Yonge Street / Big Bay Point intersection for the eastbound and westbound directions respectively.

The 8A (RVH / Yonge) bus route operates between 04:52 – 24:52 on weekdays with daytime service every 30 minutes, between 06:52 – 12:52 on Saturdays with daytime service every 30 minutes and between 08:52 – 21:52 on Sundays with service every 60 minutes. The 8B (Crosstown / Essa) bus route operates between 05:21 – 24:57 on weekdays with daytime service every 30 minutes, between 06:51 – 24:47 on Saturdays with daytime service every 30 minutes and between 09:21 – 22:47 on Sundays with service every 60 minutes. The closest bus stop to the proposed development for the 8A (RVH / Yonge) and 8B (Crosstown / Essa) bus route is located in the southwest and northeast corner of the Yonge Street / Heritage Mall Access intersection for the southbound and northbound directions respectively.

The Aurora GO bus route operates between 04:11 – 01:05 on weekdays with service every 30-60 minutes and between 06:11 – 02:05 on weekends with service approximately every hour. The closest bus stop to the proposed development is located in the northeast and southwest corner of the Ashford Drive & Madelaine Drive / Yonge Street intersection for the northbound and southbound directions respectively.

Figure 3 illustrates the above noted bus routes within the study area.

Figure 3 – Transit Service within Study Area



2.4 Other Developments within Study Area

Based on our review of the City's active development webpage, there are five adjacent developments nearby the study area that will impact the traffic generation rates, specifically:

- 681 Yonge Street
- 759 Yonge Street;
- Heritage Mall Phase 3;
- 521, 527 & 531 Big Bay Point Road; and
- 520 & 526 Big Bay Point Road.

Figure 4 shows the location of the above noted adjacent developments in relation to the subject site. For the purposes of this study, it has been assumed that all traffic generated by the adjacent developments within the study area will be new traffic and would not be in the study area if the developments were not constructed.

Figure 4 – Adjacent Developments within Study Area



2.4.1 681- 685 Yonge Street

The 681-685 Yonge Street mixed use development is located at the northwest corner of the Yonge Street / Ashford Drive & Madelaine Drive intersection and is anticipated to include 176 residential apartment units and 5,480 sq.ft. first floor commercial space. It has been assumed that the 681-685 Yonge Street development will be fully occupied by the 2024 horizon year.

Traffic generated by the 681-685 Yonge Street development has been estimated based on the May 2019 traffic impact study titled 681 Yonge Condo by JD Engineering [681 Yonge St TIS] (excerpts provided in **Appendix B**). Traffic volumes outside the 681 Yonge St TIS study area have been distributed based on the traffic distribution methodology applied for the residential component of the proposed development outlined in Section 4.2.

Figure 5 illustrates the 681-685 Yonge Street development traffic within the study area.

2.4.2 Heritage Mall Phase 3

Phase 3 of the Heritage Mall development is located at the southwest corner of the Ashford Drive & Madelaine Drive / Yonge Street intersection and is anticipated to include eight buildings with 50,838 sq.ft. commercial space and a 6,280 sq.ft. restaurant / coffee shop. It has been assumed that Phase 3 of the Heritage Mall development will be fully occupied by the 2024 horizon year.

Traffic generated by Phase 3 of the Heritage Mall development has been estimated based on the 681 Yonge Street TIS (excerpts provided in **Appendix B**). Traffic volumes outside the 681 Yonge St TIS study area have been distributed based on the traffic distribution methodology applied for the commercial component of the proposed development outlined in Section 4.2.

Figures 6, 7 and 8 illustrate the pass-by, primary and total traffic assignment for Phase 3 of the Heritage Mall Development within the study area.

2.4.3 759 Yonge Street

The 759 Yonge Street mixed-use development is located east of Yonge Street, midblock between St. Peter's Catholic Secondary School and the Barrie South GO station, south of the study area. The 759 Yonge Street development is anticipated to include 142 townhouse units, 242 stacked townhouse units, 192 stacked townhouse units, 750 mid-rise units and 30,000 sq.ft. of retail/commercial space. It has been assumed that the 759 Yonge Street development will be fully occupied by the 2024 horizon year.

The traffic generation for the 759 Yonge Street development has been based on the Institute of Transportation Engineers [ITE] *Trip Generation Manual* (11th Edition) [ITE Trip Generation Manual]. The following ITE land uses have been applied to estimate the traffic from the 759 Yonge Street development commercial component:

- ITE land use 220 (Multifamily Housing (Low-Rise)) – General Urban / Suburban Setting;
- ITE land use 221 (Multifamily Housing (Mid-Rise)) – General Urban / Suburban Setting;
- ITE land use 821 (Shopping Plaza (40-140K)) – General Urban / Suburban Setting; and
- ITE land use 822 (Strip Retail Plaza (<40K)) – General Urban / Suburban Setting.

The 759 Yonge Street development commercial space is less than 40,000 sq.ft.; consequently, ITE land use 822 is more applicable for the commercial space of the development. However, ITE land use 821 has been used for the AM peak hour as the sample size for ITE land use 822 is small for the AM peak hour.

The AM and PM peak hour traffic generation for the 759 Yonge Street development do not exactly align with the AM and PM peak hour in the traffic counts; consequently, we have applied the peak hour of adjacent street traffic values provided in the ITE Trip Generation Manual. The estimated trip generation of the 759 Yonge Street development is illustrated below in **Table 1**.

Table 1 – Estimated Traffic Generation – 759 Yonge Street

Land Use	Size	AM Peak Hour			PM Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Shopping Plaza (40-140K) ITE land use 821	30,000 sq.ft.	32	20	52	-	-	-
Strip Retail Plaza (<40K) ITE land use 822		-	-	-	99	99	198
TOTAL COMMERCIAL		32	20	52	99	99	198
Multifamily Housing (Mid-Rise) ITE Land Use: 221	142 units	15	52	67	51	30	81
Multifamily Housing (Mid-Rise) ITE Land Use: 221	1184 units	111	316	427	318	203	521
TOTAL RESIDENTIAL		126	368	494	369	233	602
TOTAL TRIP GENERATION		158	388	546	468	332	800
INTERNAL CAPTURE		-7	-7	-14	-36	-36	-72
PASS-BY TRIPS (ITE Land Use: 822 and 821) *		0	0	0	-21	-21	-42
NET SITE GENERATION*		151	381	532	411	275	686

* Commercial pass-by trips for the AM and PM peak hour are 0% and 26% respectively, according to the ITE data for ITE land use 820.

The traffic distribution for the residential component of the 759 Yonge Street development has been estimated based on the 681 Yonge Street TIS (excerpts provided in **Appendix B**). Residential Traffic volumes outside the 681 Yonge St TIS study area have been distributed based on the traffic distribution methodology applied for the residential component of the proposed development outlined in Section 4.2. Traffic volumes for the commercial component of the 759 Yonge Street development have been distributed based on the traffic distribution methodology applied for the commercial component of the proposed development outlined in section 4.2.

Figures 9, 10 and 11 illustrate the residential, commercial and total traffic assignment for the 759 Yonge Street development within the study area.

2.4.4 521, 527 & 531 Big Bay Point Road

The 521, 527 & 531 Big Bay Point Road development is located on the south side of Big Bay Point Road midblock between Yonge Street and Montgomery Drive and is anticipated to include 58 back-to-back townhouse units. It has been assumed that the 521, 527 & 531 Big Bay Point Road will be fully occupied by the 2024 horizon year.

The traffic generation for the proposed development have been calculated based on the data provided in the ITE Trip Generation Manual. The following ITE land uses have been applied to estimate the traffic from the adjacent developments:

- ITE land use 220 (Multifamily Housing (Low-Rise)) – General Urban / Suburban Setting.

The AM and PM peak hour of traffic generation for 521, 527 & 531 Big Bay Point Road development is not anticipated to exactly align with the AM and PM peak hour in the traffic counts; consequently, we have applied the peak hour of adjacent street traffic values provided in the ITE Trip Generation Manual. The estimated trip generation of the 521, 527 & 531 Big Bay Point Road development is illustrated below in **Table 2**.

Table 2 – Estimated Traffic Generation – 521, 527 & 531 Big Bay Point Road

Land Use	Size	AM Peak Hour			PM / SAT Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Multifamily Housing (Low-Rise) ITE Land Use: 220	58 Units	10	31	41	28	17	45

The traffic distribution for the 521, 527 & 531 Big Bay Point Road development has been estimated based on the traffic distribution methodology applied for the residential component of the proposed development outlined in Section 4.2, with adjustments based on the development location and the surrounding road network layout. **Table 3** summarizes the traffic distribution for the 521, 527 & 531 Big Bay Point Road development.

Table 3 – Estimated Traffic Distribution – 521, 527 & 531 Big Bay Point Road

Travel Direction (to / from)	Percent of Total Traffic Generation
North via Yonge Street	26%
West via Big Bay Point Road	35%
East via Big Bay Point Road	13%
West via Madelaine Drive	21%
South via Yonge Street	5%
TOTAL	100%

Using the traffic distribution pattern noted above, the traffic assignment for the 521, 527 & 531 Big Bay Point Road was calculated for the AM and PM peak hour and is illustrated in **Figure 12**.

2.4.5 520 & 526 Big Bay Point Road

The 520 & 526 Big Bay Point Road development is located on the north side of Big Bay Point Road midblock between Yonge Street and Montgomery Drive and is anticipated to consist of a 6-storey apartment building with 46 residential units. It has been assumed that the 520 & 526 Big Bay Point Road development will be fully occupied by the 2024 horizon year.

Traffic generated by the 520 & 526 Big Bay Point Road development has been estimated based on the May 2021 traffic impact study titled 520 & 526 Big Bay Point Road by JD Engineering [520 & 526 Big Bay Point Road TIS] (excerpts provided in **Appendix B**). Traffic volumes outside the 520 & 526 Big Bay Point Road TIS study area have been distributed based on the distribution outlined in section 2.4.4.

Figure 13 illustrates the 520 & 526 Big Bay Point Road development traffic within the study area.

2.4.6 Total Adjacent Developments

Figure 14 illustrates the total adjacent development traffic within the study area.

Figure 5 – 681-685 Yonge Street Development Traffic Assignment

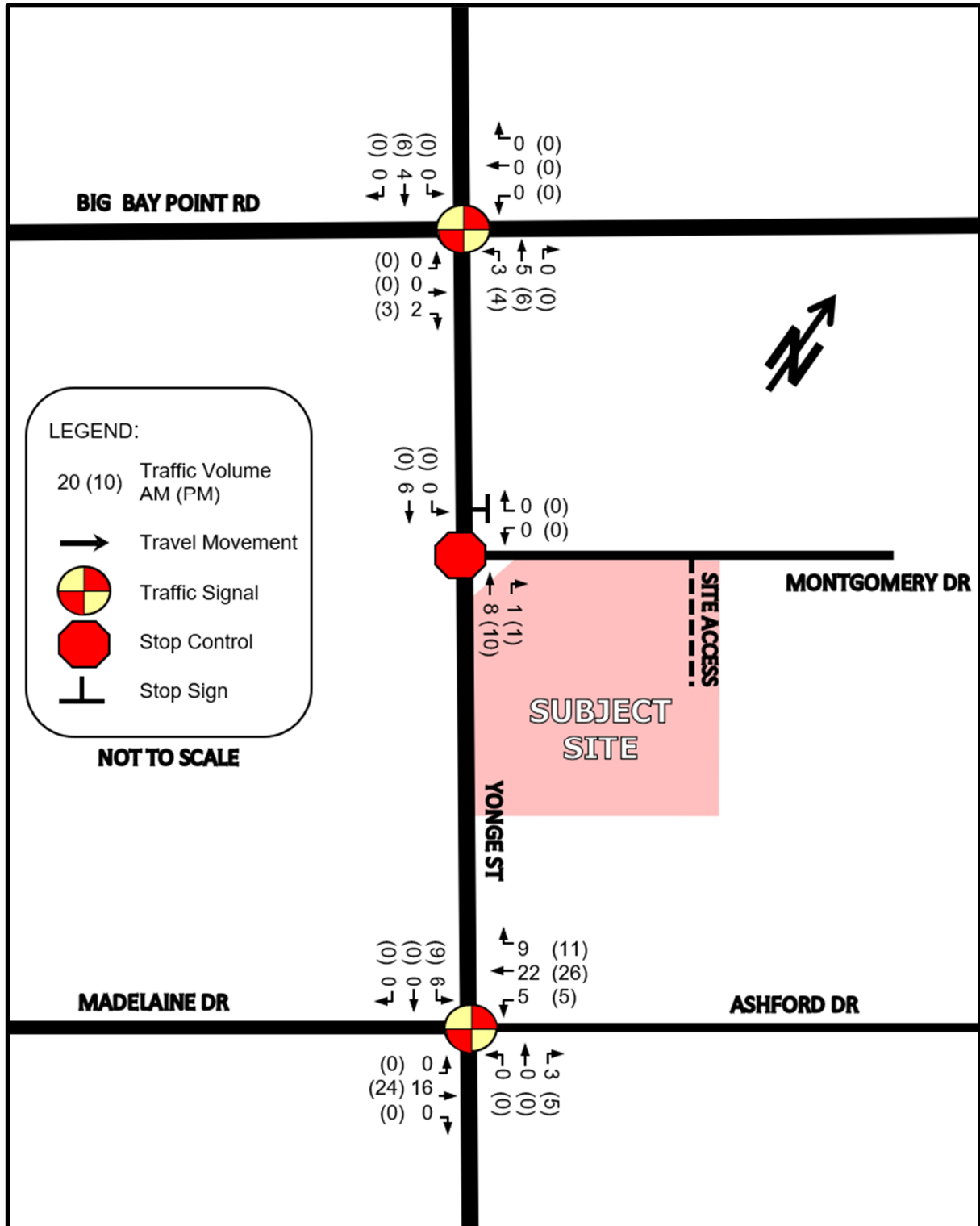


Figure 6 – Heritage Mall (Phase 3) Development Traffic Assignment – Primary

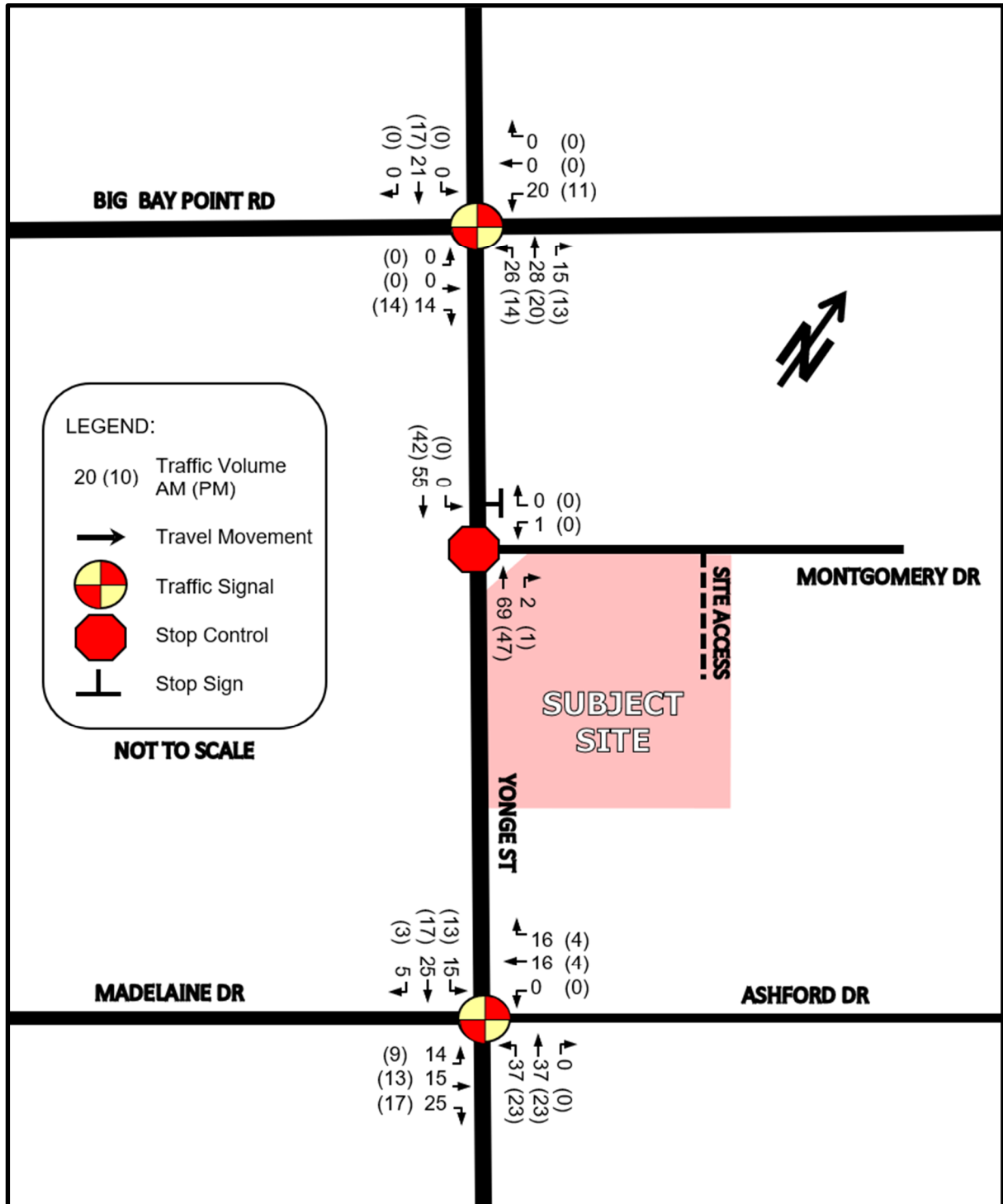


Figure 7 – Heritage Mall (Phase 3) Development Traffic Assignment – Pass by

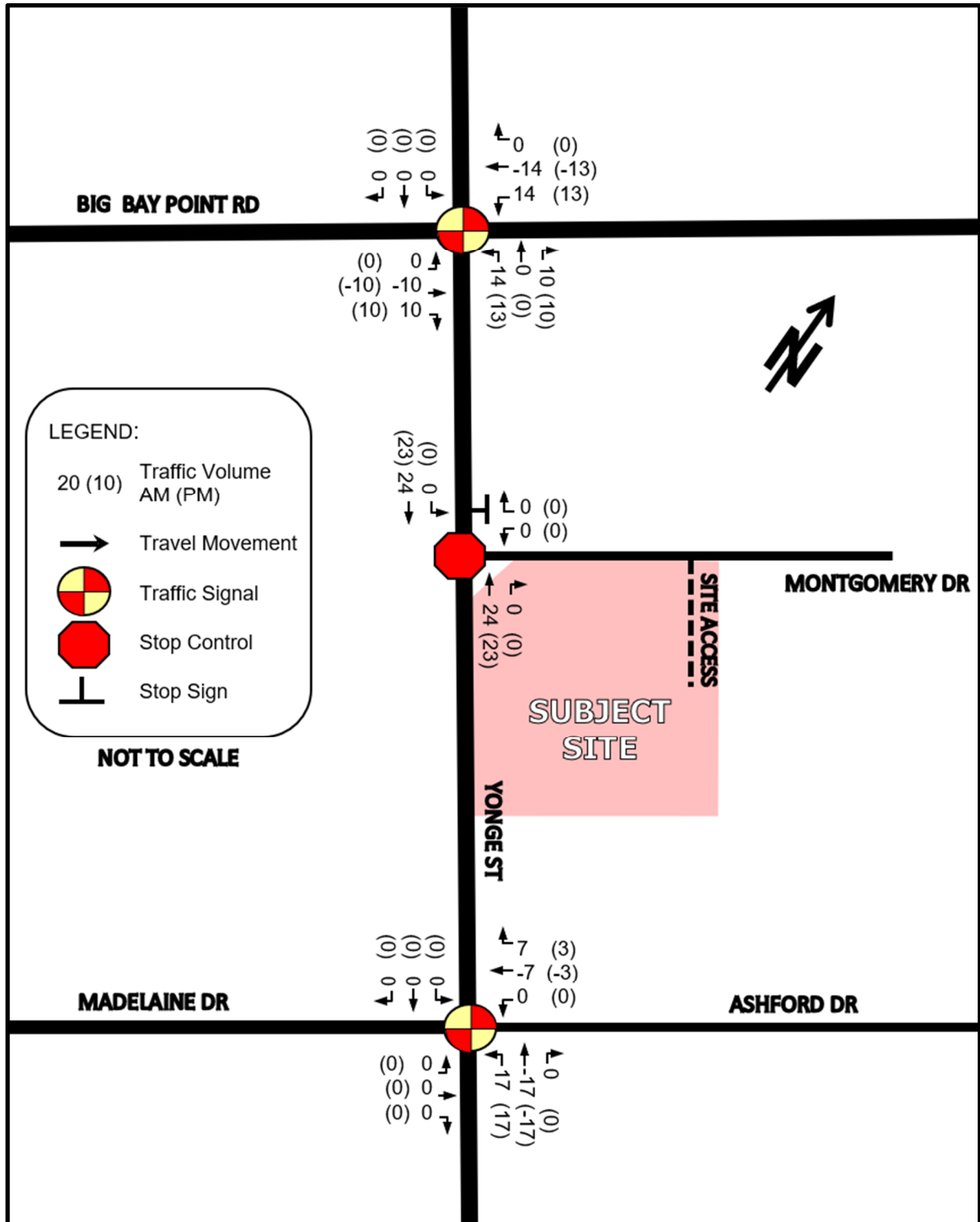


Figure 8 – Heritage Mall (Phase 3) Development Traffic Assignment – Total

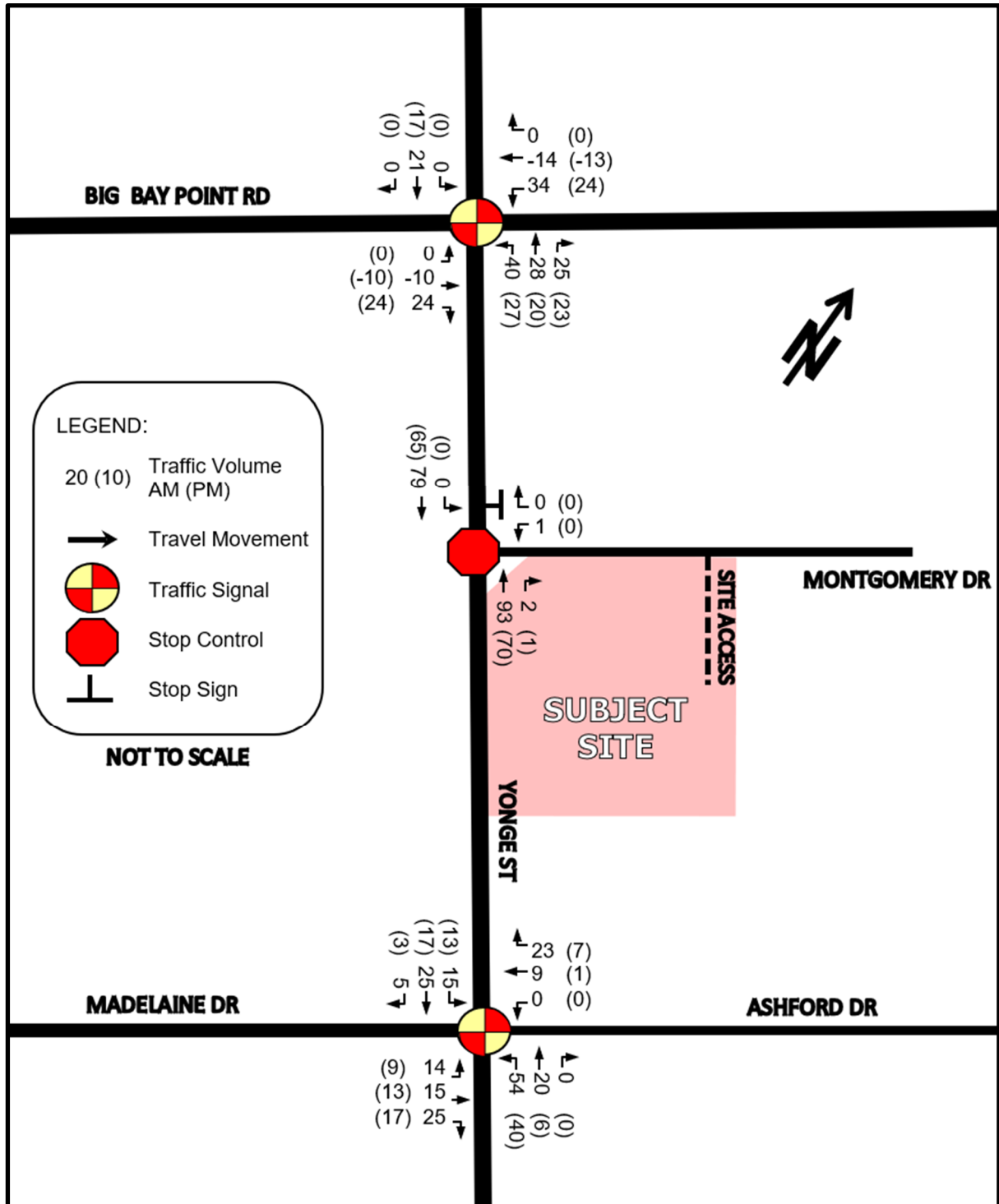


Figure 9 – 759 Yonge Street Development Traffic Assignment – Residential

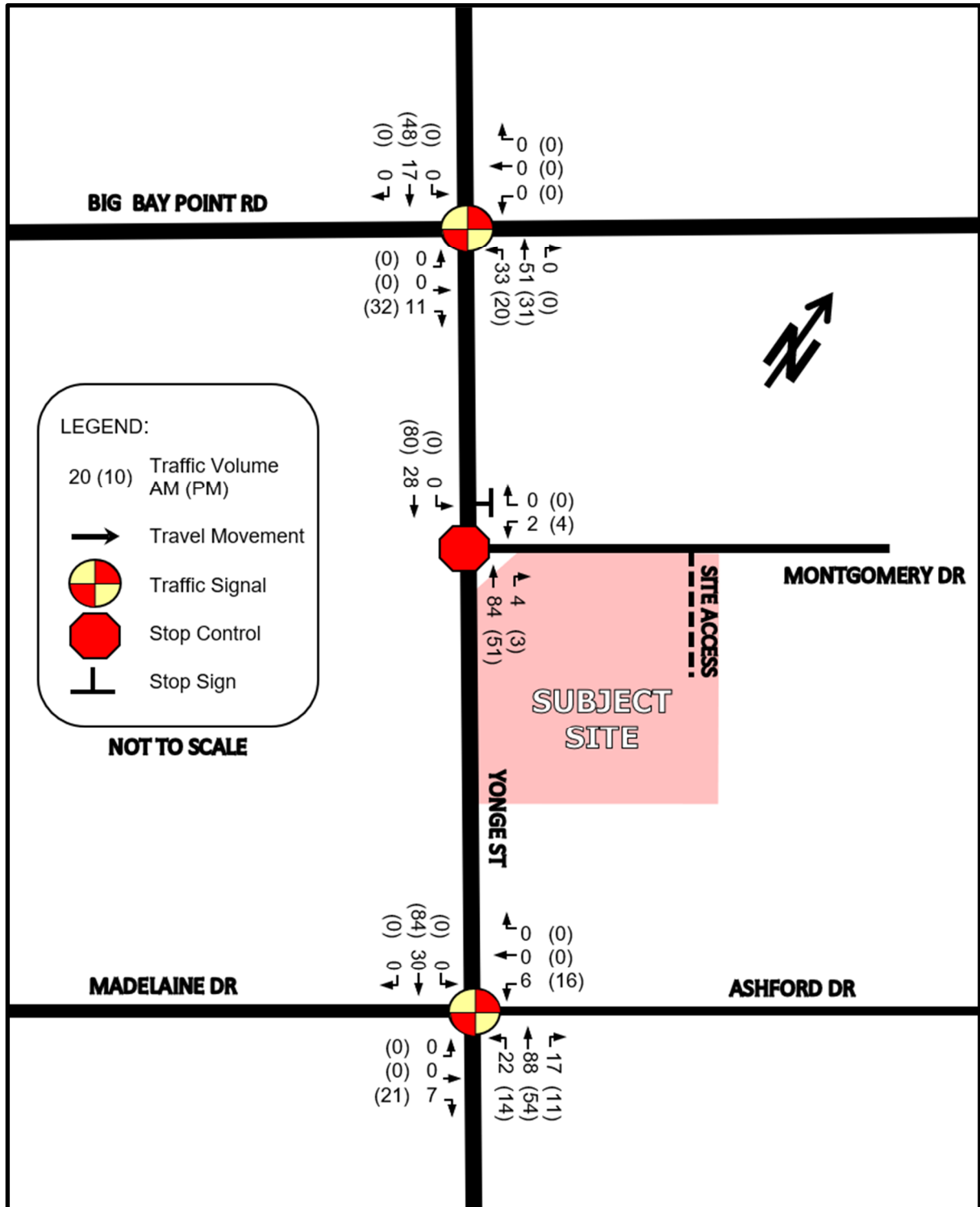


Figure 10 – 759 Yonge Street Development Traffic Assignment – Commercial

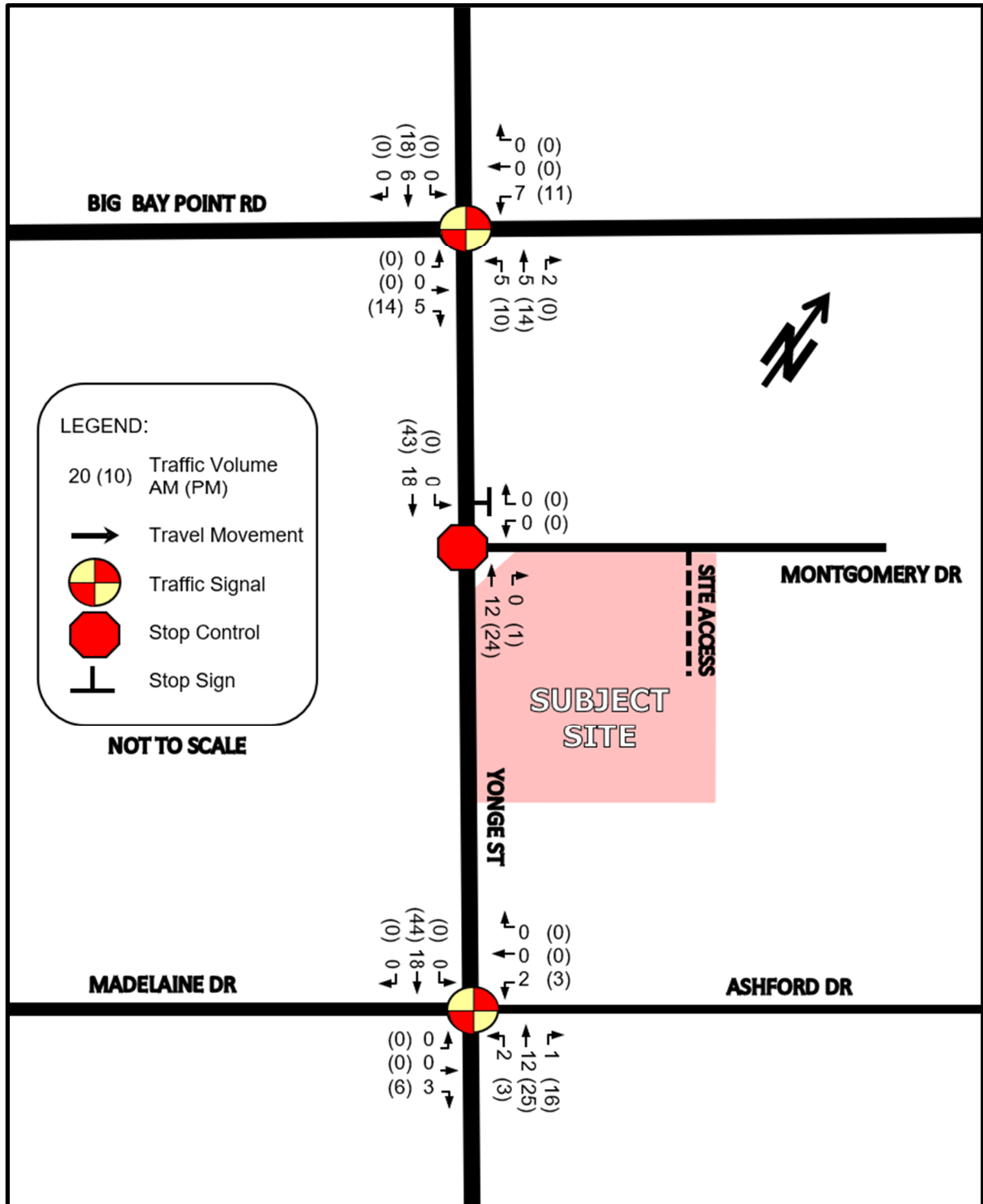


Figure 11 – 759 Yonge Street Development Traffic Assignment – Total

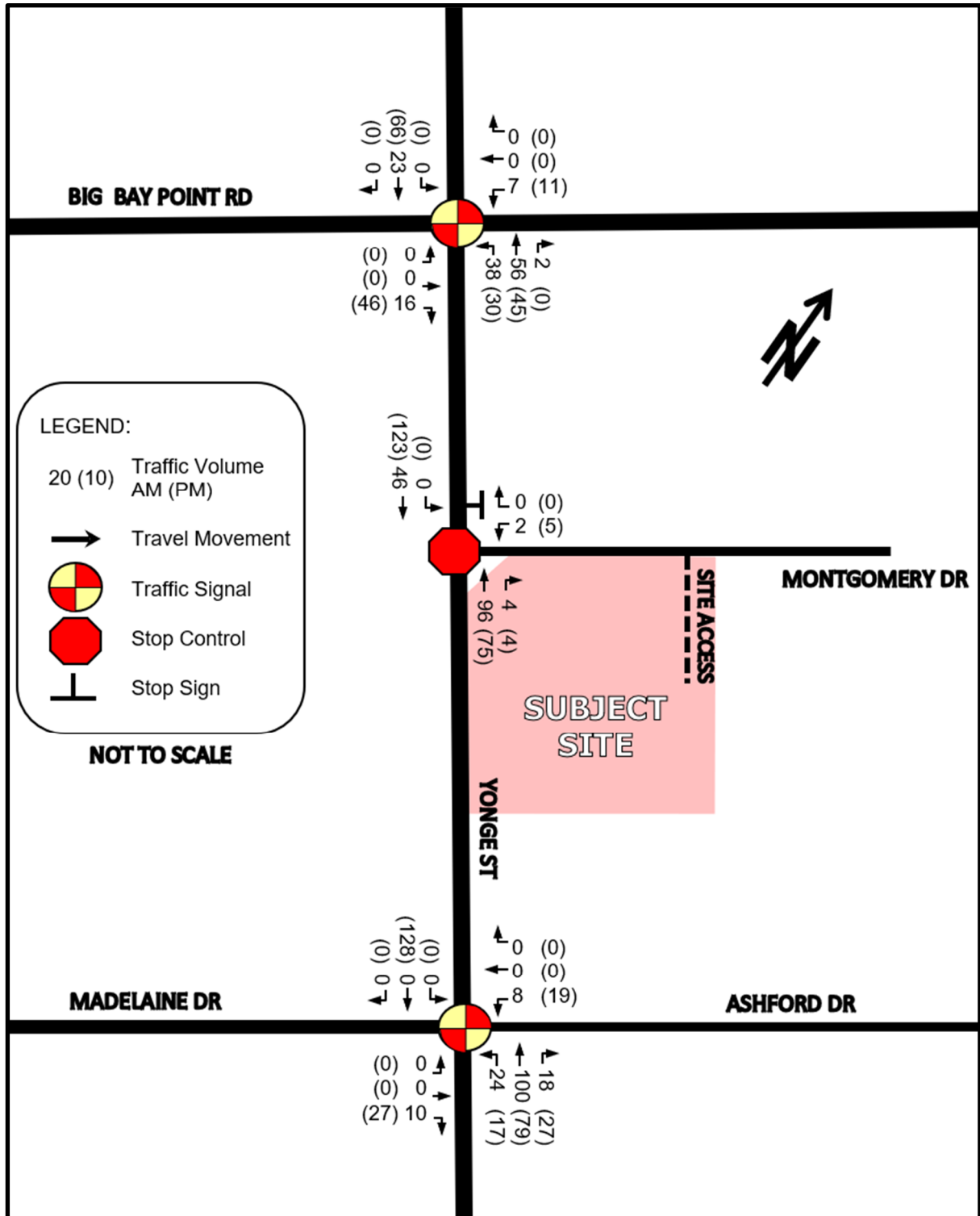


Figure 12 – 521,527& 531 Big Bay Point Road Development Traffic Assignment

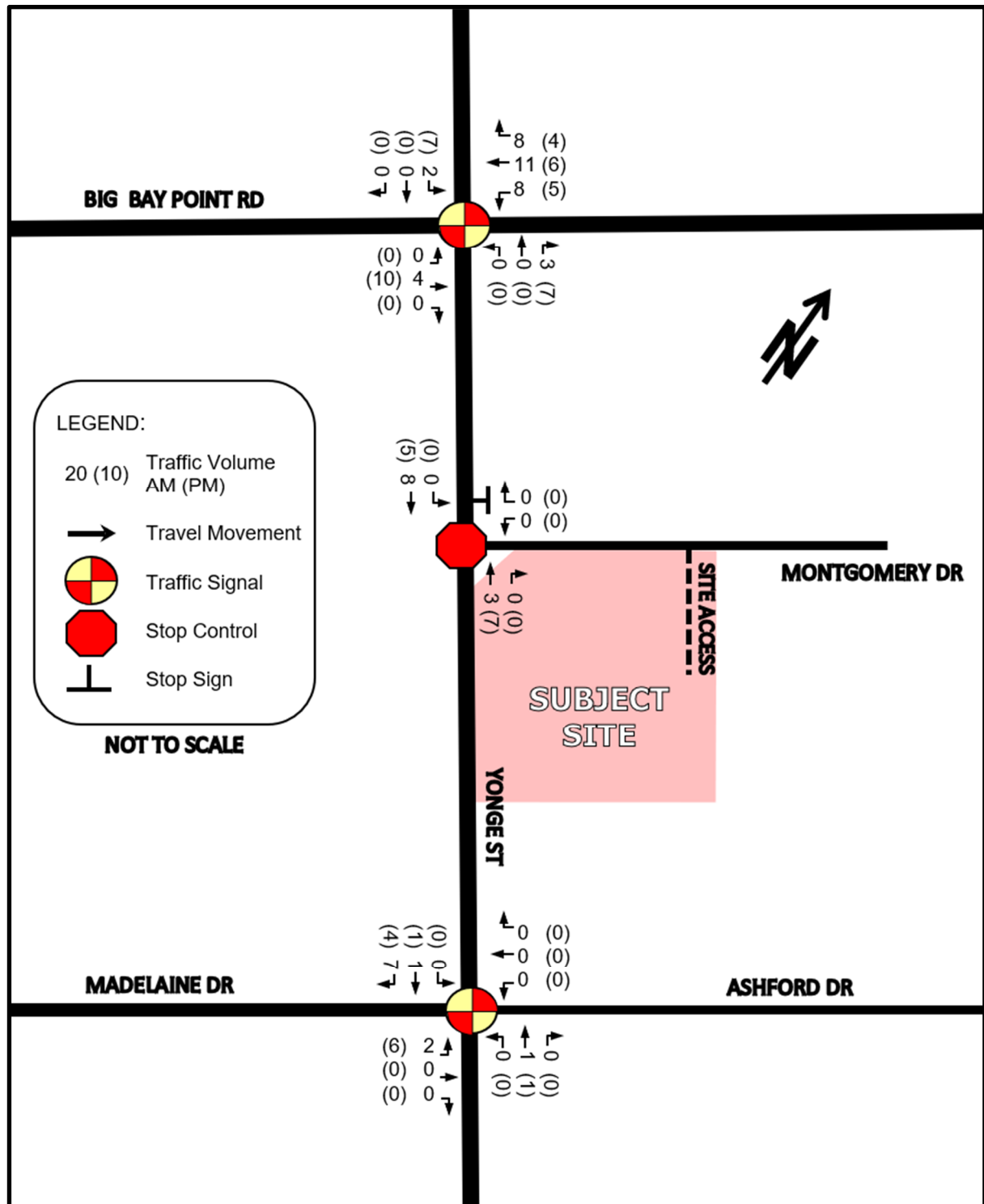


Figure 13 – 520 & 526 Big Bay Point Road Development Traffic Assignment

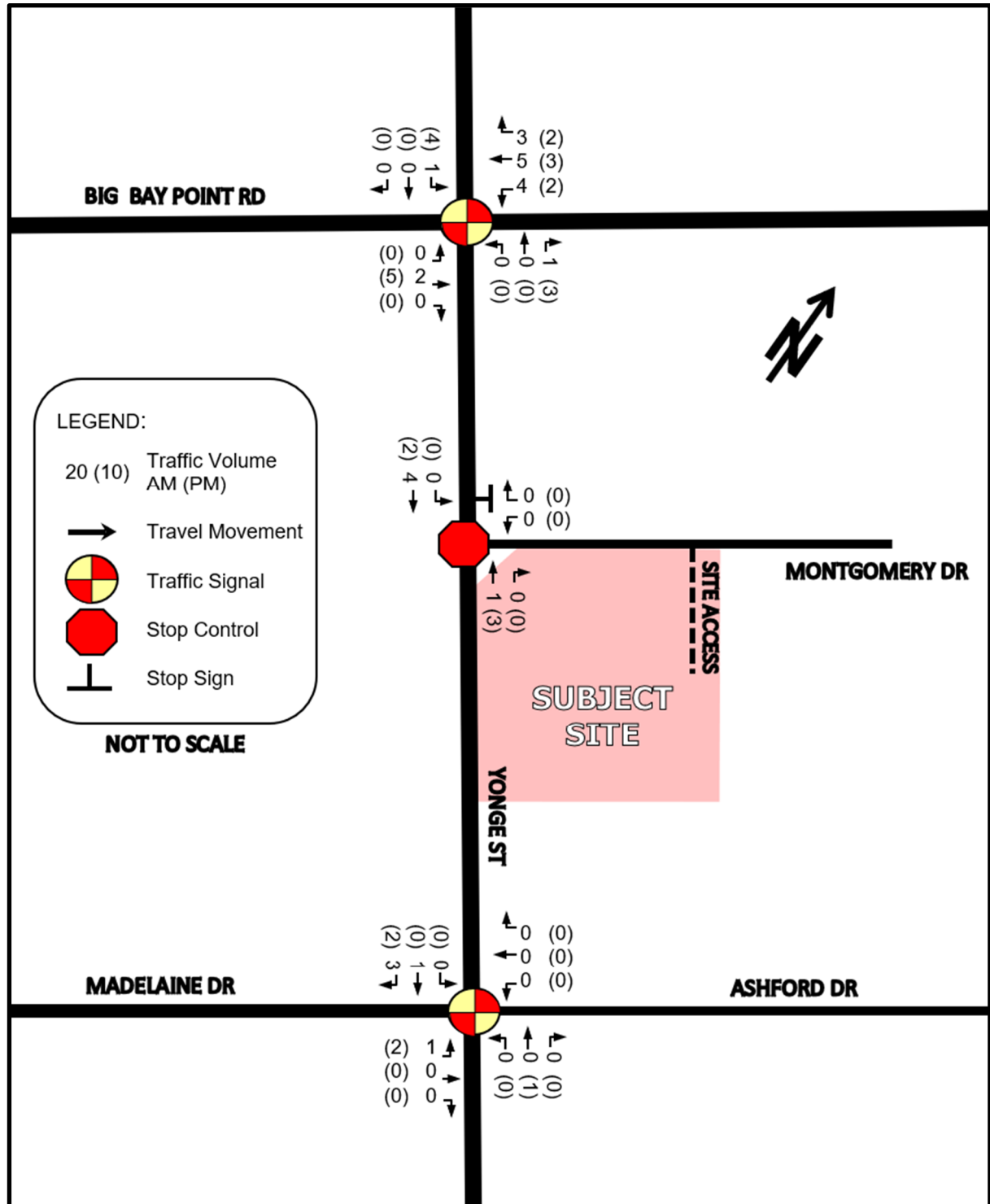
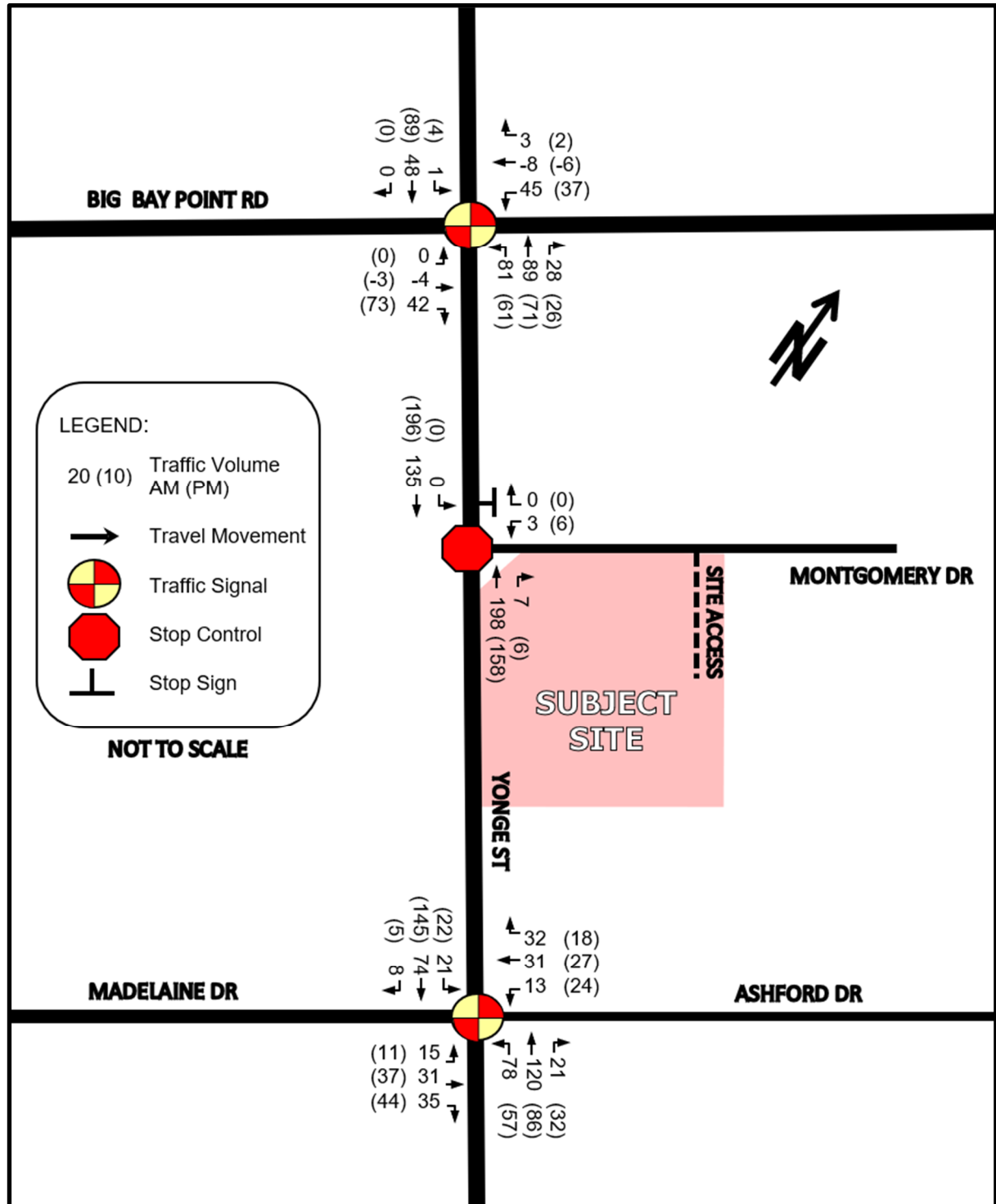


Figure 14 – Total Adjacent Development Traffic Assignment



2.5 Background Traffic Growth

In general, there is a significant amount of anticipated development planned within the annexed lands at the south end of the City, as well as intensification developments along the City's major corridors.

Based on our review of the EMME travel demand model used in the City TMP, a 3.0% and 2.0% per annum background traffic growth rate has been selected for the study area roads for the AM and PM respectively.

2.6 Traffic Counts

Detailed turning movement traffic and pedestrian counts for the Yonge Street / Big Bay Point Road and Yonge Street / Montgomery Drive intersections were commissioned by JD Engineering. Detailed turning movements traffic and pedestrian counts for Yonge Street / Big Bay Point Road intersection were also obtained from the City. Detailed turning movement traffic and pedestrian counts for the Yonge Street / Ashford Drive & Madelaine Drive intersection were obtained from the 681 Yonge ST TIS.

Table 4 summarizes the traffic count data collection information.

Table 4 - Traffic Count Data

Intersection (N-S Street / E-W Street)	Count Date	AM Peak Hour	PM Peak Hour	Source
Ashford Drive & Madelaine Drive / Yonge Street	Thursday, June 28 th 2018	08:00 – 09:00	17:00 – 18:00	681 Yonge TIS
Yonge Street / Big Bay Point Road	Thursday, June 28 th 2018	08:00 – 09:00	16:30 – 17:30	City
	Tuesday, December 7 th 2021	07:45 – 08:45	16:00 – 17:00	JD Eng.*
Yonge Street / Montgomery Drive	Tuesday, December 7 th 2021	07:45 – 08:45	16:00 – 17:00	JD Eng.*

*Traffic counts were completed by Accu-Traffic Inc. on behalf of JD Engineering.

Detailed traffic count data can be found in **Appendix C**. The peak hours of traffic generation for the study area intersections generally aligned with the anticipated peak hour of traffic generation by the proposed development. Although the AM and PM peak period at all study area intersections did not exactly align, for the purpose of this report, we have assumed that the AM and PM peak hours are concurrent.

Heavy vehicle percentages from the traffic count data have also been included in the Synchro analysis.

2.6.1 Calculation of Existing (2022) Traffic Volumes

2.6.1.1 Yonge Street / Big Bay Point Road and Yonge Street / Ashford Drive & Madelaine Drive

The background traffic growth rates discussed in Section 2.5 has been applied to the 2018 traffic counts to estimate the existing (2022) horizon year traffic volumes.

2.6.1.2 Yonge Street / Montgomery Drive

Although the traffic data for the Yonge Street / Montgomery Drive intersection were obtained in 2021, COVID-19 physical distancing requirements were implemented in Ontario at this time; consequently, these traffic counts do not reflect typical traffic conditions. To verify the 2021 counts, a comparison of the 2021 counts and 2018 counts for the Yonge Street / Big Bay Point Road intersection was completed. To determine the equivalent 2021 traffic volumes from the 2018 counts, for accurate comparison to the

2021 counts, the background traffic growth rates noted in Section 2.5 were applied to the 2018 counts. Based on a comparison of the 2021 counts and the equivalent 2021 counts for the Yonge Street / Big Bay Point Road intersection, the traffic volumes at the Yonge Street / Montgomery Drive intersection were conservatively increased by 21% in the AM and 38% in the PM peak hours (based on the impact COVID-19 restrictions had to traffic volumes on Yonge Street).

The background traffic growth rate discussed in Section 2.5 has been applied to the 2021 traffic volumes to estimate the existing (2022) horizon year traffic volumes.

2.6.1.3 Existing (2022) Traffic Volumes

Figure 15 illustrates the existing (2022) AM and PM peak hour traffic volumes within the study area.

2.7 Horizon Year Traffic Volumes

In addition to the adjacent development traffic volumes (outlined in Section 2.4), the background (2024, 2029 and 2034) traffic volumes were estimated for the AM and PM peak hour by applying the background traffic growth rates discussed in Section 2.5 to the existing (2022) traffic volumes.

Figures 16, 17 and 18 illustrate the background (2024, 2029 and 2034) AM and PM peak hour traffic volumes in the study area.

Figure 15 – Existing (2022) Traffic Volumes

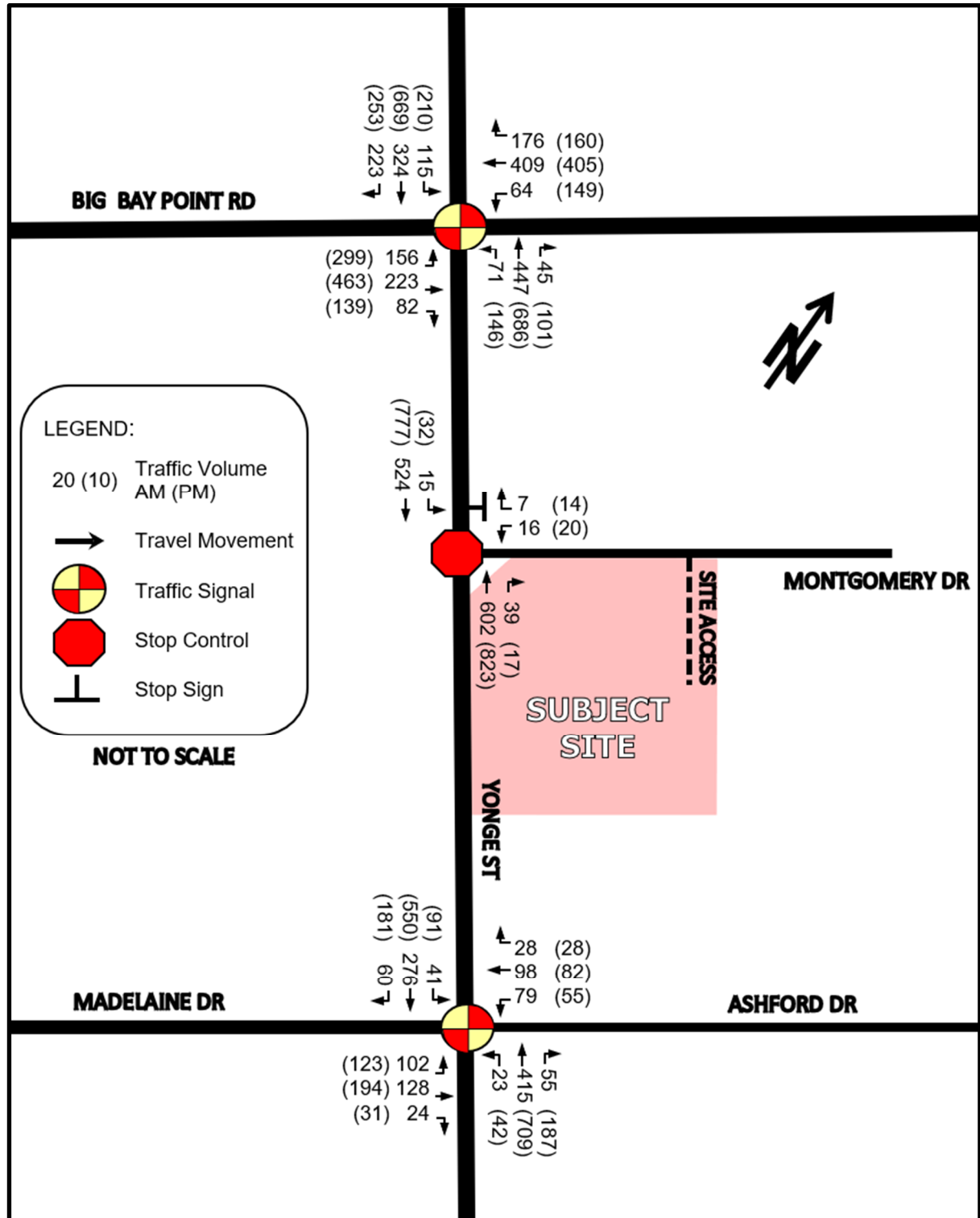


Figure 16 – Background (2024) Traffic Volumes

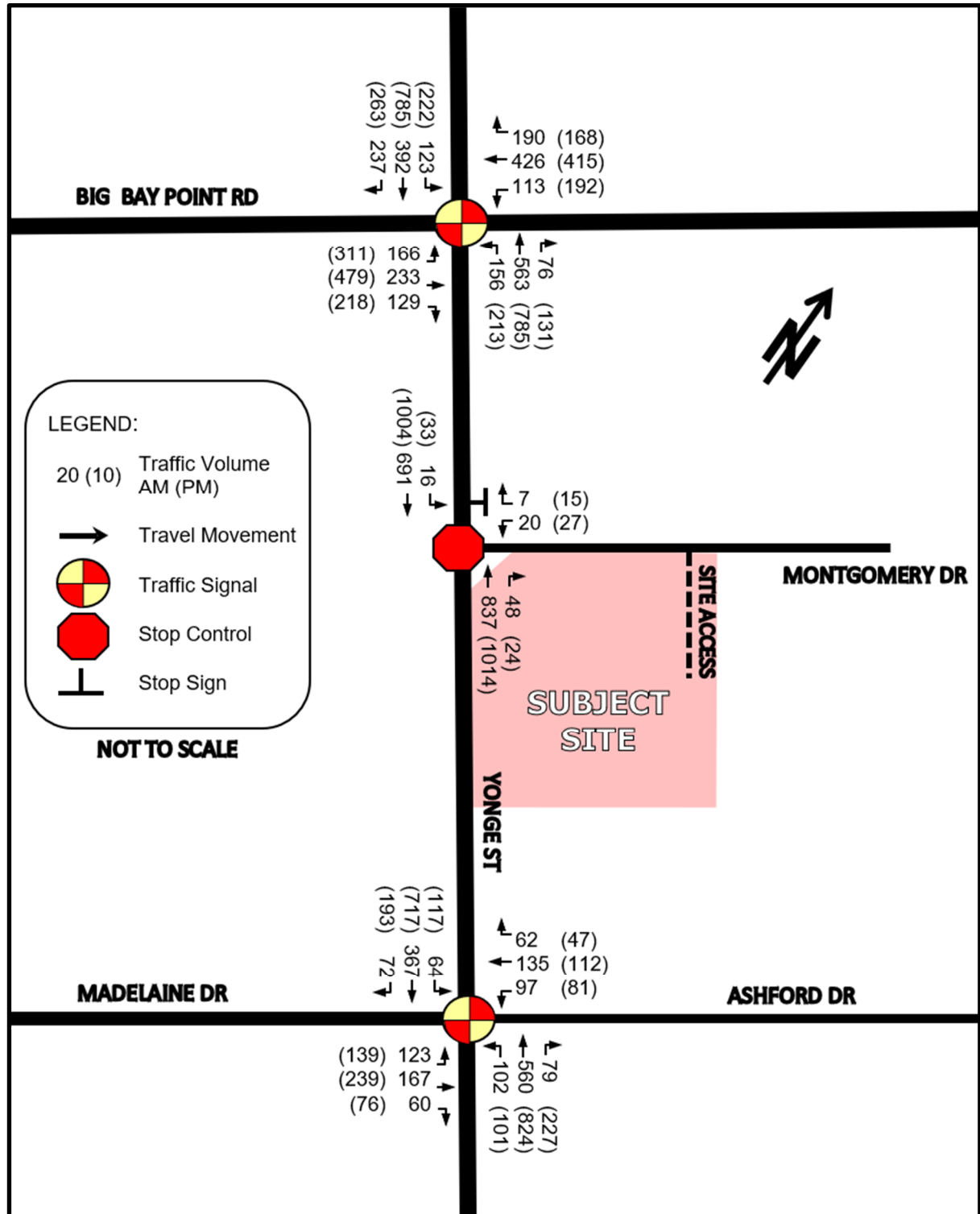


Figure 17 – Background (2029) Traffic Volumes

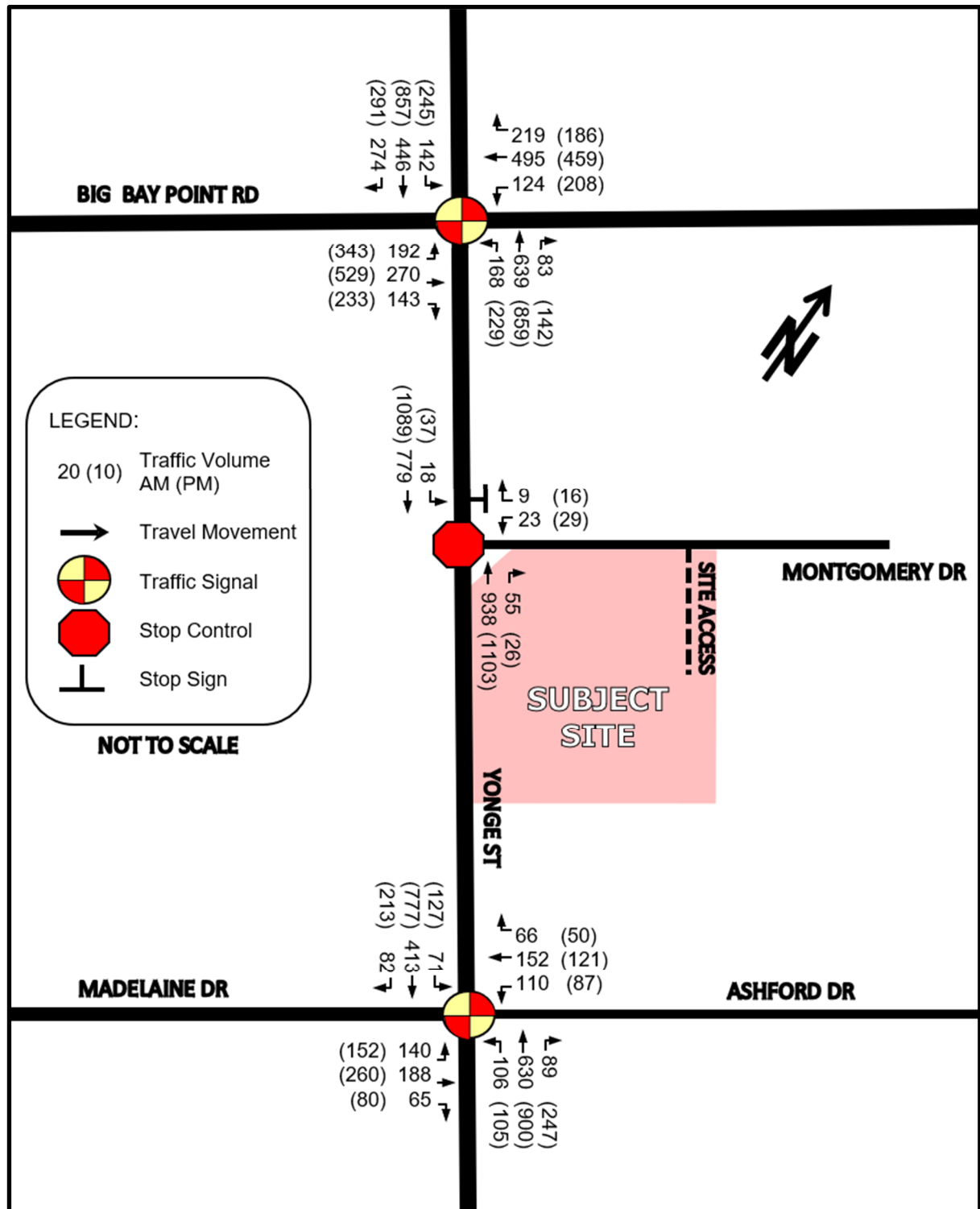
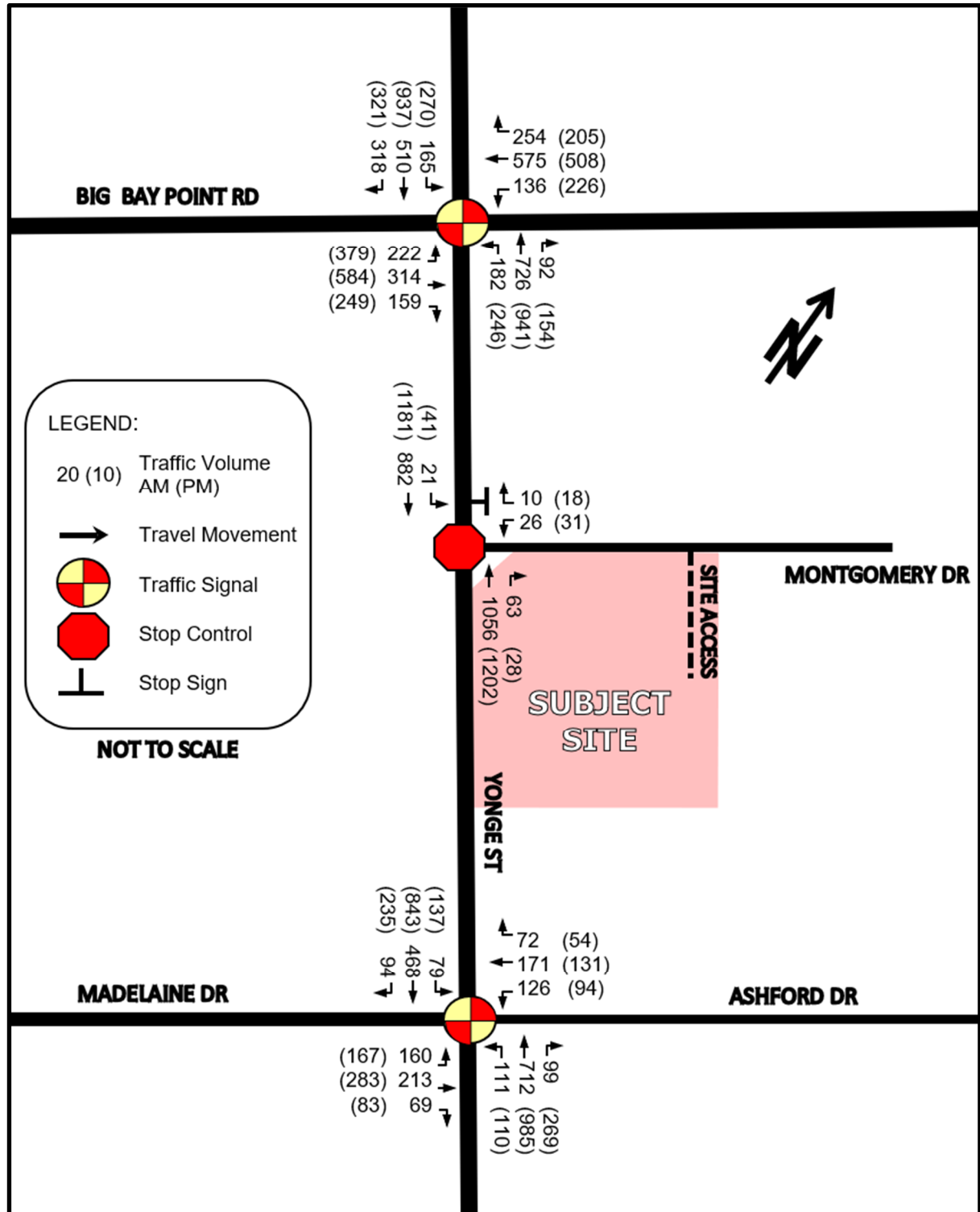


Figure 18 – Background (2034) Traffic Volumes



3 Intersection Operation without Proposed Development

3.1 Intersection Capacity Analysis Criteria

Existing year operational conditions were established to determine how the street network within the study area is currently functioning without the proposed development. This provides a base case scenario to compare with future development scenarios. Traffic operations within the study area were evaluated using the 2022 traffic volumes with the existing road configuration and traffic control. The intersection performance was measured using the traffic analysis software, Synchro 11, a deterministic model that employs Highway Capacity Manual and Intersection Capacity Utilization methodologies for analyzing intersection operations. These procedures are accepted by provincial and municipal agencies throughout North America.

Synchro 11 enables the study area to be graphically defined in terms of streets and intersections, along with their geometric and traffic control characteristics. The user is able to evaluate both signalized and unsignalized intersections in relation to each other, thus not only providing level of service for the individual intersections, but also enabling an assessment of the impact the various intersections in a network have on each other in terms of spacing, traffic congestion, delay, and queuing.

Individual turning movements with a volume-to-capacity [V/C] ratio of 0.85 or greater are considered to be critical movements and have been highlighted in the LOS tables.

The intersection operations were also evaluated in terms of the LOS. LOS is a common measure of the quality of performance at an intersection and is defined in terms of vehicular delay. This delay includes deceleration delay, queue move-up time, stopped delay, and acceleration delay. LOS is expressed on a scale of A through F, where LOS A represents very little delay (i.e., less than 10 seconds per vehicle) and LOS F represents very high delay (i.e., greater than 50 seconds per vehicle for a stop sign controlled intersection and greater than 80 seconds per vehicle for a signalized intersection).

The LOS criteria for signalized and stop sign controlled intersections are shown in **Table 5**. A description of traffic performance characteristics is included for each LOS.

Table 5 – Level of Service Criteria for Intersections

LOS	LOS Description	Control Delay (seconds per vehicle)	
		Signalized Intersections	Stop Controlled Intersections
A	Very low delay; most vehicles do not stop (Excellent)	less than 10.0	less than 10.0
B	Higher delay; more vehicles stop (Very Good)	between 10.0 and 20.0	between 10.0 and 15.0
C	Higher level of congestion; number of vehicles stopping is significant, although many still pass through intersection without stopping (Good)	between 20.0 and 35.0	between 15.0 and 25.0
D	Congestion becomes noticeable; vehicles must sometimes wait through more than one red light; many vehicles stop (Satisfactory)	between 35.0 and 55.0	between 25.0 and 35.0
E	Vehicles must often wait through more than one red light; considered by many agencies to be the limit of acceptable delay	between 55.0 and 80.0	between 35.0 and 50.0
F	This level is considered to be unacceptable to most drivers; occurs when arrival flow rates exceed the capacity of the intersection (Unacceptable)	greater than 80.0	greater than 50.0

3.2 Existing (2022) Intersection Operation

The results of the LOS analysis under existing (2022) traffic volumes during the AM and PM peak hours can be found below in **Table 6**. Existing intersection geometry and traffic control have been utilized for this scenario. Detailed output of the Synchro analysis can be found in **Appendix D**.

Table 6 - Existing (2022) LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Model	Actual				Model	Actual
Yonge Street / Big Bay Point Road (signalized)	0.47	30.0	C	-	-	0.68	33.7	C	-	-
EBL	0.69	39.1	D	50	TWLTL	0.88	52.0	D	87	TWLTL
EBTR	0.45	39.6	D	47	-	0.81	49.4	D	94	-
WBL	0.27	35.1	D	22	TWLTL	0.62	37.8	D	41	TWLTL
WBT	0.75	49.9	D	71	-	0.66	46.1	D	66	-
WBR	0.25	40.7	D	29	25	0.13	39.6	D	20	25
NBL	0.18	17.3	B	20	TWLTL	0.51	23.2	C	38	TWLTL
NBT	0.33	19.7	B	52	-	0.46	24.5	C	85	-
NBR	0.04	16.5	B	-	35	0.07	19.6	B	9	35
SBL	0.27	16.9	B	29	TWLTL	0.51	24.7	C	52	TWLTL
SBT	0.23	17.2	B	38	-	0.43	22.8	C	80	-
SBR	0.20	17.2	B	19	15	0.28	21.3	C	45	15
Yonge Street / Montgomery Drive (unsignalized)	-	0.40	A	-	-	-	0.40	A	-	-
WB	0.06	13.3	B	2	-	0.06	11.7	B	2	-
Yonge Street / Ashford Drive & Madelaine Drive (signalized)	0.30	22.6	C	-	-	0.55	27.3	C	-	-
EBL	0.23	23.2	C	28	30	0.29	24.9	C	34	30
EBT	0.28	30.3	C	44	-	0.41	33.4	C	65	-
EBR	0.02	27.8	C	-	-	0.02	29.3	C	0	-
WBL	0.19	25.3	C	22	75	0.16	27.5	C	18	75
WBTR	0.27	31.5	C	40	-	0.25	33.5	C	36	-
NBL	0.05	16.2	B	7	TWLTL	0.15	16.9	B	10	TWLTL
NBTR	0.34	21.0	C	54	-	0.69	29.5	C	117	-
SBL	0.11	14.8	B	10	TWLTL	0.37	17.6	B	19	TWLTL
SBTR	0.24	18.9	B	37	-	0.52	24.1	C	86	-

The results of the LOS analysis indicate that the V/C ratio for the eastbound left turn movement at the Yonge Street / Big Bay Point Street intersection is operating outside the typical design limits noted in Section 3.2 during the PM peak hour; however, no improvements are recommended as the V/C ratio is marginally outside design limits.

The results of the LOS analysis indicate that all other study area intersections are operating within the typical design limits noted in Section 3.1.

The anticipated 95th percentile queue length for the westbound right turn movement at the Yonge Street / Big Bay Point intersection exceeds the existing storage length; however, no improvements are required as the additional queue can be accommodated within the taper length. The anticipated 95th percentile queue lengths for all through movements at the Yonge Street / Big Bay Point Road intersection exceed the existing storage lengths for the associated right turn movement and the anticipated 95th percentile queue length for the southbound right turn movement exceeds the existing storage length; however, based on a SimTraffic review, this queuing will be experienced for a short period of time at the end of each phase with the queuing anticipated to generally clear after each cycle. Consequently, no improvements are recommended as a result of the anticipated queuing at the intersection.

The anticipated 95th percentile queue length for the eastbound left turn movement at the Yonge Street / Ashford Drive & Madelaine Drive intersection exceeds the existing storage length; however, no improvements are required as the additional queue can be accommodated within the taper length. The anticipated 95th percentile queue lengths for the eastbound through movement at the Yonge Street / Ashford Drive & Madelaine Drive intersection exceed the existing storage lengths for the associated left turn movement; however, based on a SimTraffic review, this queuing will be experienced for a short period of time at the end of each phase with the queuing anticipated to generally clear after each cycle. Consequently, no improvements are recommended as a result of the anticipated queuing at the intersection.

The anticipated 95th percentile queues for all movements at all other study area intersections can be accommodated by the existing auxiliary lane storage lengths and TWLTLs.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at the unsignalized intersection of Yonge Street / Montgomery Drive (results are provided in **Appendix E**).

A review of the need for auxiliary right lanes at the Yonge Street / Montgomery Drive intersection was completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all movements; consequently, an auxiliary turn lane is not recommended.

No infrastructure improvements are recommended within the study area.

3.3 Background (2024) Intersection Operation

The results of the LOS analysis under background (2024) traffic volumes during the AM and PM peak hour can be found below in **Table 7**. Existing intersection geometry and traffic control have been utilized for this scenario with signal timing optimization of the signalized study area intersections in the AM and PM peak hours, while maintaining the existing cycle length. Detailed output of the Synchro analysis can be found in **Appendix F**.

Table 7 – Background (2024) LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Model	Actual				Model	Actual
Yonge Street / Big Bay Point Road (signalized)	0.56	30.1	C	-	-	0.77	37.7	D	-	-
EBL	0.55	25.7	C	43	TWLTL	0.76	34.1	C	79	TWLTL
EBTR	0.46	34.0	C	45	-	0.82	46.1	D	101	-
WBL	0.39	29.0	C	31	TWLTL	0.77	46.0	D	63	TWLTL
WBT	0.74	43.7	D	71	-	0.72	48.0	D	73	-
WBR	0.19	35.0	C	23	25	0.11	39.3	D	16	25
NBL	0.47	22.9	C	48	TWLTL	0.75	39.0	D	71	TWLTL
NBT	0.50	25.4	C	83	-	0.66	33.6	C	116	-
NBR	0.06	20.0	B	-	35	0.09	24.9	C	11	35
SBL	0.40	26.3	C	41	TWLTL	0.60	34.1	C	66	TWLTL
SBT	0.39	26.5	C	61	-	0.66	33.6	C	116	-
SBR	0.34	26.7	C	49	15	0.33	28.6	C	51	15
Yonge Street / Montgomery Drive (unsignalized)	-	0.40	A	-	-	-	0.40	A	-	-
WB	0.10	16.3	C	3	-	0.09	13.1	B	2	-
Yonge Street / Ashford Drive & Madelaine Drive (signalized)	0.44	25.4	C	-	-	0.65	28.3	C	-	-
EBL	0.36	27.5	C	35	30	0.42	32.6	C	45	30
EBT	0.39	36.1	D	56	-	0.61	44.6	D	91	-
EBR	0.04	32.3	C	4	-	0.05	36.6	D	10	-
WBL	0.27	31.7	C	29	75	0.32	34.8	C	28	75
WBTR	0.50	40.1	D	66	-	0.44	42.6	D	58	-
NBL	0.23	14.5	B	21	TWLTL	0.38	16.0	B	19	TWLTL
NBTR	0.43	21.8	C	74	-	0.69	26.8	C	135	-
SBL	0.19	15.7	B	14	TWLTL	0.52	18.8	B	22	TWLTL
SBTR	0.31	20.9	C	48	-	0.59	24.0	C	108	-

The results of the LOS analysis indicate that all study area intersections are operating within the typical design limits noted in Section 3.1.

The anticipated 95th percentile queue lengths for all through movements at the Yonge Street / Big Bay Point Road intersection exceed the existing storage lengths for the associated right turn movement and the anticipated 95th percentile queue length for the southbound right turn movement exceeds the existing storage length; however, based on a SimTraffic review, this queuing will be experienced for a short period of time at the end of each phase. Consequently, no improvements are recommended as a result of the anticipated queuing at the intersection.

The anticipated 95th percentile queue length for the eastbound left turn movement at the Yonge Street / Ashford Drive & Madelaine Drive intersection exceeds the existing storage length; however, no improvements are required as the additional queue can be accommodated within the taper length. The anticipated 95th percentile queue lengths for the eastbound through movement at the Yonge Street / Ashford Drive & Madelaine Drive intersection exceed the existing storage lengths for the associated left turn movement; however, based on a SimTraffic review, this queuing will be experienced for a short period of time at the end of each phase with the queuing anticipated to generally clear after each cycle. Consequently, no improvements are recommended as a result of the anticipated queuing at the intersection.

The anticipated 95th percentile queues for all movements at all other study area intersections can be accommodated by the existing auxiliary lane storage lengths and TWLTLs.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at the unsignalized intersection of Yonge Street / Montgomery Drive (results are provided in **Appendix E**).

A review of the need for auxiliary right lanes at the Yonge Street / Montgomery Drive intersection was completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all movements; consequently, an auxiliary turn lane is not recommended.

No infrastructure improvements are recommended within the study area.

3.4 Background (2029) Intersection Operation

The results of the LOS analysis under background (2029) traffic volumes during the AM and PM peak hour can be found below in **Table 8**. Existing intersection geometry and traffic control have been utilized for this scenario with the signal timing optimization noted in Section 3.3. Detailed output of the Synchro analysis can be found in **Appendix F**.

Table 8 – Background (2029) LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Model	Actual				Model	Actual
Yonge Street / Big Bay Point Road (signalized)	0.65	33.0	C	-	-	0.83	41.9	D	-	-
EBL	0.65	28.5	C	50	TWLT	0.83	39.6	D	93	TWLT
EBTR	0.50	34.0	C	54	-	0.86	49.2	D	113	-
WBL	0.42	29.2	C	33	TWLT	0.82	52.8	D	75	TWLT
WBT	0.79	46.0	D	83	-	0.78	52.0	D	88	-
WBR	0.28	36.0	D	32	25	0.12	40.3	D	21	25
NBL	0.56	26.9	C	53	TWLT	0.80	45.0	D	79	TWLT
NBT	0.59	29.5	C	98	-	0.74	38.0	D	130	-
NBR	0.07	22.1	C	-	35	0.09	26.6	C	13	35
SBL	0.50	31.3	C	48	TWLT	0.71	41.3	D	75	TWLT
SBT	0.47	30.3	C	70	-	0.74	38.0	D	130	-
SBR	0.43	31.2	C	62	15	0.39	31.5	C	60	15
Yonge Street / Montgomery Drive (unsignalized)	-	0.40	A	-	-	-	0.40	A	-	-
WB	0.13	17.9	C	3	-	0.10	13.5	B	2	-
Yonge Street / Ashford Drive & Madelaine Drive (signalized)	0.48	26.2	C	-	-	0.72	30.1	C	-	-
EBL	0.42	27.9	C	40	30	0.49	34.6	C	48	30
EBT	0.44	36.5	D	62	-	0.73	51.1	D	105	-
EBR	0.04	32.2	C	6	-	0.06	38.2	D	11	-
WBL	0.32	32.2	C	32	75	0.37	34.5	C	30	75
WBTR	0.56	41.5	D	73	-	0.49	43.5	D	62	-
NBL	0.26	14.9	B	22	TWLT	0.43	16.7	B	20	TWLT
NBTR	0.47	22.6	C	83	-	0.75	28.2	C	154	-
SBL	0.22	16.2	B	16	TWLT	0.63	23.9	C	27	TWLT
SBTR	0.35	21.6	C	56	-	0.64	24.8	C	122	-

The results of the LOS analysis indicate that the V/C ratio for the eastbound through movement at the Yonge Street / Big Bay Point Street intersection is operating outside the typical design limits noted in Section 3.2 during the PM peak hour; however, no improvements are recommended as the V/C ratio is marginally outside design limits.

The results of the LOS analysis indicate that all other study area intersections are operating within the typical design limits noted in Section 3.1.

The anticipated 95th percentile queue length for the westbound right turn movement at the Yonge Street / Big Bay Point intersection exceeds the existing storage length; however, no improvements are required as the additional queue can be accommodated within the taper length. The anticipated 95th percentile queue lengths for all through movements at the Yonge Street / Big Bay Point Road intersection exceed the existing storage lengths for the associated right turn movement and the anticipated 95th percentile queue length for the southbound right turn movement exceeds the existing storage length. It is recommended that the City prioritize transit and active transportation infrastructure along the Yonge Street and Big Bay Point Road corridors in order to reduce the anticipated queuing and congestion along these corridors.

The anticipated 95th percentile queue length for the eastbound left turn movement at the Yonge Street / Ashford Drive & Madelaine Drive intersection exceeds the existing storage length; however, no

improvements are required as the additional queue can be accommodated within the taper length. The anticipated 95th percentile queue lengths for the eastbound through movement at the Yonge Street / Ashford Drive & Madelaine Drive intersection exceed the existing storage lengths for the associated left turn movement; however, based on a SimTraffic review, this queuing will be experienced for a short period of time at the end of each phase with the queuing anticipated to generally clear after each cycle. Consequently, no improvements are recommended as a result of the anticipated queuing at the intersection.

The anticipated 95th percentile queues for all movements at all other study area intersections can be accommodated by the existing auxiliary lane storage lengths and TWLTLs.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at the unsignalized intersection of Yonge Street / Montgomery Drive (results are provided in **Appendix E**).

A review of the need for auxiliary right lanes at the Yonge Street / Montgomery Drive intersection was completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all movements; consequently, an auxiliary turn lane is not recommended.

No infrastructure improvements are recommended within the study area.

3.5 Background (2034) Intersection Operation

The results of the LOS analysis under background (2034) traffic volumes during the AM and PM peak hour can be found below in **Table 9**. Existing intersection geometry and traffic control have been utilized for this scenario with the signal timing optimization noted in Section 3.3. Detailed output of the Synchro analysis can be found in **Appendix F**.

Table 9 – Background (2034) LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Model	Actual				Model	Actual
Yonge Street / Big Bay Point Road (signalized)	0.76	37.4	D	-	-	0.92	49.2	D	-	-
EBL	0.78	36.4	D	68	TWLTL	0.91	53.9	D	125	TWLTL
EBTR	0.54	34.6	C	64	-	0.90	53.9	D	134	-
WBL	0.48	29.7	C	36	TWLTL	0.89	65.0	E	87	TWLTL
WBT	0.85	50.4	D	98	-	0.87	60.4	E	103	-
WBR	0.40	37.4	D	45	25	0.20	42.1	D	28	25
NBL	0.68	34.2	C	56	TWLTL	0.86	54.0	D	89	TWLTL
NBT	0.70	34.9	C	115	-	0.84	44.0	D	146	-
NBR	0.07	24.3	C	3	35	0.11	28.2	C	16	35
SBL	0.63	38.9	D	55	TWLTL	0.87	61.0	E	100	TWLTL
SBT	0.57	34.7	C	81	-	0.83	43.9	D	145	-
SBR	0.55	37.1	D	79	15	0.46	34.5	C	70	15
Yonge Street / Montgomery Drive (unsignalized)	-	0.50	A	-	-	-	0.40	A	-	-
WB	0.16	20.3	C	5	-	0.11	14.0	B	3	-
Yonge Street / Ashford Drive & Madelaine Drive (signalized)	0.56	27.5	C	-	-	0.79	33.0	C	-	-
EBL	0.50	28.6	C	45	30	0.55	36.0	D	53	30
EBT	0.48	37.0	D	70	-	0.79	55.8	E	119	-
EBR	0.05	32.0	C	6	-	0.06	38.3	D	12	-
WBL	0.38	32.8	C	36	75	0.43	35.2	D	32	75
WBTR	0.62	43.4	D	82	-	0.53	44.5	D	67	-
NBL	0.30	15.5	B	24	TWLTL	0.50	18.6	B	21	TWLTL
NBTR	0.56	24.6	C	104	-	0.83	31.6	C	178	-
SBL	0.29	17.3	B	18	TWLTL	0.78	39.3	D	51	TWLTL
SBTR	0.40	22.8	C	67	-	0.69	26.3	C	138	-

The results of the LOS analysis indicate that the V/C ratio for the Yonge Street / Big Bay Point Street intersection is operating outside the typical design limits noted in Section 3.2 during the PM peak hour; however, no improvements are recommended as the intersection is operating within theoretical capacity and due to the inherent uncertainties associated with long range traffic projections. It is recommended that the City monitor this section closer to the horizon year.

The results of the LOS analysis indicate that all other study area intersections are operating within the typical design limits noted in Section 3.1.

The anticipated 95th percentile queue lengths for all through movements at the Yonge Street / Big Bay Point Road intersection exceed the existing storage lengths for the associated right turn movement and the anticipated 95th percentile queue length for the westbound and southbound right turn movement exceeds the existing storage length. As noted in Section 3.4, it is recommended that the City prioritize transit and active transportation infrastructure along the Yonge Street and Big Bay Point Road corridors in order to reduce the anticipated queuing and congestion along these corridors.

The anticipated 95th percentile queue lengths for the eastbound movements at the Yonge Street / Ashford Drive & Madelaine Drive intersection exceed the existing storage length for the associated left turn movement; however, based on a SimTraffic review, this queuing will be experienced for a short period of time at the end of each phase with the queuing anticipated to generally clear after each cycle.

Consequently, no improvements are recommended as a result of the anticipated queuing at the intersection.

The anticipated 95th percentile queues for all movements at all other study area intersections can be accommodated by the existing auxiliary lane storage lengths and TWLTLs.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at the unsignalized intersection of Yonge Street / Montgomery Drive (results are provided in **Appendix E**).

A review of the need for auxiliary right lanes at the Yonge Street / Montgomery Drive intersection was completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all movements; consequently, an auxiliary turn lane is not recommended.

No infrastructure improvements are recommended within the study area.

4 Proposed Development Traffic Generation and Assignment

4.1 Traffic Generation

The traffic generation for the proposed development has been based on the ITE Trip Generation Manual. The following ITE land uses have been applied to estimate the traffic from the proposed development:

- ITE land use 221 (Multifamily Housing (Mid-Rise)) – General Urban/Suburban Setting;
- ITE land use 821 (Shopping Plaza (40-140K)) – General Urban / Suburban Setting; and
- ITE land use 822 (Strip Retail Plaza (<40K)) – General Urban / Suburban Setting.

The proposed development commercial space is less than 40,000 sq.ft.; consequently, ITE land use 822 is more applicable for the commercial space of the proposed development. However, ITE land use 821 has been used for the AM peak hour as the sample size for ITE land use 822 is small for the AM peak hour.

The AM and PM peak hour traffic generation for the proposed development do not exactly align with the AM and PM peak hour in the traffic counts; consequently, we have applied the peak hour of adjacent street traffic values provided in the ITE Trip Generation Manual. The estimated trip generation of the proposed development is illustrated below in **Table 10**.

Table 10 – Estimated Traffic Generation of Proposed Development

Land Use	Size	AM Peak Hour			PM Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Shopping Plaza (40-140K) ITE land use 821	8,267sq.ft.	9	6	15	-	-	-
Strip Retail Plaza (<40K) ITE land use 822		-	-	-	35	34	69
TOTAL COMMERCIAL		9	6	15	35	34	69
Multifamily Housing (Mid-Rise) ITE Land Use: 221	227 units	20	68	88	54	35	89
TOTAL TRIP GENERATION		29	74	103	89	69	158
INTERNAL CAPTURE		-1	-1	-2	-13	-13	-26
NET SITE GENERATION		28	73	101	76	56	132
PASS-BY TRIPS (ITE Land Use: 820)*		0	0	0	-7	-7	-14
PRIMARY TRIPS		28	73	101	69	49	118

* Commercial pass-by trips for the AM and PM peak hour are 0% and 26% respectively, according to the ITE data for ITE land use 820. The pass-by rate from ITE land use 820 was used as the data set is larger.

No transportation modal split has been applied to the above-noted traffic generation calculation.

4.2 Traffic Assignment

For the purposes of this study, it has been assumed that all traffic generated by the proposed development will be new traffic and would not be in the study area if the development was not constructed.

The ITE data provides the anticipated percentage of new traffic entering and exiting during the peak hour.

The distribution of the residential component of the proposed development traffic has been calculated based on the 2016 Transportation Tomorrow Survey [TTS] data for traffic zone 8529 retrieved using the TTS Internet Data Retrieval System [IDRS] (output attached as **Appendix I**). TTS data provides historical origin and destination work trip percentages for specific areas within the County and the Greater Toronto and Hamilton Area [GTHA].

Traffic distribution for the trips generated by the residential component of the subject site during the AM and PM peak hour is expected to generally follow commuter travel patterns. Our analysis is based on egress traffic during the AM peak hour. Logically, the distribution of ingress traffic will follow the inverse of the exiting traffic distribution. For each of the individual areas identified in the TTS data, we have selected the probable route of travel, assuming that people will select their route primarily based on travel time.

The distribution of traffic for the residential component of the proposed development is illustrated in **Table 11** using the methodology outlined above.

Table 11 – Proposed Development Traffic Distribution - Residential

Travel Direction (to / from)	Percentage of Total Traffic Generation
North via Yonge Street	26%
West via Big Bay Point Road	17%
East via Big Bay Point Road	2%
West via Madelaine Drive	35%
South via Yonge Street	20%
TOTAL	100%

The distribution of traffic for the commercial component of the proposed development is based on the distribution of the existing traffic volumes within the study area. **Table 12** illustrates the calculation of the distribution of ingress and egress traffic for the commercial component of the proposed development.

Table 12 – Proposed Development Traffic Distribution – Commercial

Travel Direction (to / from)	AM Peak Hour		PM Peak Hour	
	Ingress	Egress	Ingress	Egress
North via Yonge Street	24%	29%	27%	28%
West via Big Bay Point Road	17%	26%	21%	19%
East via Big Bay Point Road	24%	14%	17%	19%
West via Madelaine Drive	9%	7%	8%	7%
South via Yonge Street	18%	14%	22%	15%
East via Ashford Drive	7%	8%	4%	11%
East via Montgomery Drive	1%	2%	1%	1%
TOTAL	100%	100%	100%	100%

Using the traffic distributions pattern noted above, the residential, commercial primary and commercial pass-by traffic assignment for the proposed development was calculated for the AM and PM peak hour and is illustrated in **Figures 19, 20 and 21**. The total traffic assignment of the proposed development is illustrated in **Figure 22**.

4.3 Total Horizon Year Traffic Volumes with the Proposed Development

For the total (2024, 2029 and 2034) horizon years traffic volumes, the proposed development traffic was added to the background (2024, 2029 and 2034) traffic volumes. The resulting total (2024, 2029 and 2034) horizon year traffic volumes for the AM and PM peak hour is illustrated in **Figure 23, 24 and 25**.

Figure 19 – Proposed Development Traffic Assignment – Residential

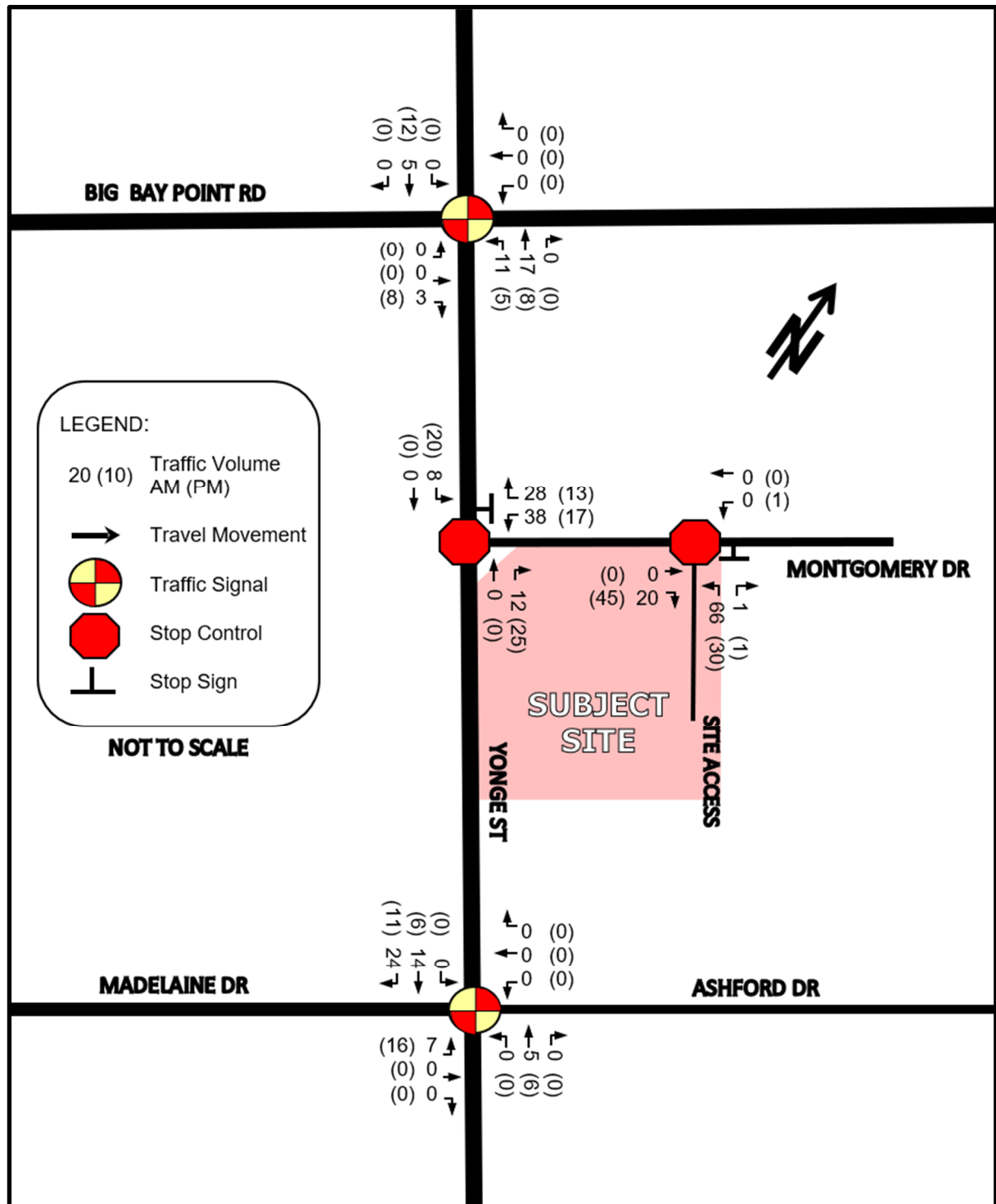


Figure 20 – Proposed Development Traffic Assignment – Commercial Primary

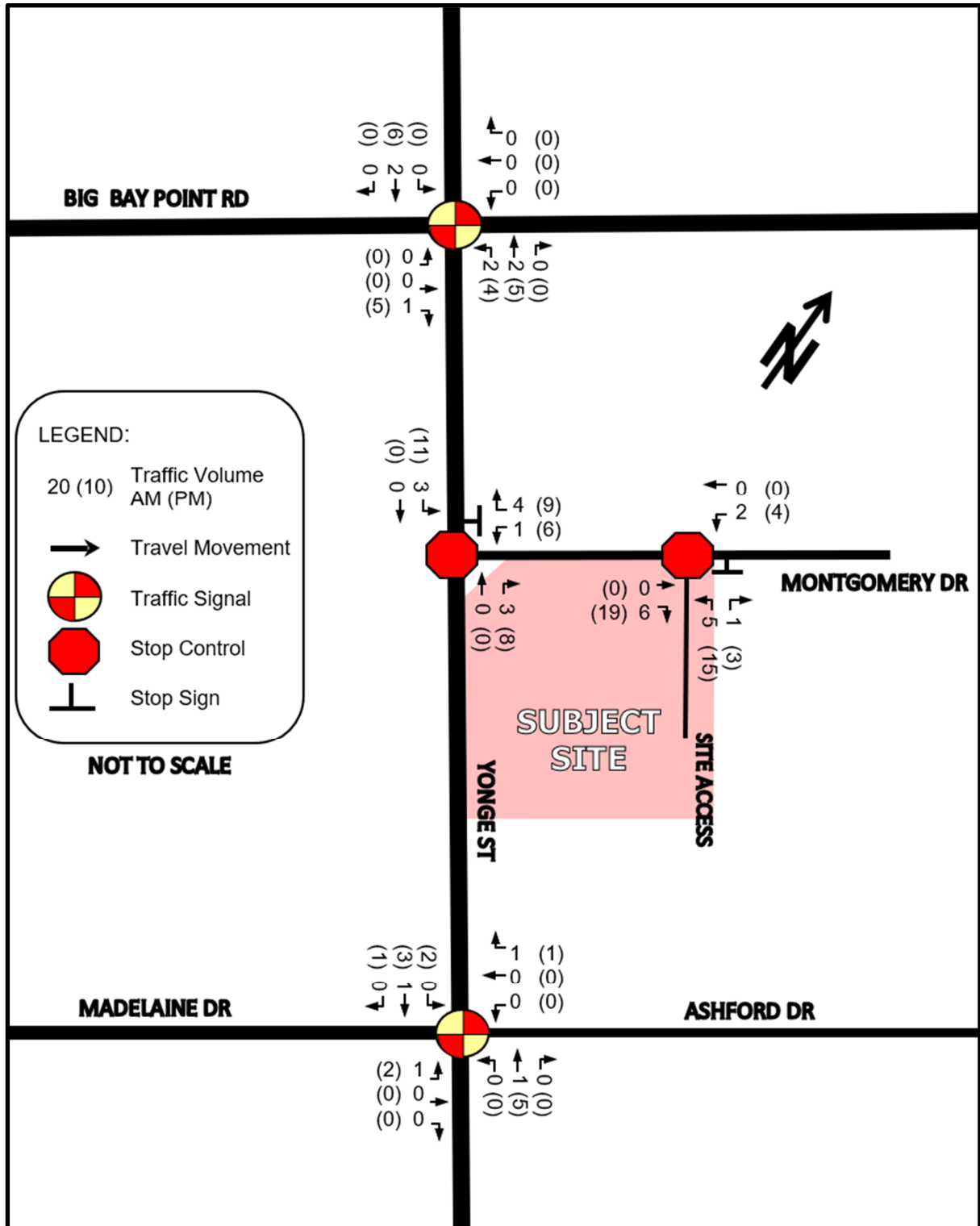


Figure 21 – Proposed Development Traffic Assignment – Commercial Pass-by

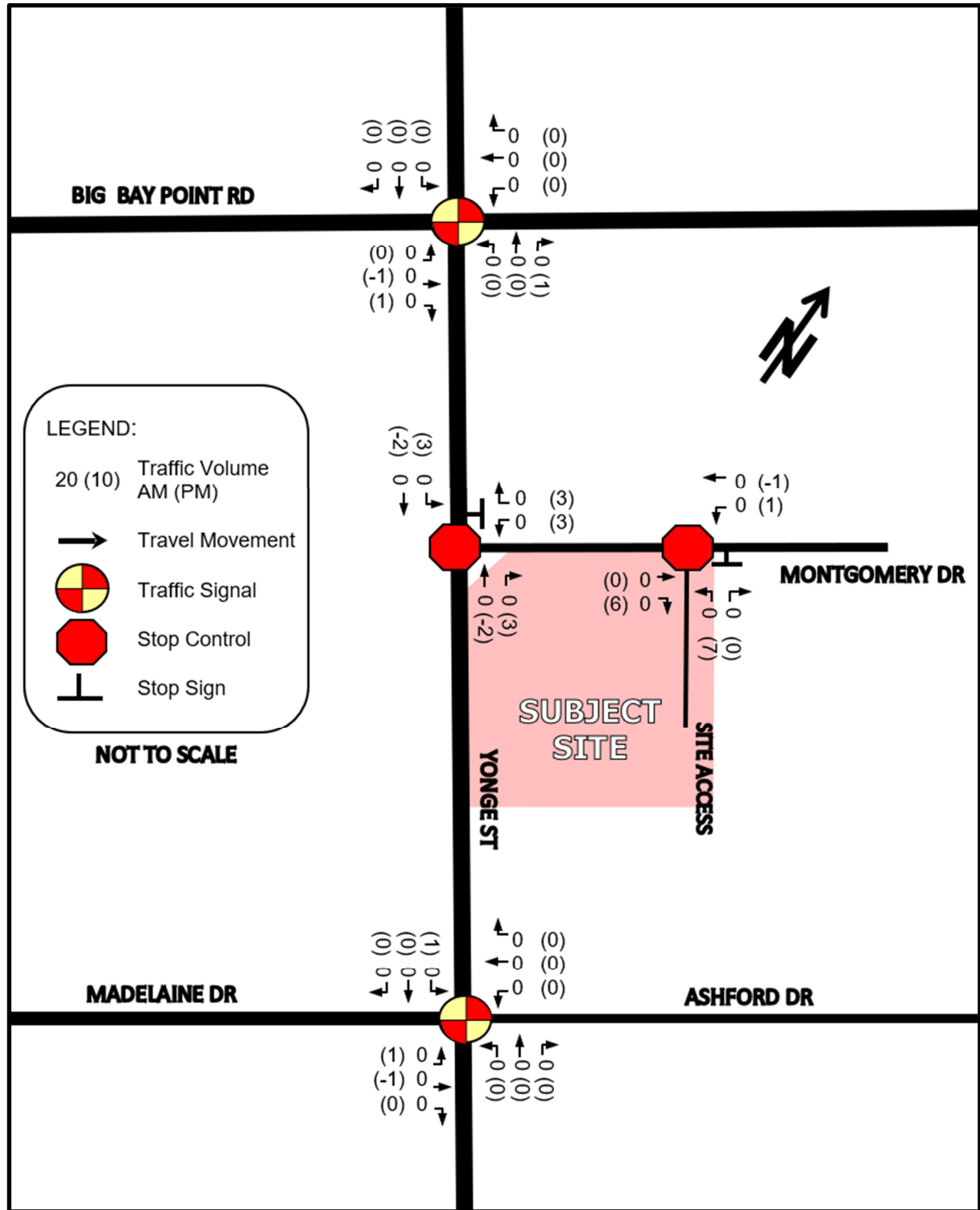


Figure 22 – Proposed Development Traffic Assignment – Total

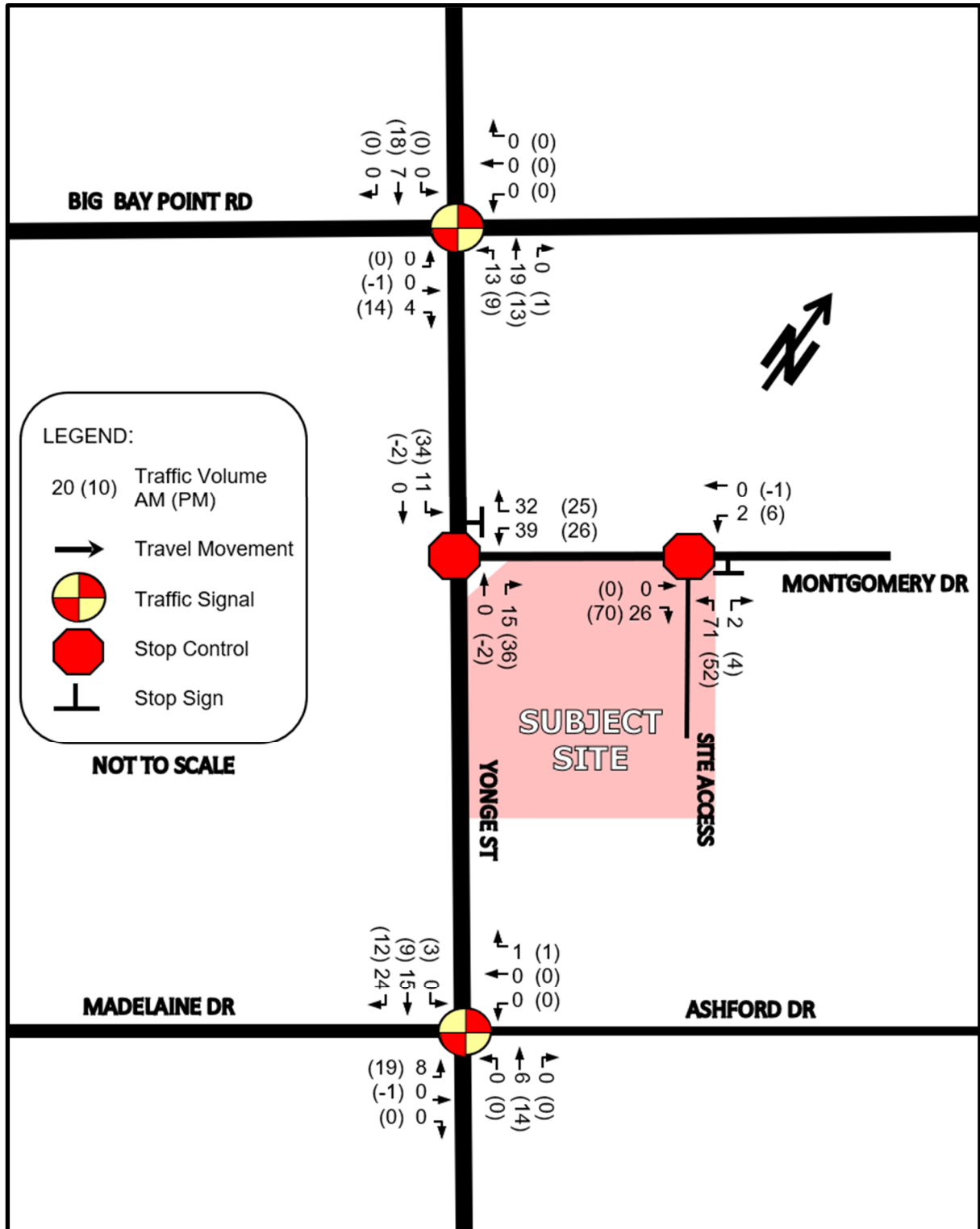


Figure 23 – Total (2024) Traffic Volumes

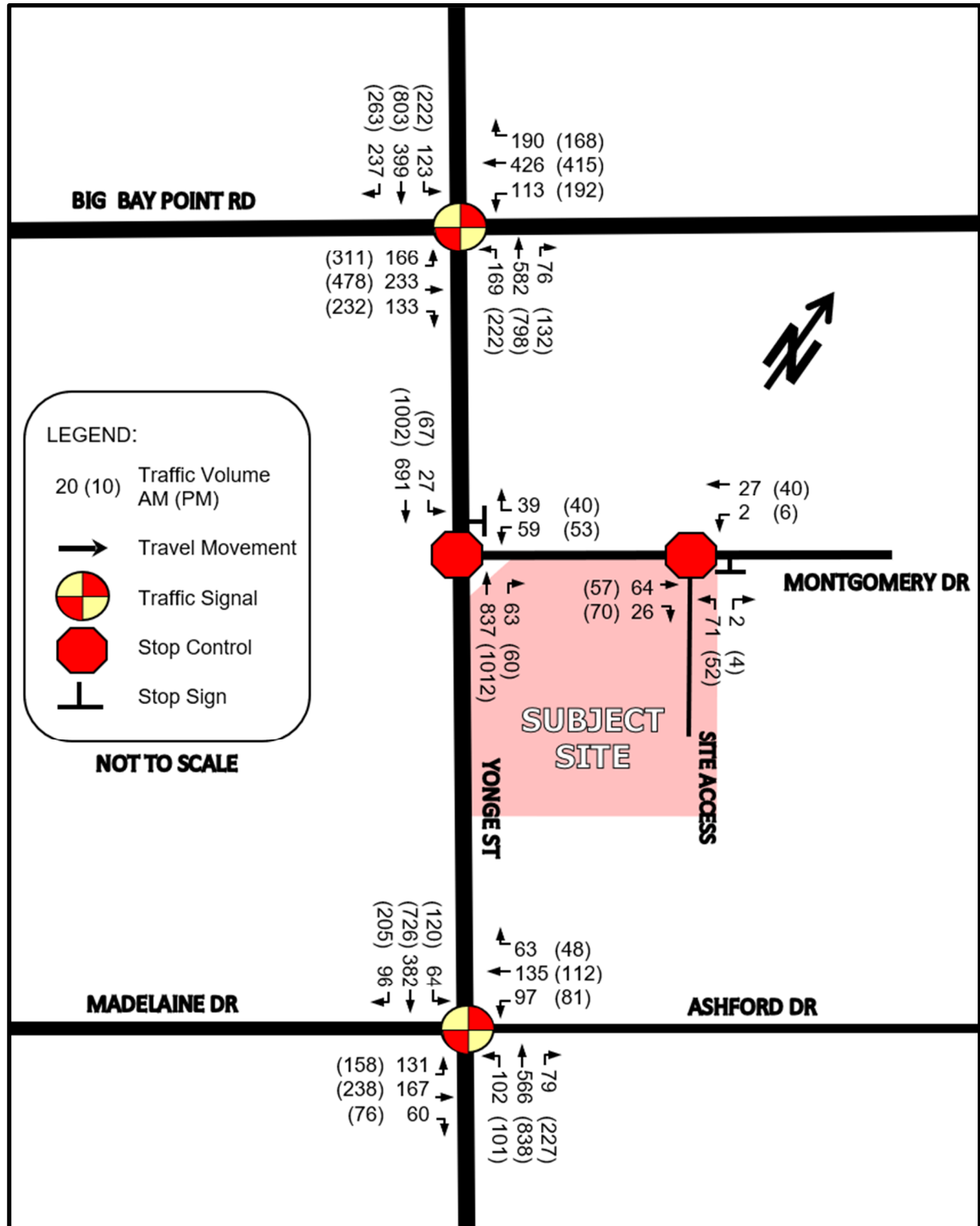


Figure 24 – Total (2029) Traffic Volumes

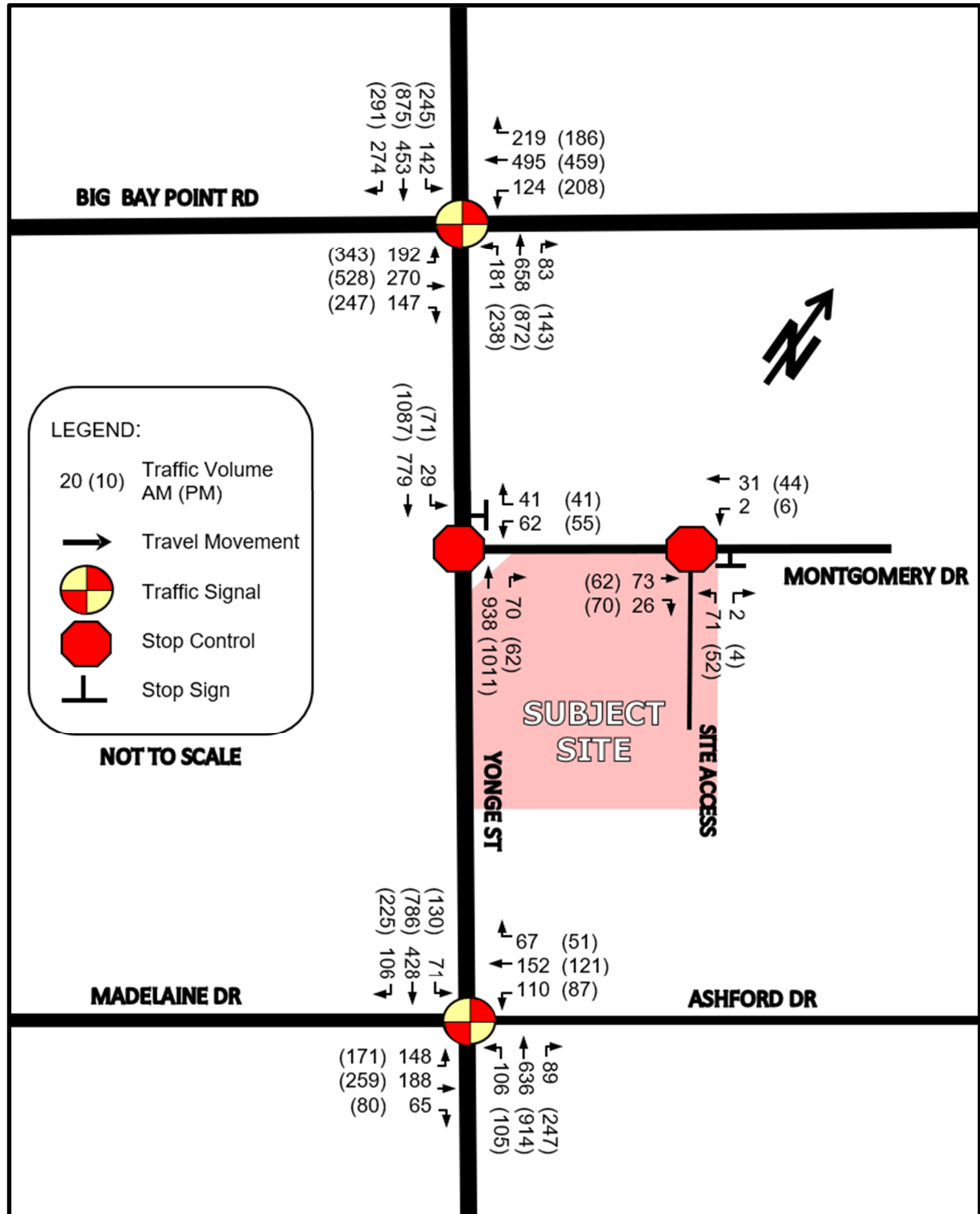
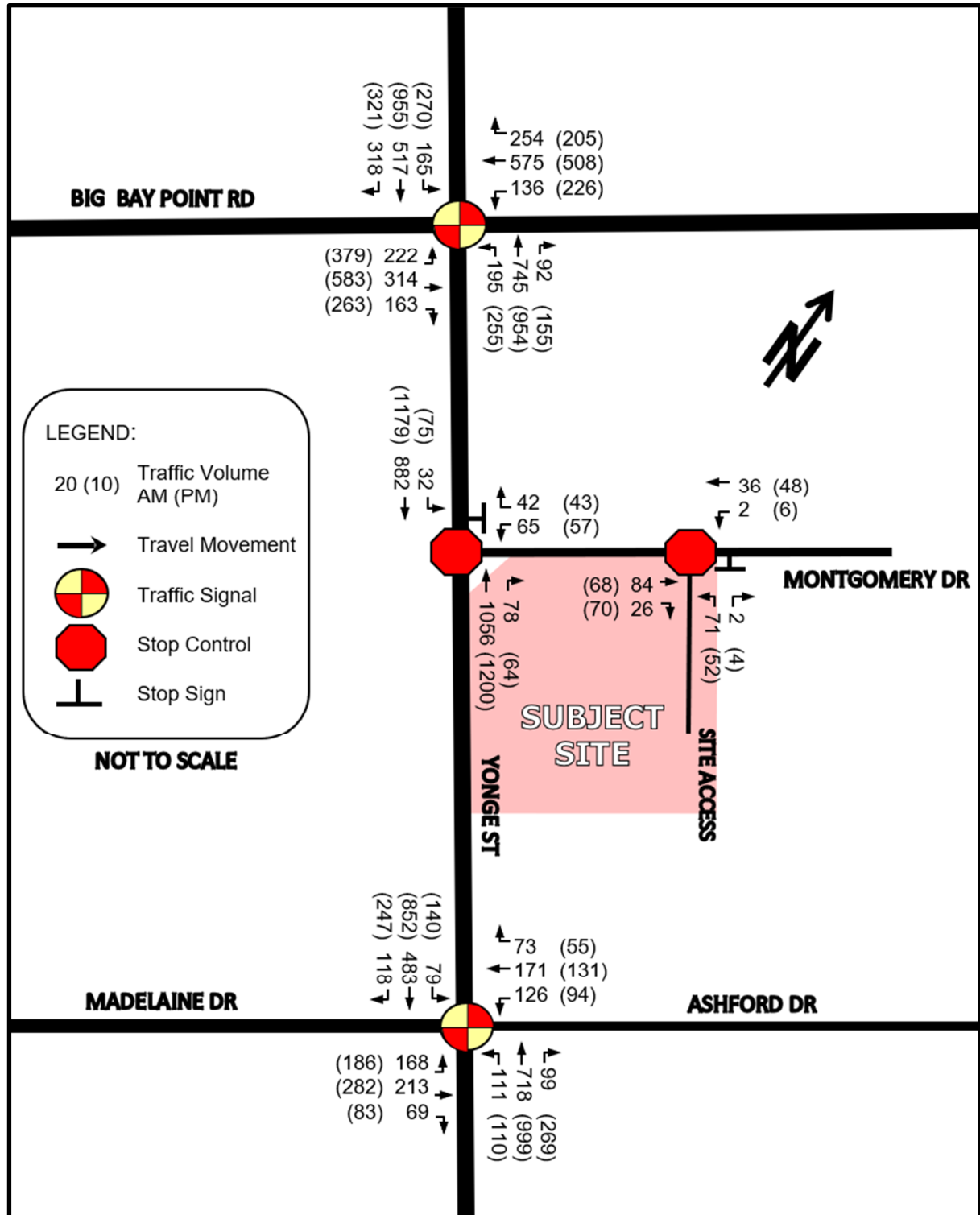


Figure 25 – Total (2034) Traffic Volumes



5 Intersection Operation with Proposed Development

5.1 Total (2024) Intersection Operation

The results of the LOS analysis under the total (2024) traffic volumes during the AM and PM peak hour can be found below in **Table 13**. Existing intersection geometry and traffic control have been utilized for this scenario with the signal timing optimization noted in Section 3.3. Detailed output of the Synchro analysis can be found in **Appendix G**.

Table 13 – Total (2024) LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Model	Actual				Model	Actual
Yonge Street / Big Bay Point Road (signalized)	0.57	30.4	C	-	-	0.78	38.2	D	-	-
EBL	0.56	25.9	C	43	TWLTL	0.76	34.2	C	79	TWLTL
EBTR	0.46	34.2	C	45	-	0.82	46.6	D	103	-
WBL	0.39	29.2	C	31	TWLTL	0.76	45.9	D	65	TWLTL
WBT	0.74	43.9	D	71	-	0.72	47.9	D	73	-
WBR	0.19	35.1	D	23	25	0.11	39.4	D	16	25
NBL	0.51	23.7	C	52	TWLTL	0.77	41.4	D	75	TWLTL
NBT	0.52	26.0	C	87	-	0.67	34.3	C	119	-
NBR	0.06	20.2	C	-	35	0.09	25.1	C	11	35
SBL	0.40	26.8	C	41	TWLTL	0.61	34.3	C	66	TWLTL
SBT	0.40	27.1	C	62	-	0.68	34.4	C	120	-
SBR	0.34	27.1	C	49	15	0.33	28.8	C	51	15
Yonge Street / Montgomery Drive (unsignalized)	-	1.3	A	-	-	-	0.9	A	-	-
WB	0.33	19.3	C	11	-	0.20	14.1	B	6	-
Yonge Street / Ashford Drive & Madeline Drive (signalized)	0.44	25.5	C	-	-	0.66	28.6	C	-	-
EBL	0.38	27.6	C	37	30	0.48	33.1	C	50	30
EBT	0.39	36.0	D	56	-	0.61	44.5	D	90	-
EBR	0.04	32.3	C	4	-	0.05	36.6	D	10	-
WBL	0.27	31.7	C	29	75	0.32	34.8	C	28	75
WBTR	0.50	40.2	D	66	-	0.45	42.7	D	58	-
NBL	0.25	14.6	B	21	TWLTL	0.39	16.3	B	19	TWLTL
NBTR	0.44	21.9	C	75	-	0.70	27.1	C	137	-
SBL	0.19	15.8	B	14	TWLTL	0.54	19.7	B	22	TWLTL
SBTR	0.34	21.3	C	52	-	0.60	24.3	C	112	-
Site Access / Montgomery Drive (unsignalized)	-	3.7	A	-	-	-	2.6	A	-	-
NB	0.09	9.5	A	2	-	0.07	9.6	A	2	-

The results of the LOS analysis indicate that all study area intersections are operating within the typical design limits noted in Section 3.1.

The anticipated 95th percentile queue lengths for all through movements at the Yonge Street / Big Bay Point Road intersection exceed the existing storage lengths for the associated right turn movement and

the anticipated 95th percentile queue length for the southbound right turn movement exceeds the existing storage length; however, based on a SimTraffic review, this queuing will be experienced for a short period of time at the end of each phase. Consequently, no improvements are recommended as a result of the anticipated queuing at the intersection.

The anticipated 95th percentile queue length for the eastbound left turn movement at the Yonge Street / Ashford Drive & Madelaine Drive intersection exceeds the existing storage length; however, no improvements are required as the additional queue can be accommodated within the taper length. The anticipated 95th percentile queue lengths for the eastbound through movement at the Yonge Street / Ashford Drive & Madelaine Drive intersection exceed the existing storage lengths for the associated left turn movement; however, based on a SimTraffic review, this queuing will be experienced for a short period of time at the end of each phase with the queuing anticipated to generally clear after each cycle. Consequently, no improvements are recommended as a result of the anticipated queuing at the intersection.

The anticipated 95th percentile queues for all movements at all other study area intersections can be accommodated by the existing auxiliary lane storage lengths and TWLTLs.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at the unsignalized study area intersections (results are provided in **Appendix E**).

An analysis was completed for left turn movements at the unsignalized study area intersections, based on the criteria outlined in Appendix 9A of the Ontario Ministry of Transportation Design Supplement for TAC Geometric Design Guide for Canadian Roads June 2017 [MTO DS]. Based on the MTO criteria, additional auxiliary left turn lanes are not warranted (results are provided in **Appendix H**).

A review of the need for auxiliary right lanes at the unsignalized study area intersections was completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all movements; consequently, an auxiliary turn lane is not recommended.

No infrastructure improvements are recommended within the study area.

5.2 Total (2029) Intersection Operation

The results of the LOS analysis under the total (2029) traffic volumes during the AM and PM peak hour can be found below in **Table 14**. Existing intersection geometry and traffic control have been utilized for this scenario with the signal timing optimization noted in Section 3.3. Detailed output of the Synchro analysis can be found in **Appendix G**.

Table 14 – Total (2029) LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Model	Actual				Model	Actual
Yonge Street / Big Bay Point Road (signalized)	0.66	33.4	C	-	-	0.84	42.5	D	-	-
EBL	0.65	28.9	C	50	TWLTL	0.83	39.5	D	93	TWLTL
EBTR	0.49	34.2	C	54	-	0.86	49.7	D	115	-
WBL	0.43	29.4	C	33	TWLTL	0.83	53.2	D	75	TWLTL
WBT	0.79	46.2	D	83	-	0.78	51.4	D	88	-
WBR	0.29	36.1	D	32	25	0.12	40.3	D	21	25
NBL	0.61	28.4	C	57	TWLTL	0.82	48.1	D	84	TWLTL
NBT	0.61	30.2	C	101	-	0.76	38.9	D	133	-
NBR	0.07	22.3	C	-	35	0.09	26.9	C	13	35
SBL	0.51	31.8	C	48	TWLTL	0.72	42.5	D	76	TWLTL
SBT	0.48	30.7	C	71	-	0.76	39.0	D	133	-
SBR	0.44	31.6	C	63	15	0.39	31.8	C	60	15
Yonge Street / Montgomery Drive (unsignalized)	-	1.4	A	-	-	-	0.9	A	-	-
WB	0.38	21.8	C	14	-	0.22	14.6	B	6	-
Yonge Street / Ashford Drive & Madeline Drive (signalized)	0.50	26.4	C	-	-	0.73	31.8	C	-	-
EBL	0.44	28.0	C	42	30	0.54	35.5	D	54	30
EBT	0.43	36.5	D	62	-	0.72	50.6	D	104	-
EBR	0.04	32.2	C	6	-	0.06	38.0	D	11	-
WBL	0.32	32.2	C	32	75	0.36	34.3	C	30	75
WBTR	0.56	41.5	D	73	-	0.49	43.4	D	62	-
NBL	0.28	15.1	B	22	TWLTL	0.44	33.6	C	20	TWLTL
NBTR	0.50	23.1	C	87	-	0.76	28.5	C	157	-
SBL	0.23	16.4	B	16	TWLTL	0.66	47.2	D	29	TWLTL
SBTR	0.38	22.2	C	60	-	0.65	25.1	C	125	-
Site Access / Montgomery Drive (unsignalized)	-	3.5	A	-	-	-	2.5	A	-	-
NB	0.09	9.6	A	2	-	0.07	9.7	A	2	-

The results of the LOS analysis indicate that the V/C ratio for the eastbound through movement at the Yonge Street / Big Bay Point Street intersection is operating outside the typical design limits noted in Section 3.2 during the PM peak hour; however, no improvements are recommended as the V/C ratio is marginally outside design limits.

The results of the LOS analysis indicate that all other study area intersections are operating within the typical design limits noted in Section 3.1.

The anticipated 95th percentile queue length for the westbound right turn movement at the Yonge Street / Big Bay Point intersection exceeds the existing storage length; however, no improvements are required as the additional queue can be accommodated within the taper length. The anticipated 95th percentile queue lengths for all through movements at the Yonge Street / Big Bay Point Road intersection exceed the existing storage lengths for the associated right turn movement and the anticipated 95th percentile queue length for the southbound right turn movement exceeds the existing storage length. As noted in Section 3.4, it is recommended that the City prioritize transit and active

transportation infrastructure along the Yonge Street and Big Bay Point Road corridors in order to reduce the anticipated queuing and congestion along these corridors.

The anticipated 95th percentile queue length for the eastbound left turn movement at the Yonge Street / Ashford Drive & Madelaine Drive intersection exceeds the existing storage length; however, no improvements are required as the additional queue can be accommodated within the taper length. The anticipated 95th percentile queue lengths for the eastbound through movement at the Yonge Street / Ashford Drive & Madelaine Drive intersection exceed the existing storage lengths for the associated left turn movement; however, based on a SimTraffic review, this queuing will be experienced for a short period of time at the end of each phase with the queuing anticipated to generally clear after each cycle. Consequently, no improvements are recommended as a result of the anticipated queuing at the intersection.

The anticipated 95th percentile queues for all movements at all other study area intersections can be accommodated by the existing auxiliary lane storage lengths and TWLTLs.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at the unsignalized study area intersections (results are provided in **Appendix E**).

An analysis was completed for left turn movements at the unsignalized study area intersections, based on the criteria outlined in Appendix 9A of the MTO DS. Based on the MTO criteria, additional auxiliary left turn lanes are not warranted (results are provided in **Appendix H**).

A review of the need for auxiliary right lanes at the unsignalized study area intersections was completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all movements; consequently, an auxiliary turn lane is not recommended.

No infrastructure improvements are recommended within the study area.

5.3 Total (2034) Intersection Operation

The results of the LOS analysis under the total (2034) traffic volumes during the AM and PM peak hour can be found below in **Table 15**. Existing intersection geometry and traffic control have been utilized for this scenario with the signal timing optimization noted in Section 3.3. Detailed output of the Synchro analysis can be found in **Appendix G**.

Table 15 – Total (2034) LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Model	Actual				Model	Actual
Yonge Street / Big Bay Point Road (signalized)	0.77	38.0	D	-	-	0.93	50.2	D	-	-
EBL	0.78	36.7	D	68	TWLTL	0.91	53.9	D	125	TWLTL
EBTR	0.54	34.7	C	65	-	0.91	54.6	D	138	-
WBL	0.48	29.9	C	36	TWLTL	0.90	65.6	E	87	TWLTL
WBT	0.85	50.5	D	98	-	0.86	59.2	E	103	-
WBR	0.40	37.5	D	45	25	0.19	42.0	D	28	25
NBL	0.73	37.5	D	62	TWLTL	0.88	58.4	E	94	TWLTL
NBT	0.72	35.8	D	118	-	0.85	45.6	D	150	-
NBR	0.07	24.5	C	3	35	0.11	28.5	C	17	35
SBL	0.63	39.5	D	55	TWLTL	0.88	63.1	E	102	TWLTL
SBT	0.58	35.4	D	83	-	0.86	45.6	D	151	-
SBR	0.56	37.7	D	79	15	0.47	34.9	C	70	15
Yonge Street / Montgomery Drive (unsignalized)	-	1.5	A	-	-	-	0.9	B	-	-
WB	0.45	26.3	D	18	-	0.24	15.4	B	7	-
Yonge Street / Ashford Drive & Madelaine Drive (signalized)	0.57	27.7	C	-	-	0.81	33.7	C	-	-
EBL	0.52	29.0	C	47	30	0.62	38.2	D	59	30
EBT	0.48	36.9	D	70	-	0.79	55.7	E	119	-
EBR	0.05	32.0	C	6	-	0.06	38.3	D	12	-
WBL	0.38	32.8	C	36	75	0.43	35.3	D	32	75
WBTR	0.62	43.6	D	82	-	0.54	44.6	D	67	-
NBL	0.32	15.8	B	24	TWLTL	0.52	19.2	B	21	TWLTL
NBTR	0.56	24.8	C	105	-	0.82	31.1	C	181	-
SBL	0.30	17.5	B	18	TWLTL	0.80	45.6	D	54	TWLTL
SBTR	0.43	23.4	C	72	-	0.71	26.7	C	142	-
Site Access / Montgomery Drive (unsignalized)	-	3.3	A	-	-	-	2.4	A	-	-
NB	0.09	9.7	A	3	-	0.07	9.8	A	2	-

The results of the LOS analysis indicate that the V/C ratio for the Yonge Street / Big Bay Point Street intersection is operating outside the typical design limits noted in Section 3.2 during the PM peak hour; however, no improvements are recommended as the intersection is operating within theoretical capacity and due to the inherent uncertainties associated with long range traffic projections. As noted in Section 3.5, it is recommended that the City monitor this section closer to the horizon year.

The results of the LOS analysis indicate that all other study area intersections are operating within the typical design limits noted in Section 3.1.

The anticipated 95th percentile queue lengths for all through movements at the Yonge Street / Big Bay Point Road intersection exceed the existing storage lengths for the associated right turn movement and the anticipated 95th percentile queue length for the westbound and southbound right turn movement exceeds the existing storage length. As noted in Section 3.4, it is recommended that the City prioritize transit and active transportation infrastructure along the Yonge Street and Big Bay Point Road corridors in order to reduce the anticipated queuing and congestion along these corridors.

The anticipated 95th percentile queue lengths for the eastbound movements at the Yonge Street / Ashford Drive & Madelaine Drive intersection exceed the existing storage length for the associated left turn movement; however, based on a SimTraffic review, this queuing will be experienced for a short period of time at the end of each phase with the queuing anticipated to generally clear after each cycle. Consequently, no improvements are recommended as a result of the anticipated queuing at the intersection.

The anticipated 95th percentile queues for all movements at all other study area intersections can be accommodated by the existing auxiliary lane storage lengths and TWLTLs.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at the unsignalized study area intersections (results are provided in **Appendix E**).

An analysis was completed for left turn movements at the unsignalized study area intersections, based on the criteria outlined in Appendix 9A of the MTO DS. Based on the MTO criteria, additional auxiliary left turn lanes are not warranted (results are provided in **Appendix H**).

A review of the need for auxiliary right lanes at the unsignalized study area intersections was completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all movements; consequently, an auxiliary turn lane is not recommended.

No infrastructure improvements are recommended within the study area.

5.4 Impact of the Proposed Development

Based on a comparison of the intersection operation tables in Section 3.2 to 3.5 and in Section 5.1 to 5.3, the proposed development traffic resulted in a negligible change to the intersection operation of the existing Yonge Street / Big Bay Point Road and Yonge Street / Ashford Drive & Madelaine Drive intersections.

The intersection operation at the Yonge Street / Montgomery Drive did get marginally worse with the proposed development traffic volumes; however, the intersection is operating within the typical design limits noted in Section 3.1 in all scenarios.

Based on the above, the proposed development will not cause any operational issues and will not add significant delay or congestion to the local roadway network.

5.5 Site Access

The Site Access will operate efficiently as a full-movement access, with one-way stop control for northbound movements. No lane improvements are recommended on Montgomery Drive at the Site Access. A single northbound and southbound lane for the Site Access will provide the necessary capacity to service the proposed development.

The proposed spacing (measured edge of roadways to edge of driveway) between the Site Access and Yonge Street (greater than 50 meters) and the Site Access and Bertha Avenue (greater than 70 meters) is in excess of the suggested minimum corner clearance requirements for a driveway as identified in the Transportation Association of Canada *Design Guide for Canadian Roads* (2017) [TAC Guidelines] – Figure 8.8.2 (Suggested Minimum Corner Clearances to Accesses or Public Lanes at Major Intersections) – 15 meters for unsignalized condition.

5.6 Sight Distance Review

A review of the available sight distance for the proposed Site Access was completed as part of this analysis.

The sight distance north of the Site Access (greater than 150 meters) is greater than the minimum stopping and intersection sight distance requirements identified in the TAC Guidelines for a design speed of 70km/h (105 and 150 metres).

The sight distance south of the Site Access ends at the Yonge Street / Montgomery Drive intersection (approximately 64 meters) and is less than the minimum stopping and intersection sight distance requirements identified in the TAC Guidelines for a design speed of 70km/h (105 and 150 metres); however, is suitable for its intended use as vehicles turning onto Montgomery Drive from Yonge Street will do so at slower speeds.

Consequently, there are no issues with the sight distance for the proposed Site Access driveway.

5.7 Parking Summary

The proposed parking supply for the subject site meets the parking requirements specified in the City Zoning By-law 2009-141. Accessible parking for the subject site is provided according to the City Zoning By-law 2009-141. The proposed parking breakdown is provided in **Table 16**.

Table 16 – Parking Statistics

Category	Zoning By-Law Section	Parking Standard	Size	Parking	
				Required	Provided
Residential	4.6.1	1.0 spaces per dwelling unit	227 units	227	274 underground, 37 surface
Multiple Uses in Commercial Zone	4.6.2.3 (b)	1 space per 24 sq.m. of gross floor area	768 sq.m.	32	
TOTAL PARKING				259 Spaces	311 Spaces
Accessible Parking	4.6.4	1 parking space plus 3% of required parking spaces	-	9 Spaces	12 Spaces

5.8 Construction Parking

Based on our correspondence with the design team for this project, the Developer is committed to the following arrangement for construction parking:

The parking of construction vehicles and vehicles owned by staff and subcontractors employed by the Developer will be formally directed (in writing where possible) to avoid parking on municipal streets surrounding the subject site and avoid parking within private parking lots surrounding the subject site, without consent from the owner of the parking lots.

5.9 Truck Turning Analysis

A truck swept path analysis has been provided in **Appendix J** to illustrate that the following vehicles can access the site as intended without any operational issues:

- Front Load Garbage Truck.

6 Transportation Demand Management

The study area has and will continue to experience a significant transformation with respect to land-use and transportation. A number of infrastructure initiatives currently in the design, planning or concept phase, will help to address the transportation capacity challenges in the area. However, the construction of new roads will not be enough to accommodate the projected future travel demand. The following section provides additional existing and planned techniques incorporated in the design for the subject site which will help to address the transportation demand in the study area.

6.1 Transit Network

The subject site is adjacent to three Barrie Transit bus route and one Go Transit bus route as identified in Section 2.3. Close proximity to the above noted bus routes provide an excellent alternative to private vehicle travel to the proposed development. Furthermore, all of the above noted bus routes connect into the Barrie South Go Station and into the City's downtown bus terminal.

6.2 Pedestrian and Cycling Network

According to the City's TMP, the existing cycling network in the City includes approximately 145 kilometers of cycling infrastructure. While there is no direct cycling infrastructure adjacent to the subject site at this time, the proposed cycling network in the City's TMP includes cycle tracks along Yonge Street and Big Bay Point Road, bike lanes on Madelaine Drive and in-boulevard pathways on Ashford Drive, connecting into the City's cycling network. There are sidewalks on Montgomery Drive and Yonge Street adjacent to the subject site, which provides pedestrian access to the sidewalk network within the City.

Furthermore, a variety of additional active transportation infrastructure is proposed within the City's TMP, including:

- Proposed additional 484 kilometers of active transportation infrastructure within the City;
- A direct, connected and continuous network of different active transportation options to be established that accommodates safe walking, cycling, hiking and other active modes of transportation;
- Provide and prioritize connections to key destinations within the City and to public transit;
- Enhance opportunities for people to walk and bike for short trips;
- Allocate an appropriate annual maintenance budget to monitoring and maintain pedestrian and cycling facilities once they have been constructed;
- Establish a winter maintained network consisting of spine routes in order for walking and cycling to be viable modes of transportation year-round; and
- Developing and implementing programs aimed at encouraging and promoting a culture of active transportation.

6.3 Local Development

The developer is not constructing the proposed development for their own use, consequently, operational decisions are beyond their control; however, the following is a list of transportation demand management techniques that can be implemented for the building:

- Incentives to encourage transit use among residents;
- Preparation and distribution of transit information packages to new residents, including bicycle maps, local transit map/schedule, information on transit incentives and any other relevant information related to active transportation, at time of distribution; and

- Provide an information display board in the amenity area to share updated transportation information. The information board shall display travel information such as bicycle maps, local transit map/schedule and other relevant information.

7 Summary

Tran Group retained **JD Engineering** to prepare this traffic impact study in support of the proposed mixed-use development municipally known as 667-675 Yonge Street located in the northeast corner of the Yonge Street / Montgomery Drive intersection in the City of Barrie [City]. The proposed Site Plan is shown in **Appendix A**. This chapter summarizes the conclusions and recommendations from the study.

The proposed development is anticipated to include an eight storey building with 227 residential units, 768 sq.m. (8,267 sq.ft.) ground floor retail space and a 466 sq.m. (5,016 sq.ft.) private amenity area.

1. The proposed development is anticipated to generate a total of 101 AM and 118 PM peak hour primary trips and 14 PM peak hour pass-by trips
2. Detailed turning movement traffic and pedestrian counts for the Yonge Street / Big Bay Point Road and Yonge Street / Montgomery Drive intersections were commissioned by JD Engineering. Detailed turning movements traffic and pedestrian counts for Yonge Street / Big Bay Point Road were also retrieved from the City. Detailed turning movement traffic and pedestrian counts for the Yonge Street / Ashford Drive & Madelaine Drive intersection were obtained from the 681-685 Yonge Street traffic impact study.
3. An intersection operational analysis was completed at the study area intersections, using the existing (2022) and background (2024, 2029 and 2034) traffic volumes, without the proposed development traffic. This enabled a review of existing and future traffic deficiencies that would be present without the influence of the proposed development. The following infrastructure improvements are recommended:

Yonge Street and Big Bay Point Road Corridor

- Prioritize transit and active transportation infrastructure along the Yonge Street and Big Bay Point Road corridors.

Yonge Street / Big Bay Point Road

Background (2024) Traffic Volumes

- Signal timing optimization during the AM and PM peak hours while maintaining the existing cycle length.

Background (2034) Traffic Volumes

- Monitor intersection operation to determine if further improvements are required.

Yonge Street / Ashford Drive & Madelaine Drive;

Background (2024) Traffic Volumes

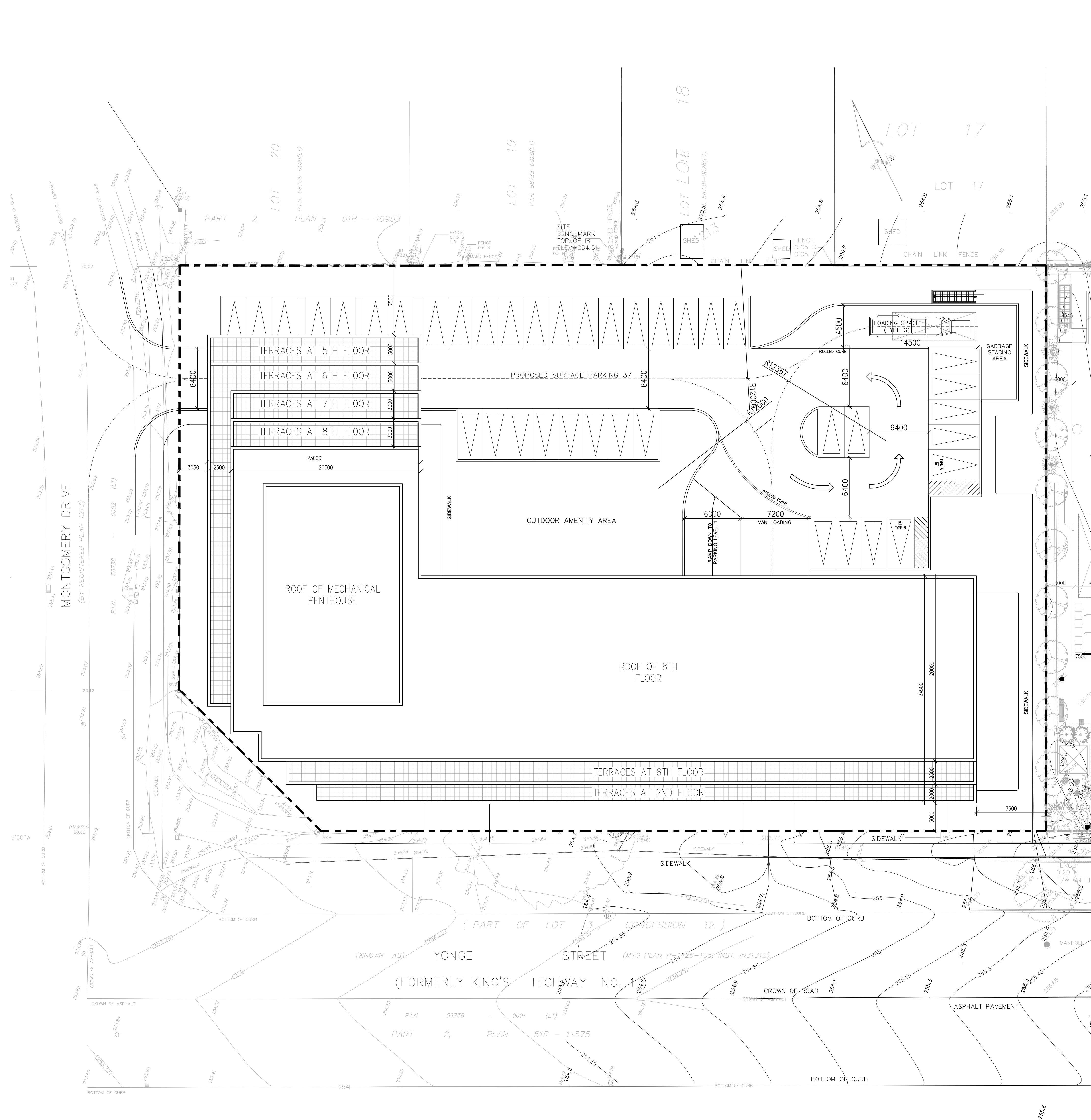
- Signal timing optimization during the AM and PM peak hours while maintaining the existing cycle length.

4. An estimate of the amount of traffic that would be generated by the subject site was prepared and assigned to the study area streets and intersection.
5. An intersection operation analysis was completed under total (2024, 2029 and 2034) traffic volumes with the proposed development operational at the study area intersections. No

additional geometric lane improvements or traffic signal improvements are recommended within the study area.

6. The Site Access will operate efficiently as a full-movement access, with one-way stop control for northbound movements. A single northbound and southbound lane for the Site Access will provide the necessary capacity to service the proposed development.
7. The sight distance available for the Site Access is suitable for its intended use.
8. The proposed parking supply for the subject site meets the parking requirements specified in the City Zoning By-law 2009-141.
9. In summary the proposed development will not cause any operational issues and will not add significant delay or congestion to the local roadway network.

Appendix A – Site Plan



context plan



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These Contract Documents are the property of the architect. The architect bears no responsibility for the interpretation of these documents by the Contractor. Upon written application the architect will provide written graphic clarification or supplementary information regarding the intent of the Contract Documents. The architect will review Shop Drawings submitted by the Contractor for design conformance only.

Drawings are not to be scaled for construction. Contractor to verify all existing conditions and dimensions required to perform the work and report any discrepancies with the Contract Documents to the architect before commencing work.

Positions of exposed or finished mechanical or electrical devices, fittings, and fixtures are indicated on architectural drawings. The locations shown on the architectural drawings govern over the mechanical and electrical drawings. Those items not clearly located will be located as directed by the architect.

These drawings are not to be used for construction unless noted below as "Issued for Construction".

All work to be carried out in conformance with the Code and bylaws of the authorities having jurisdiction.

The Designer of these plans and specifications gives no warranty or representation to any party about the constructability of the represented by them, all contractors or subcontractors must satisfy themselves when bidding and at all times that they can properly construct the work represented by these plans.

notes:

statistics

architectureunfolding										21-37	
STATISTICS - 675 Yonge St											
1. ZONING:			R1								
2. SITE AREA:			AREA m2				AREA ft2				
			5,575.0 m2				60,008.8 ft2				
3. SETBACKS:			REQUIRED				PROPOSED				
	NORTH		7.5 m				7.0 m				
	SOUTH		0.0 m				3.0 m				
	EAST		3.0 m				7.5 m				
	WEST		0.0 m				3.0 m				
4. BUILDING AREA											
PROPOSED			2149.0 m2				2313.6 ft2				
5. BUILDING COVERAGE			39%								
6. PROPOSED FLOOR AREA SUMMARY:											
GND			TOTAL FL. AREA(TFA)			GROSS FL. AREA(GFA)			SALEABLE FL. AREA (TSA)		
	PROPOSED:	LEVELS(FL)		m2	ft2	m2	ft2	m2	ft2		
	P1 (BELOW)	1	RESIDENTIAL	309	3306.3	309	3306.3	309			
		1	RESIDENTIAL	915.0	9849	844.0	9031	413.0	12395		
			RETAIL	768.0	8267	738.5	738.5				
			AMENITY	466.0	5016						
			SUB TOTAL	2149.0	23132	1582.5	16933	1151.5			
	2ND - 4TH	3	RESIDENTIAL	7101.0	76435	7101.0	76435	6501.0	69976		
				3 fl. 2367.0 m2	2367.0			# fl. 2167.0 m2			
	5TH	1	RESIDENTIAL	2299.0	24746	2299.0	24746	2099.0	22593		
	6TH	1	RESIDENTIAL	2229.0	23993	2229.0	23993	1855.0	19967		
	7TH	1	RESIDENTIAL	1951.0	21000	1951.0	21000	1751.0	18848		
	8TH	1	RESIDENTIAL	1882.0	20258	1882.0	20258	1682.0	18105		
	GRAND TOTAL AREA PROPOSED				17920.0	192889	17353.5	186792	15348.5	165210	
	GRAND TOTAL AREA INCL. RETAIL AREA										
7. UNIT BREAKDOWN											
UNIT TYPE											
PROPOSED BUILDING											
BLOCK	BA	1B	1B+D	2B	TOTAL						
GND FLOOR	1	0	1	6	8						
2ND-4TH FLOOR	3	36	45	15	99						
5TH FLOOR	1	12	16	3	32						
6TH FLOOR	1	10	14	5	30						
7TH FLOOR	1	14	11	4	30						
8TH FLOOR	1	12	10	5	28						
TOTAL	8	84	97	38	227						
	3.5%	37.0%	42.7%	16.7%	100.0%						
8. HEIGHT:											
PROPOSED: 8 STOREYS											
9. PARKING :											
	REQUIRED :					PROPOSED :					
	RES(inc vts)	1	PER UNIT (227)	227	SURFACE PROPOSED					37	
	COMM	1	PER 24m2	31	P1 PROPOSED					134	
	TOTAL			258	P2 PROPOSED					140	
	ACCESS. (1+3%of req'd)			9	TOTAL					311	
					ACCESS. (1+3%of req'd)					12	
10. EFFICIENCY (TSA/TFA)											
85.7%											
11. AMENITY											
	REQUIRED :					PROVIDED :					
	OUTDOOR	12	m2	PER UNIT (227) =	2724 m2	GND/ LANDSCAPING					m2
	TERRACES:										
	7TH FLOOR AMENITY TERRACE:										m2
	BALCONIES (TOTAL):										m2
TOTAL PROVIDED										0.0 m2	
12. PAVING:											
MAX PERMITTED =					35%						
PROPOSED =					32%						
					(1760.0 m2)						

revisions:

m.d.yr

architectural team :

mark zwicker
ihab daakour

project:
675 Yonge St
Barrie, ON L4N 4E8

site plan

Jan. 12, 22

1:200

21-37

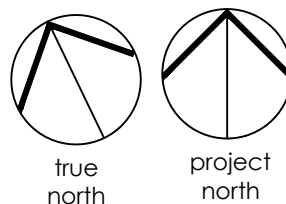
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date:

scale:

project:

drawn by:



drawing number:
A101

Appendix B – Adjacent Development Excerpts

Figure 10 – Traffic Assignment for Proposed Development

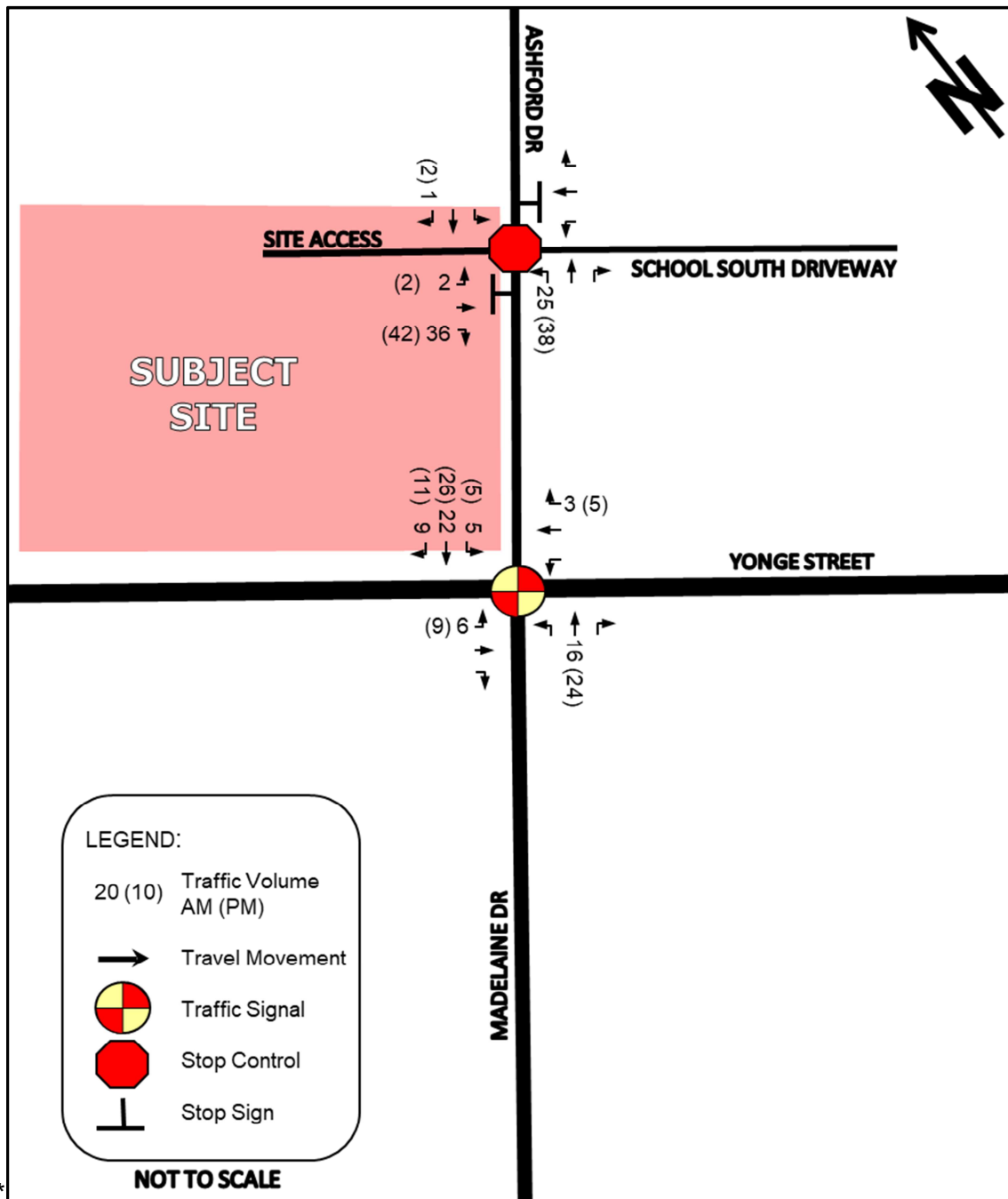


Figure 4 – Yonge Street Development (2029) Traffic Assignment

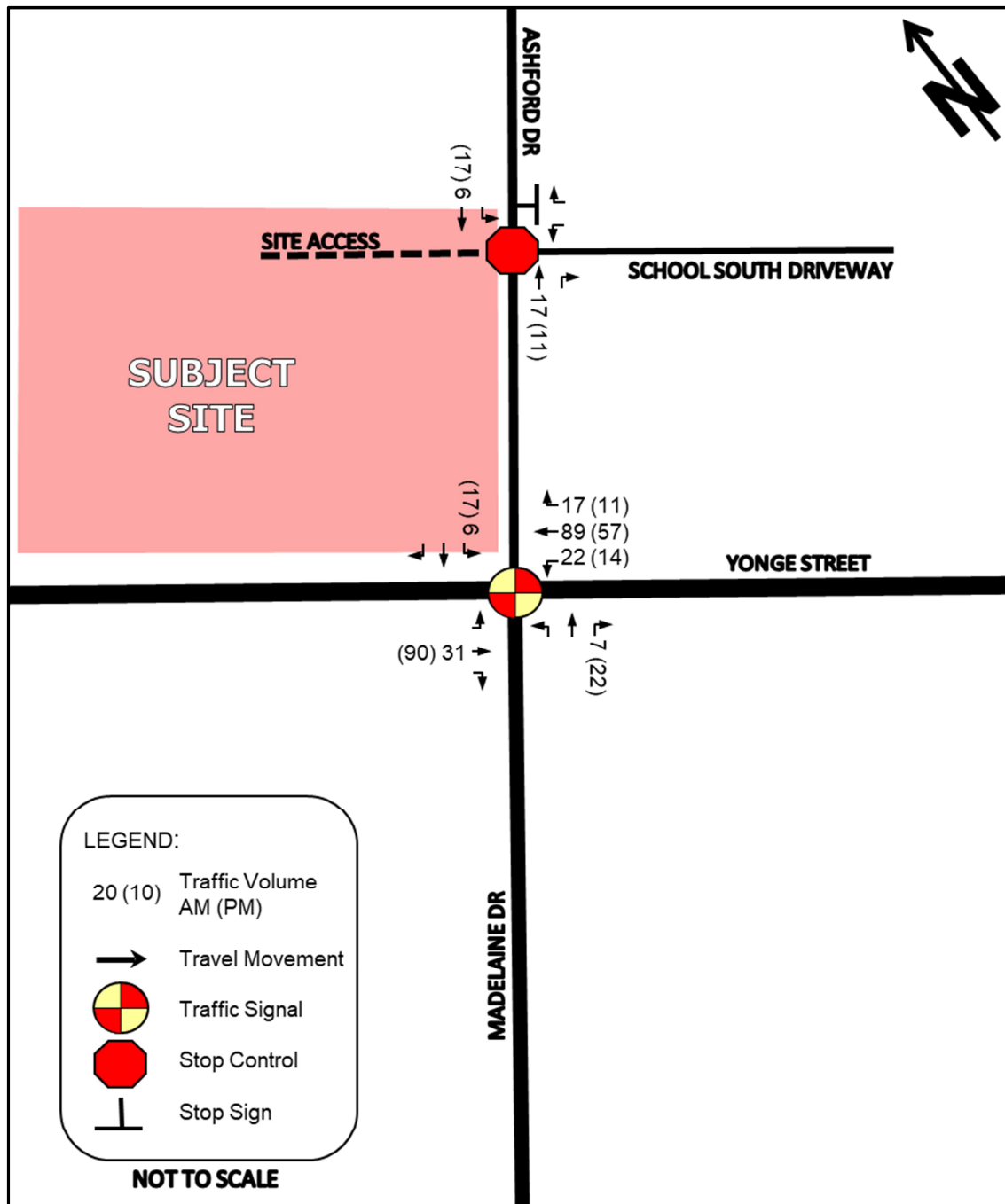


Figure 5 – Heritage Phase 3 (2029) Traffic Assignment Primary Trips

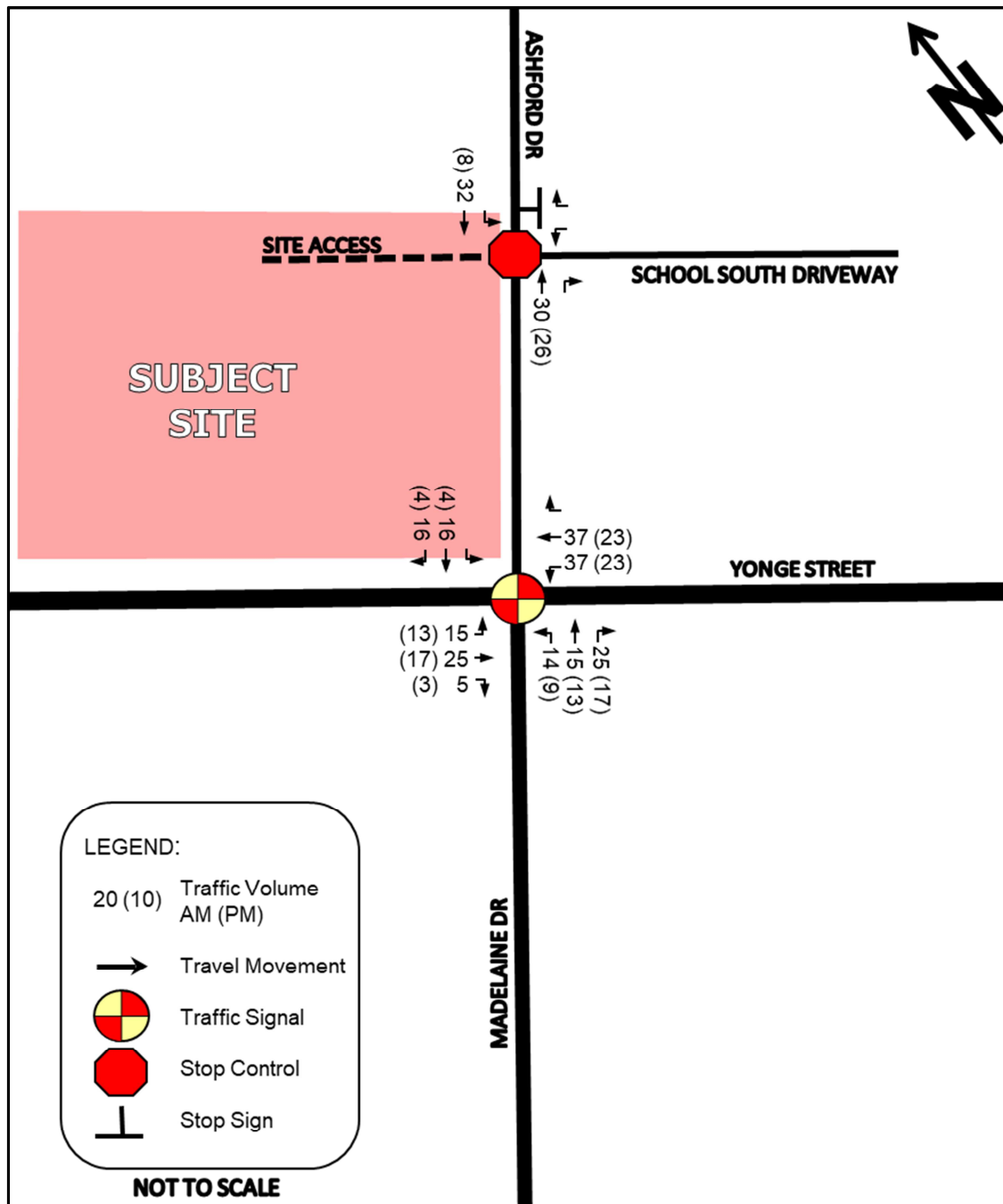


Figure 6 – Heritage Phase 3 (2029) Traffic Assignment Pass-by Trips

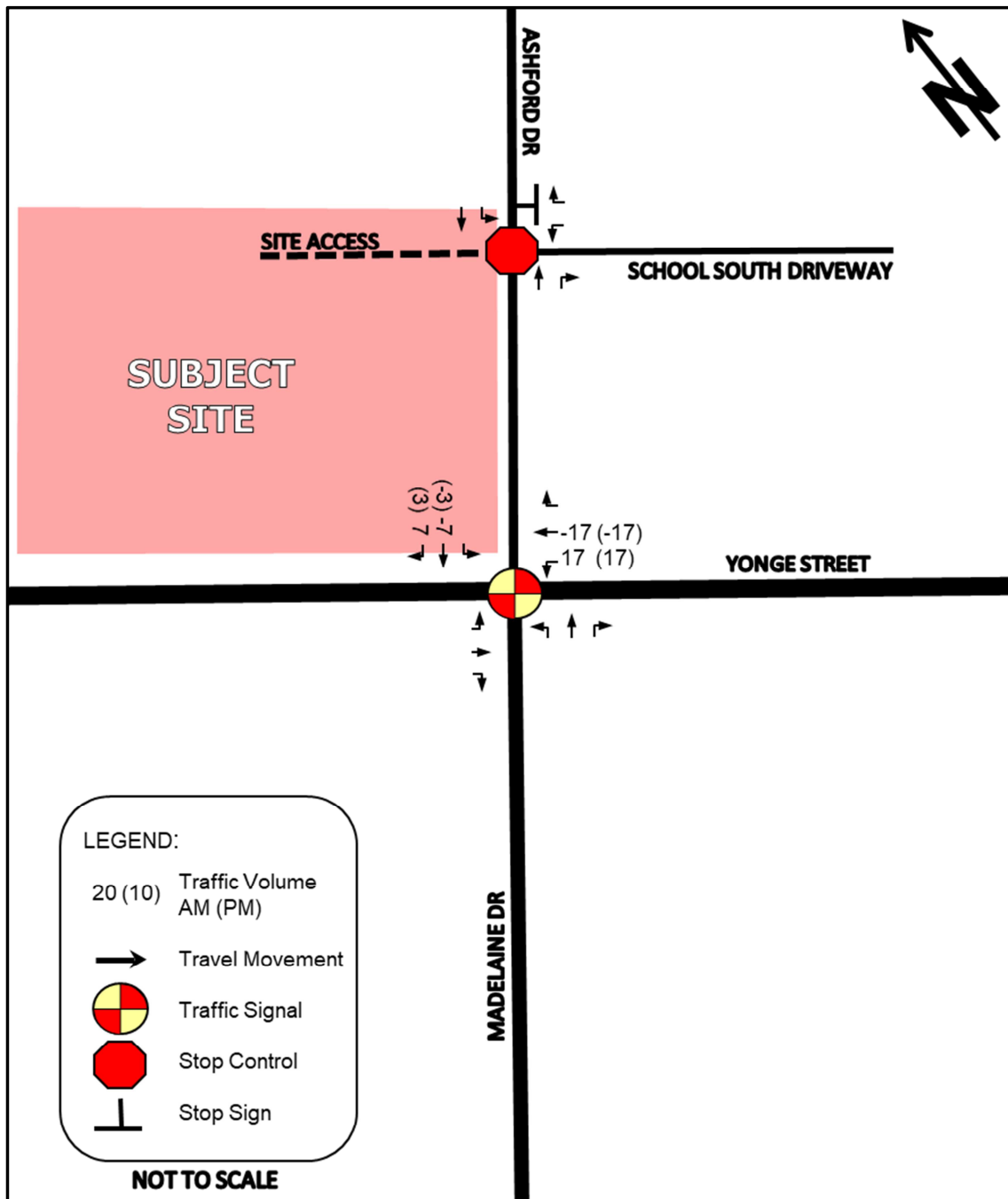
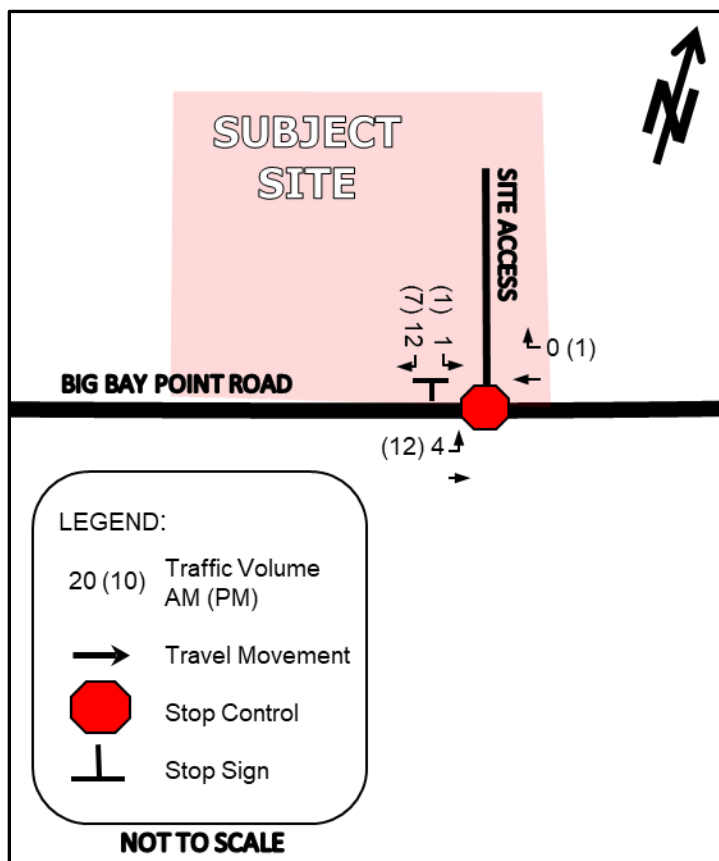


Table 3 – Proposed Development Traffic Distribution Summary

Travel Direction (to/from)	Percent of Total Traffic Generation
West via Big Bay Point Road	90%
East via Big Bay Point Road	10%
Total	100%

Using the traffic distributions pattern noted above, the traffic assignment for the proposed development was calculated for the AM and PM peak hour and is illustrated in **Figure 3**.

Figure 3 – Traffic Assignment for Proposed Development



Appendix C – Traffic Count Data



Turning Movement Count Diagram

Intersection: Yonge Street & Big Bay Point Road

Municipality: Barrie, Ontario

Intersection ID:

Date: Thursday June 28, 2018

AM Peak Hour: 8:00 to 9:00

MD Peak Hour: 12:30 to 13:30

Yonge Street									
North Total 1280						East Total 916			
North Entering 588	Cyclists	0	0	0		East Entering 576			
North Receiving 692	Truck	5	17	3		East Receiving 340			
North Peds 3	Cars	193	271	99		East Peds 1			
Big Bay Point Road		↙	↓	↘					
	0	5	134	↗		↖	148	8	0
	0	13	185	→		←	350	13	0
	0	2	71	↘		↙	54	3	0
			↙	↑	↘				
West Total 1034			61	383	38	South Total 918			
West Entering 410		2	14	2		South Entering 500			
West Receiving 624		0	0	0		South Receiving 418			
West Peds 1						South Peds 1			

Yonge Street									
North Total 1619				East Total 1090					
North Entering 828		Cyclists	0	0	0	East Entering 583			
North Receiving 791		Truck	4	16	0	East Receiving 507			
North Peds 23		Cars	192	496	120	East Peds 9			
Big Bay Point Road	0	1	187	↗		↖	129	2	0
	0	5	262	→		←	315	9	0
	0	2	97	↘		↙	127	1	0
				↖	↗				
West Total 1176			99	455	115	South Total 1433			
West Entering 554			3	17	5	South Entering 694			
West Receiving 622			0	0	0	South Receiving 739			
West Peds 17						South Peds 4			

PM Peak Hour: 16:30 to 17:30

Total 8-Hour Count

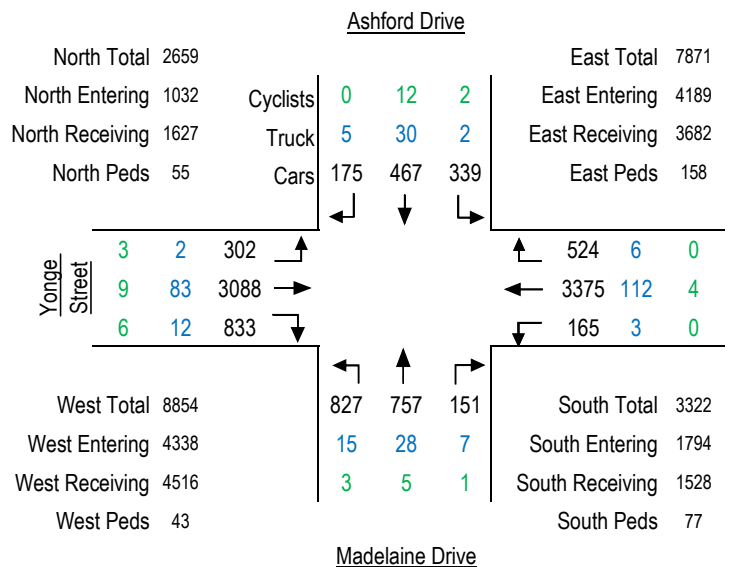
Yonge Street										
North Total 2104				East Total 1376						
North Entering 1046		Cyclists	0	0	0	East Entering 661				
North Receiving 1058		Truck	1	7	1	East Receiving 715				
North Peds 1		Cars	233	611	193	East Peds 5				
Big Bay Point Road			↙	↓	↘					
	0	1	275	↗			↖	147	1	0
	0	1	427	→			←	365	9	1
	0	0	128	↘			↙	137	1	0
West Total 1576			134	628	93	South Total 1746				
West Entering 832			1	6	0	South Entering 862				
West Receiving 744			0	0	0	South Receiving 884				
West Peds 2						South Peds 7				

Yonge Street									
North Total 12624					East Total 8473				
North Entering 6211		Cyclists	0	0	0	East Entering 4524			
North Receiving 6413		Truck	29	94	22	East Receiving 3949			
North Peds 48		Cars	1464	3604	998	East Peds 59			
Big Bay Point Road	0	27	1569	↖	↗	1106	34	0	
	0	72	2200	→	←	2541	85	3	
	0	8	754	↘	↙	746	9	0	
West Total 9556			784	3569	640	South Total 10353			
West Entering 4630			20	105	16	South Entering 5138			
West Receiving 4926			0	3	1	South Receiving 5215			
West Peds 42						South Peds 41			

Site ID Code:
Intersection Location:
Municipality:
Count Date:
Weather and Temperature:
Surveyor:

Yonge Street & Big Bay Point Road
Barrie, Ontario
Thursday June 28, 2018
Sunny, 20C
TP

AM	NORTH APPROACH										Total	EAST APPROACH										Total	SOUTH APPROACH										Total	WEST APPROACH										Total	Grand Total	
	CAR			TRUCKS			CYCLISTS					Peds	CAR			TRUCKS			CYCLISTS				Peds	CAR			TRUCKS			CYCLISTS				Peds												
	L	T	R	L	T	R	L	T	R	L			T	R	L	T	R	L	T	R	L			T	R	L	T	R	L	T	R	L			T	R										
7:00	10	45	32	4	2	0	0	0	0	1	94	9	86	18	0	1	0	0	0	0	1	115	14	46	3	1	0	2	0	0	0	0	0	66	8	27	14	5	8	1	0	0	0	1	64	339
7:15	17	89	33	2	1	1	0	0	0	0	143	5	78	25	0	1	0	0	0	0	2	111	15	47	7	0	4	0	0	0	0	0	73	16	24	10	0	6	0	0	0	0	0	56	383	
7:30	21	61	31	2	4	1	0	0	0	0	120	8	90	26	0	5	0	0	0	0	0	129	25	74	4	2	5	3	0	0	0	2	115	25	22	13	0	3	0	0	0	0	0	63	427	
7:45	18	60	32	1	3	1	0	0	0	0	115	6	106	31	0	1	3	0	0	0	0	147	21	63	3	0	4	0	0	0	0	0	91	29	29	11	1	3	0	0	0	0	0	73	426	
8:00	23	72	55	1	5	1	0	0	0	1	158	9	80	30	1	1	1	0	0	0	1	123	14	110	8	0	4	1	0	0	0	0	137	26	38	17	1	4	1	0	0	0	1	88	506	
8:15	16	69	52	0	4	0	0	0	0	0	141	14	98	35	2	3	1	0	0	0	0	153	21	100	15	2	5	1	0	0	0	0	144	32	39	9	1	3	0	0	0	0	0	84	522	
8:30	32	64	38	2	5	1	0	0	0	0	142	16	79	34	0	2	2	0	0	0	0	133	12	99	9	0	1	0	0	0	0	1	122	30	45	19	3	1	0	0	0	0	0	98	495	
8:45	28	66	48	0	3	3	0	0	0	2	150	15	93	49	0	7	4	0	0	0	0	168	14	74	6	0	4	0	0	0	0	0	98	46	63	26	0	5	1	0	0	0	0	141	557	
MD																																														
11:00	26	96	48	0	2	1	0	0	0	2	175	23	76	24	1	7	1	0	0	0	0	132	12	110	19	2	0	0	0	0	0	1	144	47	66	23	1	2	0	0	0	0	0	139	590	
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PM																																														
15:00	32	129	43	0	3	2	0	0	0	1	210	29	71	36	0	3	2	0	2	0	3	146	25	94	23	0	6	0	0	0	0	0	148	57	82	27	2	3	1	0	0	0	1	173	677	
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17:45	34	119	45	0	3	0	0	0	0	0	201	21	93	29	0	1	0	0	0	0	2	146	37	144	27	1	2	0	0	0	0	1	214	70	71	27	0	0	0	0	0	0	2	170	731	



Trans-Plan Transportation Inc.

Site ID Code:
Intersection Location:
Municipality:
Count Date:
Weather and Temperature:
Surveyor:

Yonge Street & Ashford Drive / Madeleine Drive
Barrie, Ontario
Thursday June 28, 2018
Sunny, 20C
TP

AM	NORTH APPROACH										Total	EAST APPROACH										Total	SOUTH APPROACH										Total	WEST APPROACH										Total	Grand Total
	CAR			TRUCKS			CYCLISTS			Peds		CAR			TRUCKS			CYCLISTS			Peds		CAR			TRUCKS			CYCLISTS			Peds													
	L	T	R	L	T	R	L	T	R			L	T	R	L	T	R	L	T	R			L	T	R	L	T	R	L	T	R														
7:00	14	8	0	0	0	0	0	0	0	0	22	0	49	5	0	3	0	0	1	0	1	59	17	7	3	0	0	0	0	0	0	2	29	4	56	9	1	1	0	0	0	0	71	181	
7:15	13	16	6	0	0	0	0	0	0	1	36	2	48	4	0	3	0	0	0	0	0	57	17	13	3	1	1	0	0	0	0	1	36	10	71	14	0	3	0	0	0	0	98	227	
7:30	14	12	2	0	1	2	0	2	0	0	33	1	80	10	0	6	0	0	0	0	0	97	21	6	2	0	1	0	0	0	0	30	7	59	9	0	5	0	0	0	0	80	240		
7:45	15	9	3	0	0	0	0	0	0	0	27	3	74	6	0	4	0	0	0	0	0	87	13	14	4	0	0	0	0	0	0	31	10	48	10	0	2	0	0	1	0	71	216		
8:00	19	12	3	0	1	0	0	0	0	1	36	3	98	6	0	6	0	0	0	0	0	113	22	16	5	0	3	0	0	0	0	46	7	66	10	0	4	1	0	1	0	1	90	285	
8:15	15	15	3	0	0	1	0	0	0	0	34	4	91	11	0	3	0	0	0	0	2	111	25	15	6	1	2	0	0	0	0	1	50	12	55	11	0	8	0	0	0	1	0	87	282
8:30	14	24	8	1	1	0	0	0	0	2	50	7	86	21	0	2	0	0	0	0	30	146	24	43	6	0	1	0	0	0	0	74	13	50	12	0	3	0	0	0	0	3	81	351	
8:45	21	33	10	0	1	0	0	0	0	1	66	5	79	10	1	4	1	0	0	0	5	105	19	32	4	0	2	0	0	0	0	60	4	55	18	0	4	1	0	0	0	5	87	318	
MD																																													
11:00	9	15	3	0	1	0	0	0	0	1	29	6	96	10	0	3	0	0	0	0	0	115	28	14	8	0	2	0	0	0	0	1	53	1	88	17	0	2	0	0	0	0	1	109	306
11:15	3	9	6	0	1	0	0	0	0	1	20	1	95	6	0	6	2	0	0	0	0	110	19	15	3	0	1	0	1	0	0	5	44	4	95	34	0	4	0	0	0	0	3	140	314
11:30	7	16	5	0	1	0	0	0	0	1	30	6	73	10	0	6	1	0	0	0	1	97	26	18	3	0	1	2	0	0	0	1	51	4	83	13	0	0	1	0	0	0	1	102	280
11:45	5	11	9	0	0	0	0	0	0	1	26	6	101	4	0	5	0	0	1	0	2	119	25	21	7	1	1	0	0	0	0	4	59	8	90	18	0	2	0	0	0	0	2	120	324
12:00	3	14	9	0	1	0	0	0	0	3	30	3	98	5	0	6	0	0	0	0	1	113	33	18	6	0	0	0	0	0	1	58	12	85	24	0	2	0	0	1	1	1	126	327	
12:15	10	5	8	0	0	0	0	0	0	2	25	2	88	11	0	3	0	0	0	0	0	104	26	21	6	1	1	1	0	0	0	1	57	12	101	24	0	2	1	0	1	0	2	143	329
12:30	6	16	3	0	0	0	0	0	0	2	27	2	114	5	0	2	0	0	0	0	2	125	28	16	3	1	0	0	0	0	0	2	50	6	111	38	0	1	2	0	0	0	1	159	361
12:45	8	13	3	0	1	0	0	0	0	0	25	5	95	13	0	4	0	0	0	0	0	117	20	10	5	0	1	0	0	1	0	5	42	6	119	22	0	4	1	0	0	0	0	152	336
13:00	13	7	7	0	1	1	0	0	0	1	30	4	119	8	1	5	1	0	0	0	1	139	29	14	2	1	1	0	0	2	0	3	52	9	94	36	1	1	1	0	0	0	1	143	364
13:15	12	11	3	0	1	0	0	0	0	14	41	4	99	9	0	3	0	0	0	0	1	116	24	11	2	0	1	1	0	0	0	4	43	6	91	28	0	2	0	0	0	0	0	127	327
13:30	7	12	7	0	0	0	0	0	0	2	28	5	113	17	0	0	0	0	0	0	7	142	21	19	2	0	1	0	1	0	0	7	51	16	105	26	0	0	1	0	0	0	2	150	371
13:45	10	13	4	0	0	0	0	0	0	0	27	5	70	15	0	3	0	0	0	0	1	94	26	14	4	0	0	0	0	0	0	5	49	4	120	20	0	7	0	0	0	0	5	156	326
PM																																													
15:00	7	21	5	0	2	0	0	0	0	1	36	10	114	23	0	5	0	0	0	0	21	173	24	34	4	2	2	0	1	0	1	1	69	13	117	26	0	3	0	0	4	0	4	167	445
15:15	6	23	3	0	0	1	0	2	0	9	44	4	124	10	0	3	0	0	0	0	28	169	24	27	8	0	1	0	0	0	0	4	64	3	122	39	0	3	2	0	0	2	1	172	449
15:30	15	7	5	1	3	0	1	5	0	3	40	7	118	17	1	3	0	0	1	0	13	160	23	24	4	0	0	0	0	2	0	3	56	4	111	31	0	3	0	0	0	1	1	151	407
15:45	6	12	6	0	5	0	0	0	0	0	29	6	116	24	0	5	0	0	0	0	20	171	39	34	2	6	1	2	0	0	0	7	91	6	114	37	0	4	1	0	0	0	0	162	453
16:00	10	13	7	0	2	0	0	3	0	5	40	4	124	23	0	4	0	0	0	0	2	157	29	21	5	0	0	0	0	0	0	3	58	4	129	29	0	1	0	0	0	0	0	163	418
16:15	8	14	8	0	2	0	0	0	0	0	32	3	114	18	0	3	0	0	0	0	6	144	38	26	7	1	1	0	0	0	0	2	75	8	119	31	0	1	0	0	0	0	4	163	414
16:30	10	17	6	0	1	0	0	0	0	0	34	6	115	16	0	1	0	0	0	0	1	139	38	37	5	0	0	0	0	0	0	2	82	9	120	47	0	0	0	3	1	0	0	180	435
16:45	8	16	7	0	1	0	0	0	0	1	33	12	136	34	0	4	1	0	0	0	2	189	35	39	3	0	2	1	0	0	0	2	82	16	113	33	0	4	0	0	0	0	1	167	471
17:00	12	24	4	0	0	0	0	0	0	1	41	8	162	54	0	0	0	0	0	0	6	230	28	48	8	0	0	0	0	0	0	2	86	21	135	54	0	3	0	0	0	1	0	214	571
17:15	17	15	8	0	1	0	0	0	0	0	41	11	194	50	0	0	0	0	0	0	3	258	32	56	5	0	0	0	0	0	0	1	94	19	123	42	0	1	0	0	0	0	0	185	578
17:30	10	17	8	0	1	0	1	0	0	0	37	12	145	31	0	5	0	0	0	0	0	193	24	38	7	0	1	0	0	0	0	3	73	25	118	40	0	2	0	0	0	0	2	187	490
17:45	12	17	6	0	1	0	0	0	0	2	38	8	147	38	0	2	0	0	1	0	2	198	30	36	9	0	0	0	0	0	0	1	76	19	125	31	0	1	0	0	0	0	2	178	490

Morning Peak Diagram		Specified Period From: 7:00:00 To: 9:00:00	One Hour Peak From: 7:45:00 To: 8:45:00
Municipality: Barrie Site #: 2114100001 Intersection: Yonge St & Big Bay Point Rd TFR File #: 1 Count date: 7-Dec-21		Weather conditions: Person counted: Person prepared: Person checked:	
** Signalized Intersection **		Major Road: Yonge St runs N/S	

North Leg Total: 1218 North Entering: 572 North Peds: 1 Peds Cross:	<table style="width: 100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>7</td><td>12</td><td>1</td><td>20</td></tr> <tr><td>Trucks</td><td>2</td><td>0</td><td>2</td><td>4</td></tr> <tr><td>Cars</td><td>121</td><td>336</td><td>91</td><td>548</td></tr> <tr><td>Totals</td><td>130</td><td>348</td><td>94</td><td></td></tr> </table>	Heavys	7	12	1	20	Trucks	2	0	2	4	Cars	121	336	91	548	Totals	130	348	94		<table style="width: 100%; border-collapse: collapse;"> <tr><td>Heavys</td><td>24</td></tr> <tr><td>Trucks</td><td>7</td></tr> <tr><td>Cars</td><td>615</td></tr> <tr><td>Totals</td><td>646</td></tr> </table>	Heavys	24	Trucks	7	Cars	615	Totals	646	East Leg Total: 855 East Entering: 532 East Peds: 1 Peds Cross:
Heavys	7	12	1	20																											
Trucks	2	0	2	4																											
Cars	121	336	91	548																											
Totals	130	348	94																												
Heavys	24																														
Trucks	7																														
Cars	615																														
Totals	646																														

Heavys	Trucks	Cars	Totals
16	4	515	535

Yonge St

Cars	Trucks	Heavys	Totals
168	2	3	173
322	2	4	328
30	1	0	31
520	5	7	

Heavys	Trucks	Cars	Totals
8	1	104	113
10	2	195	207
3	4	71	78
21	7	370	

Big Bay Point Rd

Cars	Trucks	Heavys	Totals
307	4	12	323

Peds Cross: West Peds: 2 West Entering: 398 West Leg Total: 933	<table style="width: 100%; border-collapse: collapse;"> <tr><td>Cars</td><td>437</td></tr> <tr><td>Trucks</td><td>5</td></tr> <tr><td>Heavys</td><td>15</td></tr> <tr><td>Totals</td><td>457</td></tr> </table>	Cars	437	Trucks	5	Heavys	15	Totals	457	<table style="width: 100%; border-collapse: collapse;"> <tr><td>Cars</td><td>72</td><td>343</td><td>21</td><td>436</td></tr> <tr><td>Trucks</td><td>0</td><td>4</td><td>0</td><td>4</td></tr> <tr><td>Heavys</td><td>5</td><td>13</td><td>1</td><td>19</td></tr> <tr><td>Totals</td><td>77</td><td>360</td><td>22</td><td></td></tr> </table>	Cars	72	343	21	436	Trucks	0	4	0	4	Heavys	5	13	1	19	Totals	77	360	22		Peds Cross: South Peds: 7 South Entering: 459 South Leg Total: 916
Cars	437																														
Trucks	5																														
Heavys	15																														
Totals	457																														
Cars	72	343	21	436																											
Trucks	0	4	0	4																											
Heavys	5	13	1	19																											
Totals	77	360	22																												

Comments

Afternoon Peak Diagram		Specified Period From: 16:00:00 To: 19:00:00	One Hour Peak From: 16:00:00 To: 17:00:00
Municipality: Barrie Site #: 2114100001 Intersection: Yonge St & Big Bay Point Rd TFR File #: 1 Count date: 7-Dec-21		Weather conditions: Person counted: Person prepared: Person checked:	
** Signalized Intersection **		Major Road: Yonge St runs N/S	

North Leg Total: 1687 North Entering: 812 North Peds: 2 Peds Cross:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">0</td> <td style="text-align: right;">4</td> <td style="text-align: right;">1</td> <td style="border-left: 1px solid black; text-align: right;">5</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">2</td> <td style="text-align: right;">1</td> <td style="text-align: right;">0</td> <td style="border-left: 1px solid black; text-align: right;">3</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">173</td> <td style="text-align: right;">494</td> <td style="text-align: right;">137</td> <td style="border-left: 1px solid black; text-align: right;">804</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">175</td> <td style="text-align: right;">499</td> <td style="text-align: right;">138</td> <td style="border-left: 1px solid black;"></td> </tr> </table>	Heavys	0	4	1	5	Trucks	2	1	0	3	Cars	173	494	137	804	Totals	175	499	138		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right;">Heavys</td> <td style="text-align: right;">14</td> </tr> <tr> <td style="text-align: right;">Trucks</td> <td style="text-align: right;">2</td> </tr> <tr> <td style="text-align: right;">Cars</td> <td style="text-align: right;">859</td> </tr> <tr> <td style="text-align: right;">Totals</td> <td style="text-align: right;">875</td> </tr> </table>	Heavys	14	Trucks	2	Cars	859	Totals	875	East Leg Total: 1091 East Entering: 539 East Peds: 7 Peds Cross:
Heavys	0	4	1	5																											
Trucks	2	1	0	3																											
Cars	173	494	137	804																											
Totals	175	499	138																												
Heavys	14																														
Trucks	2																														
Cars	859																														
Totals	875																														

Heavys	Trucks	Cars	Totals
2	7	609	618

Yonge St

Big Bay Point Rd

Heavys	Trucks	Cars	Totals
2	1	223	226
3	1	362	366
0	0	119	119
5	2	704	

Big Bay Point Rd

Yonge St

Cars	696
Trucks	1
Heavys	4
Totals	701

Cars	110	509	48	667
Trucks	4	1	0	5
Heavys	0	12	0	12
Totals	114	522	48	

Cars	127	0	0	127
Trucks	326	1	2	329
Heavys	83	0	0	83
Totals	536	1	2	

Cars	547	1	4	552
Trucks				
Heavys				
Totals				

Peds Cross:	
West Peds:	12
West Entering:	711
West Leg Total:	1329

Peds Cross:	
South Peds:	15
South Entering:	684
South Leg Total:	1385

Comments

Total Count Diagram

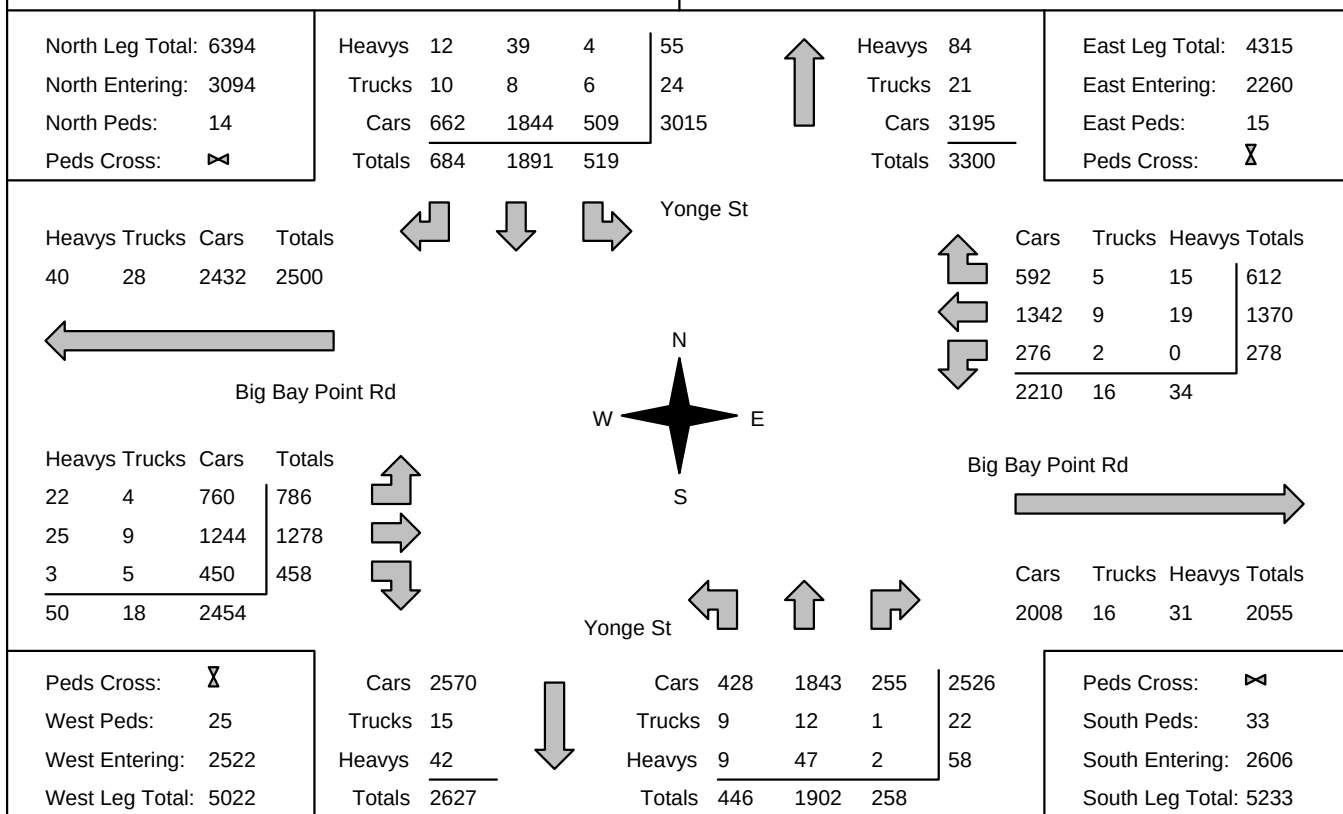
Municipality: Barrie
Site #: 2114100001
Intersection: Yonge St & Big Bay Point Rd
TFR File #: 1
Count date: 7-Dec-21

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Signalized Intersection ****

Major Road: Yonge St runs N/S



Comments

Traffic Count Summary

Intersection: Yonge St & Big Bay Point Rd

Count Date: 7-Dec-21

Municipality: Barrie

North Approach Totals						North/South Total Approaches	South Approach Totals						
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total		
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0	
8:00:00	60	300	110	470	3	808	8:00:00	57	265	16	338	2	
9:00:00	100	323	133	556	0	993	9:00:00	72	344	21	437	8	
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0	
17:00:00	138	499	175	812	2	1496	17:00:00	114	522	48	684	15	
18:00:00	139	455	141	735	5	1377	18:00:00	110	442	90	642	5	
19:00:00	82	314	125	521	4	1026	19:00:00	93	329	83	505	3	

[illegible]

Morning Peak Diagram		Specified Period From: 7:00:00 To: 9:00:00	One Hour Peak From: 7:45:00 To: 8:45:00																																																																																																																			
Municipality: Barrie Site #: 2114100002 Intersection: Yonge St & Montgomery Dr TFR File #: 1 Count date: 7-Dec-21		Weather conditions: Person counted: Person prepared: Person checked:																																																																																																																				
** Non-Signalized Intersection **		Major Road: Yonge St runs N/S																																																																																																																				
North Leg Total: 921 North Entering: 432 North Peds: 0 Peds Cross: ☒	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%; vertical-align: top;"> <table style="width: 100%; border-collapse: collapse;"> <tr><td>Heavys</td><td style="text-align: right;">15</td><td style="text-align: right;">2</td><td style="border-left: 1px solid black; text-align: right;">17</td></tr> <tr><td>Trucks</td><td style="text-align: right;">2</td><td style="text-align: right;">0</td><td style="border-left: 1px solid black; text-align: right;">2</td></tr> <tr><td>Cars</td><td style="text-align: right;">403</td><td style="text-align: right;">10</td><td style="border-left: 1px solid black; text-align: right;">413</td></tr> <tr><td>Totals</td><td style="text-align: right;">420</td><td style="text-align: right;">12</td><td style="border-left: 1px solid black;"></td></tr> </table> </td> <td style="width: 10%; text-align: center; vertical-align: middle;">↑</td> <td style="width: 30%; vertical-align: top;"> <table style="width: 100%; border-collapse: collapse;"> <tr><td>Heavys</td><td style="text-align: right;">20</td></tr> <tr><td>Trucks</td><td style="text-align: right;">5</td></tr> <tr><td>Cars</td><td style="text-align: right;">464</td></tr> <tr><td>Totals</td><td style="text-align: right;">489</td></tr> </table> </td> <td style="width: 20%; vertical-align: top;"> <table style="width: 100%; border-collapse: collapse;"> <tr><td>East Leg Total:</td><td style="text-align: right;">62</td></tr> <tr><td>East Entering:</td><td style="text-align: right;">19</td></tr> <tr><td>East Peds:</td><td style="text-align: right;">3</td></tr> <tr><td>Peds Cross:</td><td style="text-align: right;">☒</td></tr> </table> </td> </tr> </table>  Yonge St  Montgomery Dr <table style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td style="width: 30%; vertical-align: top;"> <table style="width: 100%; border-collapse: collapse;"> <tr><td>Cars</td><td style="text-align: right;">416</td></tr> <tr><td>Trucks</td><td style="text-align: right;">2</td></tr> <tr><td>Heavys</td><td style="text-align: right;">15</td></tr> <tr><td>Totals</td><td style="text-align: right;">433</td></tr> </table> </td> <td style="width: 10%; 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text-align: right;">6</td></tr> <tr><td></td><td style="text-align: right;">13</td><td style="text-align: right;">0</td><td style="text-align: right;">0</td><td style="border-left: 1px solid black; text-align: right;">13</td></tr> <tr><td></td><td style="text-align: right;">19</td><td style="text-align: right;">0</td><td style="text-align: right;">0</td><td style="border-left: 1px solid black;"></td></tr> </table> </td> </tr> </table>  Yonge St  Montgomery Dr <table style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td style="width: 30%; vertical-align: top;"> <table style="width: 100%; border-collapse: collapse;"> <tr><td>Cars</td><td style="text-align: right;">416</td></tr> <tr><td>Trucks</td><td style="text-align: right;">2</td></tr> <tr><td>Heavys</td><td style="text-align: right;">15</td></tr> <tr><td>Totals</td><td style="text-align: right;">433</td></tr> </table> </td> <td style="width: 10%; text-align: center; vertical-align: middle;">↓</td> <td style="width: 30%; 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Afternoon Peak Diagram		Specified Period From: 16:00:00 To: 19:00:00	One Hour Peak From: 16:00:00 To: 17:00:00																																																																																																	
Municipality: Barrie Site #: 2114100002 Intersection: Yonge St & Montgomery Dr TFR File #: 1 Count date: 7-Dec-21		Weather conditions: Person counted: Person prepared: Person checked:																																																																																																		
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Total Count Diagram

Municipality: Barrie
Site #: 2114100002
Intersection: Yonge St & Montgomery Dr
TFR File #: 1
Count date: 7-Dec-21

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

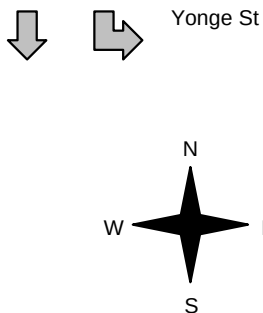
Major Road: Yonge St runs N/S

North Leg Total: 4523
 North Entering: 2229
 North Peds: 0
 Peds Cross: 

Heavys	38	2	40
Trucks	15	0	15
Cars	2098	76	2174
Totals	2151	78	

Heavys	55
Trucks	25
Cars	2214
Totals	2294

East Leg Total: 242
 East Entering: 95
 East Peds: 15
 Peds Cross: 



Cars	Trucks	Heavys	Totals
35	0	0	35
59	0	1	60
94	0	1	

Montgomery Dr



Cars	Trucks	Heavys	Totals
142	0	5	147

Cars	2157
Trucks	15
Heavys	39
Totals	2211

Cars	2179	66	2245
Trucks	25	0	25
Heavys	55	3	58
Totals	2259	69	

Peds Cross: 
 South Peds: 0
 South Entering: 2328
 South Leg Total: 4539

Comments

Traffic Count Summary

Intersection: Yonge St & Montgomery Dr					Count Date: 7-Dec-21		Municipality: Barrie					
North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	12	377	0	389	0	764	8:00:00	0	353	22	375	0
9:00:00	5	380	0	385	0	857	9:00:00	0	456	16	472	0
16:00:00	0	0	0	0	0	1	16:00:00	0	1	0	1	0
17:00:00	23	553	0	576	0	1174	17:00:00	0	586	12	598	0
18:00:00	20	488	0	508	0	1026	18:00:00	0	506	12	518	0
19:00:00	18	353	0	371	0	735	19:00:00	0	357	7	364	0



Count Date: 7-Dec-21 Site #: 2114100002																					
Interval Time	Passenger Cars - South Approach						Trucks - South Approach						Heavys - South Approach						Pedestrians		
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		South Cross		
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:15:00	0	0	44	44	1	1	0	0	3	3	0	0	0	0	5	5	0	0	0	0	
7:30:00	0	0	108	64	2	1	0	0	4	1	0	0	0	0	8	3	0	0	0	0	
7:45:00	0	0	187	79	6	4	0	0	5	1	0	0	0	0	15	7	0	0	0	0	
8:00:00	0	0	328	141	21	15	0	0	6	1	0	0	0	0	19	4	1	1	0	0	
8:15:00	0	0	447	119	28	7	0	0	9	3	0	0	0	0	25	6	2	1	0	0	
8:30:00	0	0	546	99	30	2	0	0	9	0	0	0	0	0	33	8	2	0	0	0	
8:45:00	0	0	645	99	34	4	0	0	10	1	0	0	0	0	35	2	3	1	0	0	
9:00:00	0	0	760	115	35	1	0	0	12	2	0	0	0	0	37	2	3	0	0	0	
9:15:00	0	0	760	0	35	0	0	0	13	1	0	0	0	0	37	0	3	0	0	0	
16:00:00	0	0	760	0	35	0	0	0	13	0	0	0	0	0	37	0	3	0	0	0	
16:15:00	0	0	884	124	37	2	0	0	15	2	0	0	0	0	42	5	3	0	0	0	
16:30:00	0	0	1024	140	39	2	0	0	17	2	0	0	0	0	44	2	3	0	0	0	
16:45:00	0	0	1181	157	43	4	0	0	20	3	0	0	0	0	46	2	3	0	0	0	
17:00:00	0	0	1330	149	47	4	0	0	20	0	0	0	0	0	46	0	3	0	0	0	
17:15:00	0	0	1457	127	54	7	0	0	20	0	0	0	0	0	50	4	3	0	0	0	
17:30:00	0	0	1590	133	56	2	0	0	20	0	0	0	0	0	51	1	3	0	0	0	
17:45:00	0	0	1715	125	56	0	0	0	22	2	0	0	0	0	51	0	3	0	0	0	
18:00:00	0	0	1829	114	59	3	0	0	22	0	0	0	0	0	51	0	3	0	0	0	
18:15:00	0	0	1927	98	61	2	0	0	22	0	0	0	0	0	52	1	3	0	0	0	
18:30:00	0	0	2019	92	63	2	0	0	22	0	0	0	0	0	53	1	3	0	0	0	
18:45:00	0	0	2109	90	64	1	0	0	23	1	0	0	0	0	54	1	3	0	0	0	
19:00:00	0	0	2179	70	66	2	0	0	25	2	0	0	0	0	55	1	3	0	0	0	
19:15:00	0	0	2179	0	66	0	0	0	25	0	0	0	0	0	55	0	3	0	0	0	
19:15:15	0	0	2179	0	66	0	0	0	25	0	0	0	0	0	55	0	3	0	0	0	
					</																

Appendix D – Synchro Analysis Output – Existing Traffic Volumes

667-675 Yonge Street
3: Yonge ST & Big Bay Point RD

Queues
Existing (2022) AM Peak Hour

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	156	223	64	409	176	71	447	45	115	324	223
Future Volume (vph)	156	223	64	409	176	71	447	45	115	324	223
Lane Group Flow (vph)	168	328	69	440	189	76	481	48	124	348	240
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases	4		8		8	2		2	6		6
Detector Phase	7	4	3	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	7.0	12.0	7.0	12.0	12.0	7.0	29.0	29.0	7.0	29.0	29.0
Minimum Split (s)	15.0	34.0	13.0	32.0	32.0	12.0	61.0	61.0	12.0	61.0	61.0
Total Split (s)	15.0	34.0	13.0	32.0	32.0	12.0	61.0	61.0	12.0	61.0	61.0
Total Split (%)	12.5%	28.3%	10.8%	26.7%	26.7%	10.0%	50.8%	50.8%	10.0%	50.8%	50.8%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max	Max
v/c Ratio	0.68	0.47	0.24	0.77	0.50	0.17	0.32	0.07	0.27	0.23	0.30
Control Delay	44.2	36.7	28.8	54.0	15.0	17.4	19.7	0.2	20.1	18.0	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.2	36.7	28.8	54.0	15.0	17.4	19.7	0.2	20.1	18.0	4.9
Queue Length 50th (m)	29.7	32.2	11.4	52.7	6.8	9.3	36.1	0.0	15.7	24.9	3.8
Queue Length 95th (m)	#49.7	47.1	22.4	71.1	28.8	19.5	52.4	0.0	29.3	37.6	19.5
Internal Link Dist (m)		414.7		323.5			305.9			337.7	
Turn Bay Length (m)	60.0		65.0		25.0	40.0		35.0	50.0		15.0
Base Capacity (vph)	248	755	302	708	429	458	1499	717	467	1534	801
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.43	0.23	0.62	0.44	0.17	0.32	0.07	0.27	0.23	0.30

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 114.7

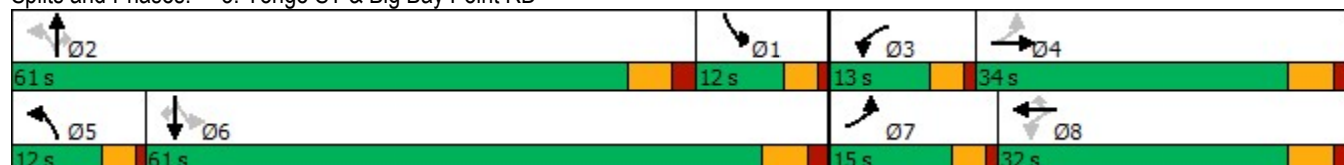
Natural Cycle: 120

Control Type: Semi Act-Uncoord

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Yonge ST & Big Bay Point RD



667-675 Yonge Street
3: Yonge ST & Big Bay Point RD

HCM Signalized Intersection Capacity Analysis

Existing (2022) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	223	82	64	409	176	71	447	45	115	324	223
Future Volume (vph)	156	223	82	64	409	176	71	447	45	115	324	223
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1562	2931		1545	3124	1366	1577	3124	1366	1577	3065	1393
Flt Permitted	0.27	1.00		0.55	1.00	1.00	0.49	1.00	1.00	0.48	1.00	1.00
Satd. Flow (perm)	440	2931		900	3124	1366	815	3124	1366	792	3065	1393
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	168	240	88	69	440	189	76	481	48	124	348	240
RTOR Reduction (vph)	0	32	0	0	0	126	0	0	25	0	0	106
Lane Group Flow (vph)	168	296	0	69	440	63	76	481	23	124	348	134
Confl. Peds. (#/hr)	1		3	3		1	1		1	1		1
Heavy Vehicles (%)	4%	7%	3%	5%	4%	5%	3%	4%	5%	3%	6%	3%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	36.8	26.0		28.7	21.9	21.9	55.1	55.1	55.1	59.4	57.4	57.4
Effective Green, g (s)	36.8	26.0		28.7	21.9	21.9	55.1	55.1	55.1	59.4	57.4	57.4
Actuated g/C Ratio	0.32	0.22		0.25	0.19	0.19	0.47	0.47	0.47	0.51	0.49	0.49
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	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	3.0
Lane Grp Cap (vph)	244	654		259	587	257	426	1478	646	461	1511	686
v/s Ratio Prot	c0.06	0.10		0.02	0.14		0.01	c0.15		c0.02	0.11	
v/s Ratio Perm	c0.15			0.05		0.05	0.07		0.02	0.12		0.10
v/c Ratio	0.69	0.45		0.27	0.75	0.25	0.18	0.33	0.04	0.27	0.23	0.20
Uniform Delay, d1	31.3	39.1		34.6	44.7	40.2	17.1	19.1	16.4	16.5	16.9	16.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.8	0.5		0.6	5.2	0.5	0.2	0.6	0.1	0.3	0.4	0.6
Delay (s)	39.1	39.6		35.1	49.9	40.7	17.3	19.7	16.5	16.9	17.2	17.2
Level of Service	D	D		D	D	D	B	B	B	B	B	B
Approach Delay (s)		39.4			45.9			19.1			17.1	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			30.0		HCM 2000 Level of Service					C		
HCM 2000 Volume to Capacity ratio			0.47									
Actuated Cycle Length (s)			116.4		Sum of lost time (s)					20.0		
Intersection Capacity Utilization			70.3%		ICU Level of Service					C		
Analysis Period (min)			15									
c Critical Lane Group												

667-675 Yonge Street
13: Yonge ST & Montgomery DR

HCM Unsignalized Intersection Capacity Analysis

Existing (2022) AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	16	7	602	39	15	524
Future Volume (Veh/h)	16	7	602	39	15	524
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	20	9	762	49	19	663
Pedestrians	3					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			TWLT		TWLT	
Median storage (veh)			2		2	
Upstream signal (m)			238		330	
pX, platoon unblocked	0.95	0.95			0.95	
vC, conflicting volume	1159	408			814	
vC1, stage 1 conf vol	790					
vC2, stage 2 conf vol	370					
vCu, unblocked vol	1061	270			697	
tC, single (s)	6.8	6.9			4.4	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.4	
p0 queue free %	95	99			97	
cM capacity (veh/h)	401	695			759	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	29	508	303	19	332	332
Volume Left	20	0	0	19	0	0
Volume Right	9	0	49	0	0	0
cSH	462	1700	1700	759	1700	1700
Volume to Capacity	0.06	0.30	0.18	0.03	0.20	0.20
Queue Length 95th (m)	1.6	0.0	0.0	0.6	0.0	0.0
Control Delay (s)	13.3	0.0	0.0	9.9	0.0	0.0
Lane LOS	B			A		
Approach Delay (s)	13.3	0.0		0.3		
Approach LOS	B					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			27.9%		ICU Level of Service	A
Analysis Period (min)			15			

667-675 Yonge Street
10: Yonge ST & Madelaine DR/Ashford DR

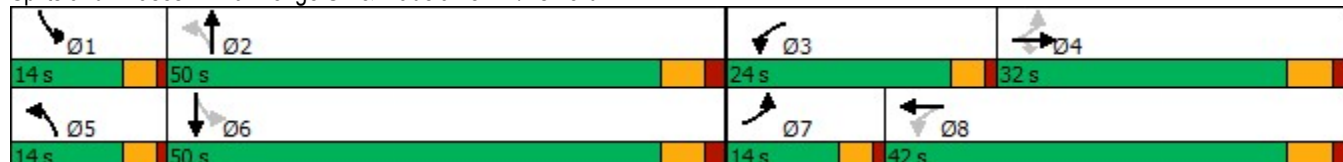
Queues
Existing (2022) AM Peak Hour

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	102	128	24	79	98	23	415	41	276
Future Volume (vph)	102	128	24	79	98	23	415	41	276
Lane Group Flow (vph)	109	136	26	84	134	24	500	44	358
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	26.0	26.0	7.0	26.0	7.0	44.0	7.0	44.0
Minimum Split (s)	11.0	32.0	32.0	11.0	35.0	11.0	50.0	11.0	50.0
Total Split (s)	14.0	32.0	32.0	24.0	42.0	14.0	50.0	14.0	50.0
Total Split (%)	11.7%	26.7%	26.7%	20.0%	35.0%	11.7%	41.7%	11.7%	41.7%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	1.0	2.0	1.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	None	Max
v/c Ratio	0.22	0.27	0.05	0.17	0.29	0.05	0.34	0.10	0.24
Control Delay	21.8	33.4	0.2	21.3	31.0	12.4	20.6	12.8	17.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.8	33.4	0.2	21.3	31.0	12.4	20.6	12.8	17.3
Queue Length 50th (m)	15.2	24.1	0.0	11.6	21.8	2.4	37.7	4.4	19.8
Queue Length 95th (m)	27.8	43.5	0.0	22.4	39.8	6.6	53.7	10.2	36.7
Internal Link Dist (m)		240.2			213.8		240.7		213.8
Turn Bay Length (m)	30.0			75.0		20.0		20.0	
Base Capacity (vph)	504	504	547	612	634	560	1461	482	1490
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	0.22	0.27	0.05	0.14	0.21	0.04	0.34	0.09	0.24

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 102.2
Natural Cycle: 110
Control Type: Semi Act-Uncoord

Splits and Phases: 10: Yonge ST & Madelaine DR/Ashford DR



667-675 Yonge Street
10: Yonge ST & Madelaine DR/Ashford DR

HCM Signalized Intersection Capacity Analysis
Existing (2022) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	128	24	79	98	28	23	415	55	41	276	60
Future Volume (vph)	102	128	24	79	98	28	23	415	55	41	276	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00		0.98	1.00	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.98		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)	1781	1776	1584	1780	1771		1705	3367		1774	3248	
Flt Permitted	0.62	1.00	1.00	0.67	1.00		0.54	1.00		0.41	1.00	
Satd. Flow (perm)	1168	1776	1584	1256	1771		965	3367		763	3248	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	109	136	26	84	104	30	24	441	59	44	294	64
RTOR Reduction (vph)	0	0	19	0	9	0	0	8	0	0	13	0
Lane Group Flow (vph)	109	136	7	84	125	0	24	492	0	44	345	0
Confl. Peds. (#/hr)	4		4	4		4	9		37	37		9
Heavy Vehicles (%)	1%	7%	0%	1%	3%	4%	5%	4%	2%	0%	8%	4%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	38.1	29.1	29.1	34.5	27.3		47.6	44.9		50.8	46.5	
Effective Green, g (s)	38.1	29.1	29.1	34.5	27.3		47.6	44.9		50.8	46.5	
Actuated g/C Ratio	0.36	0.28	0.28	0.33	0.26		0.45	0.43		0.48	0.44	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	474	489	436	446	458		454	1432		408	1431	
v/s Ratio Prot	c0.02	c0.08		0.01	0.07		0.00	c0.15		c0.00	0.11	
v/s Ratio Perm	0.06		0.00	0.05			0.02			0.05		
v/c Ratio	0.23	0.28	0.02	0.19	0.27		0.05	0.34		0.11	0.24	
Uniform Delay, d1	23.0	30.0	27.8	25.1	31.2		16.1	20.4		14.7	18.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.3	0.0	0.2	0.3		0.0	0.7		0.1	0.4	
Delay (s)	23.2	30.3	27.8	25.3	31.5		16.2	21.0		14.8	18.9	
Level of Service	C	C	C	C	C		B	C		B	B	
Approach Delay (s)		27.2			29.1			20.8			18.4	
Approach LOS		C			C			C			B	
Intersection Summary												
HCM 2000 Control Delay			22.6			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.30									
Actuated Cycle Length (s)			105.5			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			77.5%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

667-675 Yonge Street
3: Yonge ST & Big Bay Point RD

Queues
Existing (2022) PM Peak Hour

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	299	463	149	405	160	146	686	101	210	669	253
Future Volume (vph)	299	463	149	405	160	146	686	101	210	669	253
Lane Group Flow (vph)	308	620	154	418	165	151	707	104	216	690	261
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases	4		8		8	2		2	6		6
Detector Phase	7	4	3	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	4.0	12.0	7.0	12.0	12.0	7.0	29.0	29.0	7.0	29.0	29.0
Minimum Split (s)	19.0	34.0	17.0	32.0	32.0	11.0	55.0	55.0	11.0	57.0	57.0
Total Split (s)	19.0	34.0	17.0	32.0	32.0	12.0	55.0	55.0	14.0	57.0	57.0
Total Split (%)	15.8%	28.3%	14.2%	26.7%	26.7%	10.0%	45.8%	45.8%	11.7%	47.5%	47.5%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max	Max
v/c Ratio	0.86	0.81	0.60	0.66	0.40	0.50	0.46	0.14	0.51	0.43	0.34
Control Delay	53.0	50.4	35.9	48.8	10.4	26.7	25.4	3.5	31.0	23.7	13.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.0	50.4	35.9	48.8	10.4	26.7	25.4	3.5	31.0	23.7	13.9
Queue Length 50th (m)	55.3	71.2	25.1	48.8	2.0	21.7	63.1	0.0	31.2	59.2	22.4
Queue Length 95th (m)	#86.8	93.5	41.1	65.9	20.5	38.1	85.0	8.7	51.5	80.2	45.1
Internal Link Dist (m)		414.7		323.5			305.9			337.7	
Turn Bay Length (m)	60.0		65.0		25.0	40.0		35.0	50.0		15.0
Base Capacity (vph)	358	869	280	794	477	304	1527	745	425	1589	767
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.71	0.55	0.53	0.35	0.50	0.46	0.14	0.51	0.43	0.34

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 114.9

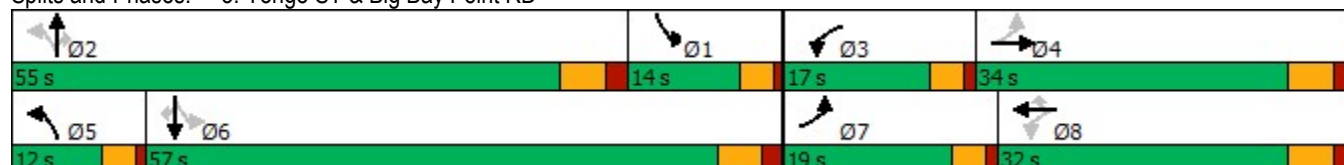
Natural Cycle: 120

Control Type: Semi Act-Uncoord

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Yonge ST & Big Bay Point RD



667-675 Yonge Street
3: Yonge ST & Big Bay Point RD

HCM Signalized Intersection Capacity Analysis

Existing (2022) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	299	463	139	149	405	160	146	686	101	210	669	253
Future Volume (vph)	299	463	139	149	405	160	146	686	101	210	669	253
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	3468		1786	3505	1578	1787	3574	1586	1786	3574	1592
Flt Permitted	0.29	1.00		0.21	1.00	1.00	0.26	1.00	1.00	0.38	1.00	1.00
Satd. Flow (perm)	543	3468		393	3505	1578	481	3574	1586	720	3574	1592
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)	308	477	143	154	418	165	151	707	104	216	690	261
RTOR Reduction (vph)	0	24	0	0	0	127	0	0	60	0	0	60
Lane Group Flow (vph)	308	596	0	154	418	38	151	707	44	216	690	201
Confl. Peds. (#/hr)	1		7	7		1	2		5	5		2
Heavy Vehicles (%)	0%	0%	0%	1%	3%	1%	1%	1%	0%	1%	1%	0%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	39.5	24.5		32.3	20.9	20.9	49.1	49.1	49.1	53.1	51.1	51.1
Effective Green, g (s)	39.5	24.5		32.3	20.9	20.9	49.1	49.1	49.1	53.1	51.1	51.1
Actuated g/C Ratio	0.34	0.21		0.28	0.18	0.18	0.43	0.43	0.43	0.46	0.44	0.44
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	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	3.0
Lane Grp Cap (vph)	351	739		248	637	287	295	1527	677	424	1589	708
v/s Ratio Prot	c0.11	0.17		0.06	0.12		0.04	c0.20		c0.04	0.19	
v/s Ratio Perm	c0.19			0.11		0.02	0.18		0.03	c0.19		0.13
v/c Ratio	0.88	0.81		0.62	0.66	0.13	0.51	0.46	0.07	0.51	0.43	0.28
Uniform Delay, d1	30.9	42.9		33.1	43.7	39.4	21.7	23.5	19.4	23.7	22.0	20.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	21.1	6.4		4.8	2.4	0.2	1.5	1.0	0.2	1.0	0.9	1.0
Delay (s)	52.0	49.4		37.8	46.1	39.6	23.2	24.5	19.6	24.7	22.8	21.3
Level of Service	D	D		D	D	D	C	C	B	C	C	C
Approach Delay (s)		50.2			42.9			23.8			22.8	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			33.7									HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			114.9									Sum of lost time (s) 20.0
Intersection Capacity Utilization			80.5%									ICU Level of Service D
Analysis Period (min)			15									
c Critical Lane Group												

667-675 Yonge Street
13: Yonge ST & Montgomery DR

HCM Unsignalized Intersection Capacity Analysis
Existing (2022) PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 		 	 
Traffic Volume (veh/h)	20	14	823	17	32	777
Future Volume (Veh/h)	20	14	823	17	32	777
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	22	15	885	18	34	835
Pedestrians	3					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			TWLTL		TWLTL	
Median storage (veh)			2		2	
Upstream signal (m)			238		330	
pX, platoon unblocked	0.86	0.82			0.82	
vC, conflicting volume	1382	454			906	
vC1, stage 1 conf vol	897					
vC2, stage 2 conf vol	486					
vCu, unblocked vol	711	0			455	
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 %	95	98			96	
cM capacity (veh/h)	464	895			916	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	37	590	313	34	418	418
Volume Left	22	0	0	34	0	0
Volume Right	15	0	18	0	0	0
cSH	577	1700	1700	916	1700	1700
Volume to Capacity	0.06	0.35	0.18	0.04	0.25	0.25
Queue Length 95th (m)	1.6	0.0	0.0	0.9	0.0	0.0
Control Delay (s)	11.7	0.0	0.0	9.1	0.0	0.0
Lane LOS	B			A		
Approach Delay (s)	11.7	0.0		0.4		
Approach LOS	B					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			36.6%		ICU Level of Service	A
Analysis Period (min)			15			

667-675 Yonge Street
10: Yonge ST & Madelaine DR/Ashford DR

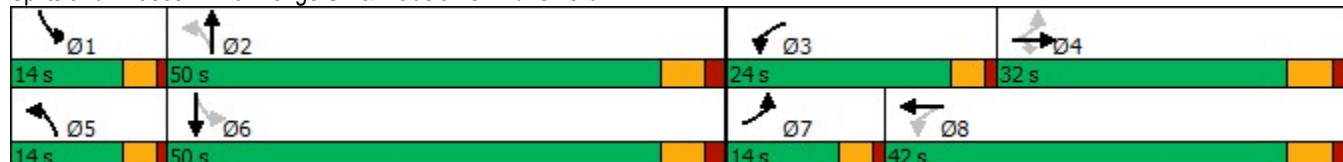
Queues
Existing (2022) PM Peak Hour

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	123	194	31	55	82	42	709	91	550
Future Volume (vph)	123	194	31	55	82	42	709	91	550
Lane Group Flow (vph)	134	211	34	60	119	46	974	99	795
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	26.0	26.0	7.0	26.0	7.0	44.0	7.0	44.0
Minimum Split (s)	11.0	32.0	32.0	11.0	35.0	11.0	50.0	11.0	50.0
Total Split (s)	14.0	32.0	32.0	24.0	42.0	14.0	50.0	14.0	50.0
Total Split (%)	11.7%	26.7%	26.7%	20.0%	35.0%	11.7%	41.7%	11.7%	41.7%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	1.0	2.0	1.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	None	Max
v/c Ratio	0.28	0.41	0.06	0.14	0.27	0.14	0.70	0.36	0.52
Control Delay	24.1	36.5	0.2	22.5	31.7	12.9	29.1	16.0	23.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.1	36.5	0.2	22.5	31.7	12.9	29.1	16.0	23.0
Queue Length 50th (m)	19.4	39.2	0.0	8.3	19.0	4.6	90.3	10.3	65.1
Queue Length 95th (m)	34.4	65.1	0.0	17.7	36.1	10.3	117.5	18.9	85.8
Internal Link Dist (m)		240.2			213.8		240.7		213.8
Turn Bay Length (m)	30.0			75.0		20.0		20.0	
Base Capacity (vph)	486	517	533	554	598	384	1392	296	1519
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	0.28	0.41	0.06	0.11	0.20	0.12	0.70	0.33	0.52

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 107.9
Natural Cycle: 110
Control Type: Semi Act-Uncoord

Splits and Phases: 10: Yonge ST & Madelaine DR/Ashford DR



667-675 Yonge Street
10: Yonge ST & Madelaine DR/Ashford DR

HCM Signalized Intersection Capacity Analysis

Existing (2022) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	123	194	31	55	82	28	42	709	187	91	550	181
Future Volume (vph)	123	194	31	55	82	28	42	709	187	91	550	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		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	1.00	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1799	1881	1584	1800	1766		1802	3375		1805	3410	
Flt Permitted	0.62	1.00	1.00	0.58	1.00		0.27	1.00		0.16	1.00	
Satd. Flow (perm)	1167	1881	1584	1106	1766		513	3375		296	3410	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	134	211	34	60	89	30	46	771	203	99	598	197
RTOR Reduction (vph)	0	0	25	0	11	0	0	18	0	0	24	0
Lane Group Flow (vph)	134	211	9	60	108	0	46	956	0	99	771	0
Confl. Peds. (#/hr)	4		4	4		4	9		37	37		9
Heavy Vehicles (%)	0%	1%	0%	0%	4%	0%	0%	1%	0%	0%	1%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	39.1	29.7	29.7	33.5	26.9		50.8	44.9		55.8	47.4	
Effective Green, g (s)	39.1	29.7	29.7	33.5	26.9		50.8	44.9		55.8	47.4	
Actuated g/C Ratio	0.36	0.27	0.27	0.31	0.25		0.46	0.41		0.51	0.43	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	470	509	429	379	433		307	1382		266	1474	
v/s Ratio Prot	c0.02	c0.11		0.01	0.06		0.01	c0.28		c0.03	0.23	
v/s Ratio Perm	0.08		0.01	0.04			0.06			0.16		
v/c Ratio	0.29	0.41	0.02	0.16	0.25		0.15	0.69		0.37	0.52	
Uniform Delay, d1	24.5	32.8	29.3	27.3	33.2		16.7	26.6		16.7	22.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.5	0.0	0.2	0.3		0.2	2.9		0.9	1.3	
Delay (s)	24.9	33.4	29.3	27.5	33.5		16.9	29.5		17.6	24.1	
Level of Service	C	C	C	C	C		B	C		B	C	
Approach Delay (s)		30.0			31.5			28.9			23.4	
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	0.55											
Actuated Cycle Length (s)	109.6			Sum of lost time (s)			20.0					
Intersection Capacity Utilization	87.6%			ICU Level of Service			E					
Analysis Period (min)	15											
c Critical Lane Group												

Appendix E – OTM Signal Justification Sheets

Justification No. 7 - 2034 Total Traffic (Critical Case)

Yonge St / Montgomery Drive

Justification	Description		Compliance			Signal Warrant	Underground Provisions Warrant
			Sectional		Entire %		
			Rest. Flow	Numerical			
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	720	1193	166%	110%	YES	YES
	B. Vehicle volume, along minor streets (average hour)	255	1141	448%		YES	YES
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	720	31	4%	3%	NO	NO
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	75	591	788%		YES	YES

Justification No. 7 - 2034 Total Traffic (Critical Case)

Site Access / Montgomery Drive

Justification	Description		Compliance			Signal Warrant	Underground Provisions Warrant
			Sectional		Entire %		
			Rest. Flow	Numerical			
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	720	117	16%	8%	NO	NO
	B. Vehicle volume, along minor streets (average hour)	255	32	13%		NO	NO
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	720	61	8%	6%	NO	NO
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	75	31	41%		NO	NO

Appendix F – Synchro Analysis Output – Background Traffic Volumes

667-675 Yonge Street
3: Yonge ST & Big Bay Point RD

Queues
BG (2024) AM Peak Hour

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	166	233	113	426	190	156	563	76	123	392	237
Future Volume (vph)	166	233	113	426	190	156	563	76	123	392	237
Lane Group Flow (vph)	178	390	122	458	204	168	605	82	132	422	255
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases	4		8		8	2		2	6		6
Detector Phase	7	4	3	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	6.0	12.0	6.0	12.0	12.0	6.0	29.0	29.0	6.0	29.0	29.0
Minimum Split (s)	10.0	32.0	10.0	32.0	32.0	10.0	35.0	35.0	10.0	35.0	35.0
Total Split (s)	22.0	43.0	15.0	36.0	36.0	21.0	46.0	46.0	16.0	41.0	41.0
Total Split (%)	18.3%	35.8%	12.5%	30.0%	30.0%	17.5%	38.3%	38.3%	13.3%	34.2%	34.2%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max	Max
v/c Ratio	0.55	0.51	0.37	0.74	0.48	0.46	0.50	0.13	0.40	0.40	0.44
Control Delay	27.9	28.0	24.3	47.4	10.6	27.5	27.7	0.4	34.6	29.3	16.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.9	28.0	24.3	47.4	10.6	27.5	27.7	0.4	34.6	29.3	16.3
Queue Length 50th (m)	24.9	28.6	16.5	48.2	2.2	23.0	50.0	0.0	19.2	35.4	17.2
Queue Length 95th (m)	43.4	45.2	30.6	71.0	22.8	48.3	83.2	0.0	41.3	60.6	48.8
Internal Link Dist (m)		414.7		323.5			305.9			337.7	
Turn Bay Length (m)	60.0		65.0		25.0	40.0		35.0	50.0		15.0
Base Capacity (vph)	371	1100	349	911	533	409	1215	625	385	1067	576
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.35	0.35	0.50	0.38	0.41	0.50	0.13	0.34	0.40	0.44

Intersection Summary

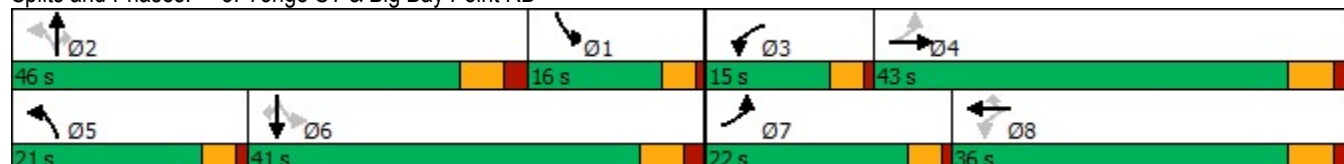
Cycle Length: 120

Actuated Cycle Length: 104

Natural Cycle: 90

Control Type: Semi Act-Uncoord

Splits and Phases: 3: Yonge ST & Big Bay Point RD



667-675 Yonge Street
3: Yonge ST & Big Bay Point RD

HCM Signalized Intersection Capacity Analysis

BG (2024) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	166	233	129	113	426	190	156	563	76	123	392	237
Future Volume (vph)	166	233	129	113	426	190	156	563	76	123	392	237
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1562	2897		1545	3124	1366	1577	3124	1366	1577	3065	1393
Flt Permitted	0.27	1.00		0.52	1.00	1.00	0.37	1.00	1.00	0.42	1.00	1.00
Satd. Flow (perm)	448	2897		848	3124	1366	613	3124	1366	702	3065	1393
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	178	251	139	122	458	204	168	605	82	132	422	255
RTOR Reduction (vph)	0	69	0	0	0	153	0	0	50	0	0	91
Lane Group Flow (vph)	178	321	0	122	458	51	168	605	32	132	422	164
Confl. Peds. (#/hr)	1		3	3		1	1		1	1		1
Heavy Vehicles (%)	4%	7%	3%	5%	4%	5%	3%	4%	5%	3%	6%	3%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	38.9	25.1		30.4	20.6	20.6	40.5	40.5	40.5	38.3	36.3	36.3
Effective Green, g (s)	38.9	25.1		30.4	20.6	20.6	40.5	40.5	40.5	38.3	36.3	36.3
Actuated g/C Ratio	0.37	0.24		0.29	0.20	0.20	0.39	0.39	0.39	0.37	0.35	0.35
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	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	3.0
Lane Grp Cap (vph)	321	700		314	619	271	356	1218	532	329	1071	487
v/s Ratio Prot	c0.08	0.11		0.04	c0.15		0.06	c0.19		c0.03	0.14	
v/s Ratio Perm	0.13			0.08		0.04	0.13		0.02	0.12		0.12
v/c Ratio	0.55	0.46		0.39	0.74	0.19	0.47	0.50	0.06	0.40	0.39	0.34
Uniform Delay, d1	23.6	33.6		28.2	39.1	34.6	21.9	23.9	19.8	25.4	25.5	24.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	0.5		0.8	4.6	0.3	1.0	1.4	0.2	0.8	1.1	1.9
Delay (s)	25.7	34.0		29.0	43.7	35.0	22.9	25.4	20.0	26.3	26.5	26.7
Level of Service	C	C		C	D	C	C	C	B	C	C	C
Approach Delay (s)		31.4			39.1			24.4			26.6	
Approach LOS		C			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			30.1			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			103.8			Sum of lost time (s)				20.0		
Intersection Capacity Utilization			74.0%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

667-675 Yonge Street
13: Yonge ST & Montgomery DR

HCM Unsignalized Intersection Capacity Analysis
BG (2024) AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 		 	 
Traffic Volume (veh/h)	20	7	837	48	16	691
Future Volume (Veh/h)	20	7	837	48	16	691
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	25	9	1059	61	20	875
Pedestrians	3					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			TWLTL		TWLTL	
Median storage veh			2		2	
Upstream signal (m)			238		330	
pX, platoon unblocked	0.91	0.90			0.90	
vC, conflicting volume	1570	563			1123	
vC1, stage 1 conf vol	1092					
vC2, stage 2 conf vol	478					
vCu, unblocked vol	1307	295			916	
tC, single (s)	6.8	6.9			4.4	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.4	
p0 queue free %	92	99			97	
cM capacity (veh/h)	303	636			587	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	34	706	414	20	438	438
Volume Left	25	0	0	20	0	0
Volume Right	9	0	61	0	0	0
cSH	352	1700	1700	587	1700	1700
Volume to Capacity	0.10	0.42	0.24	0.03	0.26	0.26
Queue Length 95th (m)	2.5	0.0	0.0	0.8	0.0	0.0
Control Delay (s)	16.3	0.0	0.0	11.3	0.0	0.0
Lane LOS	C			B		
Approach Delay (s)	16.3	0.0		0.3		
Approach LOS	C					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			34.7%		ICU Level of Service	A
Analysis Period (min)			15			

667-675 Yonge Street
10: Yonge ST & Madelaine DR/Ashford DR

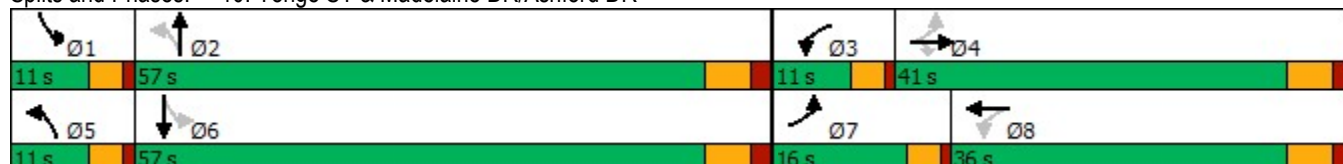
Queues
BG (2024) AM Peak Hour

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	123	167	60	97	135	102	560	64	367
Future Volume (vph)	123	167	60	97	135	102	560	64	367
Lane Group Flow (vph)	131	178	64	103	210	109	680	68	467
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	26.0	26.0	7.0	26.0	7.0	44.0	7.0	44.0
Minimum Split (s)	11.0	32.0	32.0	11.0	35.0	11.0	50.0	11.0	50.0
Total Split (s)	16.0	41.0	41.0	11.0	36.0	11.0	57.0	11.0	57.0
Total Split (%)	13.3%	34.2%	34.2%	9.2%	30.0%	9.2%	47.5%	9.2%	47.5%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	1.0	2.0	1.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	None	Max
v/c Ratio	0.34	0.39	0.13	0.26	0.51	0.23	0.43	0.17	0.32
Control Delay	27.1	37.9	2.6	26.3	40.7	13.6	21.9	13.1	20.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.1	37.9	2.6	26.3	40.7	13.6	21.9	13.1	20.3
Queue Length 50th (m)	20.7	34.7	0.0	16.0	40.3	11.8	56.8	7.2	35.2
Queue Length 95th (m)	35.3	55.9	4.1	28.7	65.7	21.2	74.1	14.3	48.4
Internal Link Dist (m)		240.2			213.8		240.7		213.8
Turn Bay Length (m)	30.0			75.0		20.0		20.0	
Base Capacity (vph)	400	542	553	403	469	468	1567	392	1461
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.33	0.12	0.26	0.45	0.23	0.43	0.17	0.32

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 114.6
Natural Cycle: 110
Control Type: Semi Act-Uncoord

Splits and Phases: 10: Yonge ST & Madelaine DR/Ashford DR



667-675 Yonge Street
10: Yonge ST & Madelaine DR/Ashford DR

HCM Signalized Intersection Capacity Analysis

BG (2024) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	123	167	60	97	135	62	102	560	79	64	367	72
Future Volume (vph)	123	167	60	97	135	62	102	560	79	64	367	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.99		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	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	0.95		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)	1784	1776	1583	1780	1742		1710	3357		1786	3254	
Flt Permitted	0.43	1.00	1.00	0.64	1.00		0.43	1.00		0.33	1.00	
Satd. Flow (perm)	802	1776	1583	1209	1742		782	3357		625	3254	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	131	178	64	103	144	66	109	596	84	68	390	77
RTOR Reduction (vph)	0	0	48	0	14	0	0	9	0	0	13	0
Lane Group Flow (vph)	131	178	16	103	196	0	109	671	0	68	454	0
Confl. Peds. (#/hr)	4		4	4		4	9		37	37		9
Heavy Vehicles (%)	1%	7%	0%	1%	3%	4%	5%	4%	2%	0%	8%	4%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	40.2	29.6	29.6	33.0	26.0		60.3	53.3		57.5	51.9	
Effective Green, g (s)	40.2	29.6	29.6	33.0	26.0		60.3	53.3		57.5	51.9	
Actuated g/C Ratio	0.35	0.26	0.26	0.29	0.23		0.52	0.46		0.50	0.45	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	369	455	405	380	392		464	1549		367	1462	
v/s Ratio Prot	c0.03	0.10		0.02	c0.11		c0.01	c0.20		0.01	0.14	
v/s Ratio Perm	0.09		0.01	0.06			0.11			0.08		
v/c Ratio	0.36	0.39	0.04	0.27	0.50		0.23	0.43		0.19	0.31	
Uniform Delay, d1	26.9	35.5	32.3	31.3	39.1		14.2	20.9		15.4	20.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.6	0.0	0.4	1.0		0.3	0.9		0.2	0.6	
Delay (s)	27.5	36.1	32.3	31.7	40.1		14.5	21.8		15.7	20.9	
Level of Service	C	D	C	C	D		B	C		B	C	
Approach Delay (s)		32.4			37.3			20.8			20.2	
Approach LOS		C			D			C			C	
Intersection Summary												
HCM 2000 Control Delay	25.4			HCM 2000 Level of Service			C					
HCM 2000 Volume to Capacity ratio	0.44											
Actuated Cycle Length (s)	115.5			Sum of lost time (s)			20.0					
Intersection Capacity Utilization	87.6%			ICU Level of Service			E					
Analysis Period (min)	15											
c Critical Lane Group												

667-675 Yonge Street
3: Yonge ST & Big Bay Point RD

Queues
BG (2024) PM Peak Hour

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	311	479	192	415	168	213	785	131	222	785	263
Future Volume (vph)	311	479	192	415	168	213	785	131	222	785	263
Lane Group Flow (vph)	321	719	198	428	173	220	809	135	229	809	271
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases	4		8		8	2		2	6		6
Detector Phase	7	4	3	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	6.0	12.0	6.0	12.0	12.0	6.0	29.0	29.0	6.0	29.0	29.0
Minimum Split (s)	10.0	31.0	10.0	25.0	25.0	10.0	35.0	35.0	10.0	35.0	35.0
Total Split (s)	31.0	39.0	17.0	25.0	25.0	20.0	44.0	44.0	20.0	44.0	44.0
Total Split (%)	25.8%	32.5%	14.2%	20.8%	20.8%	16.7%	36.7%	36.7%	16.7%	36.7%	36.7%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max	Max
v/c Ratio	0.74	0.83	0.74	0.72	0.41	0.74	0.66	0.21	0.60	0.66	0.43
Control Delay	35.4	45.7	43.9	52.5	7.7	43.5	35.4	4.0	43.5	35.4	17.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.4	45.7	43.9	52.5	7.7	43.5	35.4	4.0	43.5	35.4	17.1
Queue Length 50th (m)	53.8	78.4	30.7	50.3	0.0	38.7	87.3	0.0	40.4	87.3	23.6
Queue Length 95th (m)	78.8	101.4	#64.1	73.0	15.9	#70.7	116.4	10.7	66.4	116.4	51.0
Internal Link Dist (m)		414.7		323.5			305.9			337.7	
Turn Bay Length (m)	60.0		65.0		25.0	40.0		35.0	50.0		15.0
Base Capacity (vph)	518	1063	284	629	440	326	1229	647	411	1229	637
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.68	0.70	0.68	0.39	0.67	0.66	0.21	0.56	0.66	0.43

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 111.2

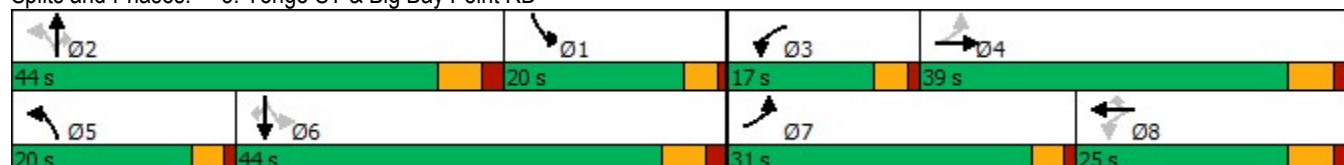
Natural Cycle: 90

Control Type: Semi Act-Uncoord

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Yonge ST & Big Bay Point RD



667-675 Yonge Street
3: Yonge ST & Big Bay Point RD

HCM Signalized Intersection Capacity Analysis
BG (2024) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	311	479	218	192	415	168	213	785	131	222	785	263
Future Volume (vph)	311	479	218	192	415	168	213	785	131	222	785	263
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	3417		1786	3505	1578	1787	3574	1587	1786	3574	1592
Flt Permitted	0.26	1.00		0.21	1.00	1.00	0.17	1.00	1.00	0.35	1.00	1.00
Satd. Flow (perm)	486	3417		400	3505	1578	311	3574	1587	651	3574	1592
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)	321	494	225	198	428	173	220	809	135	229	809	271
RTOR Reduction (vph)	0	46	0	0	0	144	0	0	88	0	0	89
Lane Group Flow (vph)	321	673	0	198	428	29	220	809	47	229	809	182
Confl. Peds. (#/hr)	1		7	7		1	2		5	5		2
Heavy Vehicles (%)	0%	0%	0%	1%	3%	1%	1%	1%	0%	1%	1%	0%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	42.7	26.8		30.7	18.8	18.8	38.3	38.3	38.3	40.3	38.3	38.3
Effective Green, g (s)	42.7	26.8		30.7	18.8	18.8	38.3	38.3	38.3	40.3	38.3	38.3
Actuated g/C Ratio	0.38	0.24		0.28	0.17	0.17	0.34	0.34	0.34	0.36	0.34	0.34
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	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	3.0
Lane Grp Cap (vph)	423	824		258	593	267	294	1232	547	380	1232	548
v/s Ratio Prot	c0.14	c0.20		0.08	0.12		c0.09	0.23		0.08	c0.23	
v/s Ratio Perm	0.16			0.13		0.02	c0.16		0.03	0.14		0.11
v/c Ratio	0.76	0.82		0.77	0.72	0.11	0.75	0.66	0.09	0.60	0.66	0.33
Uniform Delay, d1	26.5	39.8		33.2	43.7	39.1	29.3	30.8	24.6	31.4	30.8	26.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.6	6.3		12.8	4.3	0.2	10.0	2.7	0.3	2.7	2.7	1.6
Delay (s)	34.1	46.1		46.0	48.0	39.2	39.3	33.6	24.9	34.1	33.6	28.6
Level of Service	C	D		D	D	D	D	C	C	C	C	C
Approach Delay (s)		42.4			45.6			33.6			32.6	
Approach LOS		D			D			C			C	

Intersection Summary

HCM 2000 Control Delay	37.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	111.1	Sum of lost time (s)	20.0
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

667-675 Yonge Street
13: Yonge ST & Montgomery DR

HCM Unsignalized Intersection Capacity Analysis
BG (2024) PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (veh/h)	27	15	1014	24	33	1004
Future Volume (Veh/h)	27	15	1014	24	33	1004
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	29	16	1090	26	35	1080
Pedestrians	5					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			TWLT		TWLT	
Median storage (veh)			2		2	
Upstream signal (m)			238		330	
pX, platoon unblocked	0.86	0.78			0.78	
vC, conflicting volume	1718	563			1121	
vC1, stage 1 conf vol	1108					
vC2, stage 2 conf vol	610					
vCu, unblocked vol	694	0			597	
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 %	93	98			95	
cM capacity (veh/h)	396	849			771	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	45	727	389	35	540	540
Volume Left	29	0	0	35	0	0
Volume Right	16	0	26	0	0	0
cSH	489	1700	1700	771	1700	1700
Volume to Capacity	0.09	0.43	0.23	0.05	0.32	0.32
Queue Length 95th (m)	2.4	0.0	0.0	1.1	0.0	0.0
Control Delay (s)	13.1	0.0	0.0	9.9	0.0	0.0
Lane LOS	B			A		
Approach Delay (s)	13.1	0.0		0.3		
Approach LOS	B					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			38.8%		ICU Level of Service	A
Analysis Period (min)			15			

667-675 Yonge Street
10: Yonge ST & Madelaine DR/Ashford DR

Queues
BG (2024) PM Peak Hour

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	139	239	76	81	112	101	824	117	717
Future Volume (vph)	139	239	76	81	112	101	824	117	717
Lane Group Flow (vph)	151	260	83	88	173	110	1143	127	989
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	24.0	24.0	7.0	24.0	7.0	44.0	7.0	44.0
Minimum Split (s)	11.0	30.0	30.0	11.0	30.0	11.0	50.0	11.0	50.0
Total Split (s)	14.0	30.0	30.0	14.0	30.0	12.0	64.0	12.0	64.0
Total Split (%)	11.7%	25.0%	25.0%	11.7%	25.0%	10.0%	53.3%	10.0%	53.3%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	1.0	2.0	1.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	None	Max
v/c Ratio	0.42	0.61	0.19	0.29	0.47	0.37	0.69	0.51	0.59
Control Delay	33.4	50.1	6.3	30.8	43.2	13.9	25.8	17.8	23.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.4	50.1	6.3	30.8	43.2	13.9	25.8	17.8	23.0
Queue Length 50th (m)	27.1	60.1	0.0	15.2	34.6	11.0	109.2	12.8	87.1
Queue Length 95th (m)	44.7	90.6	10.1	28.1	57.9	19.1	134.7	21.7	108.2
Internal Link Dist (m)		240.2			213.8		240.7		213.8
Turn Bay Length (m)	30.0			75.0		20.0		20.0	
Base Capacity (vph)	361	425	435	323	365	305	1651	254	1685
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	0.42	0.61	0.19	0.27	0.47	0.36	0.69	0.50	0.59

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 119.6
Natural Cycle: 105
Control Type: Semi Act-Uncoord

Splits and Phases: 10: Yonge ST & Madelaine DR/Ashford DR

			
Ø1	Ø2	Ø3	Ø4
12 s	64 s	14 s	30 s
			
Ø5	Ø6	Ø7	Ø8
12 s	64 s	14 s	30 s

667-675 Yonge Street
10: Yonge ST & Madelaine DR/Ashford DR

HCM Signalized Intersection Capacity Analysis

BG (2024) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	139	239	76	81	112	47	101	824	227	117	717	193
Future Volume (vph)	139	239	76	81	112	47	101	824	227	117	717	193
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.99		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	1.00	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.97		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)	1801	1881	1583	1802	1756		1805	3360		1805	3431	
Flt Permitted	0.49	1.00	1.00	0.42	1.00		0.19	1.00		0.14	1.00	
Satd. Flow (perm)	935	1881	1583	794	1756		368	3360		266	3431	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	151	260	83	88	122	51	110	896	247	127	779	210
RTOR Reduction (vph)	0	0	64	0	13	0	0	21	0	0	20	0
Lane Group Flow (vph)	151	260	19	88	160	0	110	1122	0	127	969	0
Confl. Peds. (#/hr)	4		4	4		4	9		37	37		9
Heavy Vehicles (%)	0%	1%	0%	0%	4%	0%	0%	1%	0%	0%	1%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	36.9	27.1	27.1	32.3	24.8		65.7	58.0		65.9	58.1	
Effective Green, g (s)	36.9	27.1	27.1	32.3	24.8		65.7	58.0		65.9	58.1	
Actuated g/C Ratio	0.31	0.23	0.23	0.27	0.21		0.55	0.48		0.55	0.48	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	357	423	356	275	361		292	1618		245	1655	
v/s Ratio Prot	c0.03	c0.14		0.02	0.09		0.02	c0.33		c0.03	0.28	
v/s Ratio Perm	0.10		0.01	0.07			0.18			0.25		
v/c Ratio	0.42	0.61	0.05	0.32	0.44		0.38	0.69		0.52	0.59	
Uniform Delay, d1	31.8	42.0	36.6	34.1	41.8		15.2	24.3		16.9	22.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	2.6	0.1	0.7	0.9		0.8	2.5		1.9	1.5	
Delay (s)	32.6	44.6	36.6	34.8	42.6		16.0	26.8		18.8	24.0	
Level of Service	C	D	D	C	D		B	C		B	C	
Approach Delay (s)		39.6			40.0			25.8			23.4	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay	28.3			HCM 2000 Level of Service					C			
HCM 2000 Volume to Capacity ratio	0.65											
Actuated Cycle Length (s)	120.4			Sum of lost time (s)					20.0			
Intersection Capacity Utilization	87.5%			ICU Level of Service					E			
Analysis Period (min)	15											
c Critical Lane Group												

667-675 Yonge Street
3: Yonge ST & Big Bay Point RD

Queues
BG (2029) AM Peak Hour

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	192	270	124	495	219	168	639	83	142	446	274
Future Volume (vph)	192	270	124	495	219	168	639	83	142	446	274
Lane Group Flow (vph)	206	444	133	532	235	181	687	89	153	480	295
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases	4		8		8	2		2	6		6
Detector Phase	7	4	3	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	6.0	12.0	6.0	12.0	12.0	6.0	29.0	29.0	6.0	29.0	29.0
Minimum Split (s)	10.0	23.0	10.0	23.0	23.0	10.0	35.0	35.0	10.0	35.0	35.0
Total Split (s)	22.0	43.0	15.0	36.0	36.0	21.0	46.0	46.0	16.0	41.0	41.0
Total Split (%)	18.3%	35.8%	12.5%	30.0%	30.0%	17.5%	38.3%	38.3%	13.3%	34.2%	34.2%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max	Max
v/c Ratio	0.64	0.53	0.41	0.79	0.53	0.55	0.59	0.15	0.50	0.47	0.53
Control Delay	30.9	29.7	24.7	49.5	13.7	32.1	31.7	0.5	40.9	32.7	20.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.9	29.7	24.7	49.5	13.7	32.1	31.7	0.5	40.9	32.7	20.6
Queue Length 50th (m)	30.3	36.4	18.5	60.3	8.1	28.7	67.0	0.0	25.7	46.6	27.9
Queue Length 95th (m)	50.0	54.0	33.0	83.1	32.6	52.6	98.0	0.3	48.0	70.2	62.5
Internal Link Dist (m)		414.7		323.5			305.9			337.7	
Turn Bay Length (m)	60.0		65.0		25.0	40.0		35.0	50.0		15.0
Base Capacity (vph)	354	1053	343	872	519	366	1163	606	348	1015	556
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.42	0.39	0.61	0.45	0.49	0.59	0.15	0.44	0.47	0.53

Intersection Summary

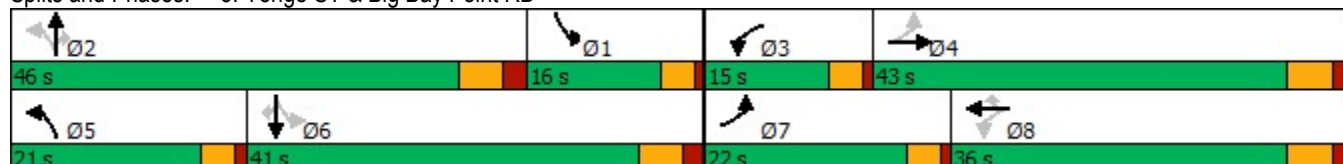
Cycle Length: 120

Actuated Cycle Length: 108.5

Natural Cycle: 80

Control Type: Semi Act-Uncoord

Splits and Phases: 3: Yonge ST & Big Bay Point RD



667-675 Yonge Street
3: Yonge ST & Big Bay Point RD

HCM Signalized Intersection Capacity Analysis

BG (2029) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	192	270	143	124	495	219	168	639	83	142	446	274
Future Volume (vph)	192	270	143	124	495	219	168	639	83	142	446	274
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1562	2900		1546	3124	1366	1577	3124	1366	1577	3065	1393
Flt Permitted	0.23	1.00		0.49	1.00	1.00	0.30	1.00	1.00	0.39	1.00	1.00
Satd. Flow (perm)	377	2900		790	3124	1366	504	3124	1366	648	3065	1393
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	206	290	154	133	532	235	181	687	89	153	480	295
RTOR Reduction (vph)	0	61	0	0	0	150	0	0	56	0	0	95
Lane Group Flow (vph)	206	383	0	133	532	85	181	687	33	153	480	200
Confl. Peds. (#/hr)	1		3	3		1	1		1	1		1
Heavy Vehicles (%)	4%	7%	3%	5%	4%	5%	3%	4%	5%	3%	6%	3%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	42.9	28.9		33.5	23.5	23.5	40.4	40.4	40.4	37.9	35.9	35.9
Effective Green, g (s)	42.9	28.9		33.5	23.5	23.5	40.4	40.4	40.4	37.9	35.9	35.9
Actuated g/C Ratio	0.40	0.27		0.31	0.22	0.22	0.37	0.37	0.37	0.35	0.33	0.33
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	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	3.0
Lane Grp Cap (vph)	317	773		314	677	296	321	1165	509	303	1016	461
v/s Ratio Prot	c0.09	0.13		0.04	c0.17		0.07	c0.22		c0.04	0.16	
v/s Ratio Perm	0.16			0.09		0.06	0.14		0.02	0.13		0.14
v/c Ratio	0.65	0.50		0.42	0.79	0.29	0.56	0.59	0.07	0.50	0.47	0.43
Uniform Delay, d1	23.9	33.5		28.3	40.0	35.4	24.6	27.3	21.8	30.0	28.7	28.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.5	0.5		0.9	6.0	0.5	2.3	2.2	0.2	1.3	1.6	3.0
Delay (s)	28.5	34.0		29.2	46.0	36.0	26.9	29.5	22.1	31.3	30.3	31.2
Level of Service	C	C		C	D	D	C	C	C	C	C	C
Approach Delay (s)		32.3			40.9			28.3			30.7	
Approach LOS		C			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			33.0			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			108.3			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			78.4%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

667-675 Yonge Street
13: Yonge ST & Montgomery DR

HCM Unsignalized Intersection Capacity Analysis

BG (2029) AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	23	9	938	55	18	779
Future Volume (Veh/h)	23	9	938	55	18	779
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	29	11	1187	70	23	986
Pedestrians	3					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			TWLTL		TWLTL	
Median storage veh			2		2	
Upstream signal (m)			238		330	
pX, platoon unblocked	0.91	0.88			0.88	
vC, conflicting volume	1764	632			1260	
vC1, stage 1 conf vol	1225					
vC2, stage 2 conf vol	539					
vCu, unblocked vol	1344	299			1016	
tC, single (s)	6.8	6.9			4.4	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.4	
p0 queue free %	89	98			96	
cM capacity (veh/h)	269	615			521	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	40	791	466	23	493	493
Volume Left	29	0	0	23	0	0
Volume Right	11	0	70	0	0	0
cSH	318	1700	1700	521	1700	1700
Volume to Capacity	0.13	0.47	0.27	0.04	0.29	0.29
Queue Length 95th (m)	3.4	0.0	0.0	1.1	0.0	0.0
Control Delay (s)	17.9	0.0	0.0	12.2	0.0	0.0
Lane LOS	C			B		
Approach Delay (s)	17.9	0.0		0.3		
Approach LOS	C					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			37.7%		ICU Level of Service	A
Analysis Period (min)			15			

667-675 Yonge Street
10: Yonge ST & Madelaine DR/Ashford DR

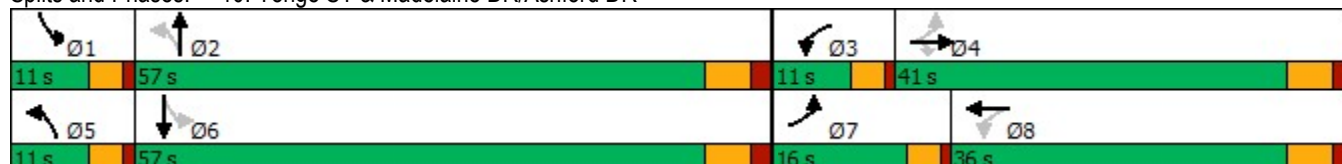
Queues
BG (2029) AM Peak Hour

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	140	188	65	110	152	106	630	71	413
Future Volume (vph)	140	188	65	110	152	106	630	71	413
Lane Group Flow (vph)	149	200	69	117	232	113	742	76	526
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	26.0	26.0	7.0	26.0	7.0	44.0	7.0	44.0
Minimum Split (s)	11.0	32.0	32.0	11.0	35.0	11.0	50.0	11.0	50.0
Total Split (s)	16.0	41.0	41.0	11.0	36.0	11.0	57.0	11.0	57.0
Total Split (%)	13.3%	34.2%	34.2%	9.2%	30.0%	9.2%	47.5%	9.2%	47.5%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	1.0	2.0	1.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	None	Max
v/c Ratio	0.41	0.43	0.14	0.30	0.57	0.26	0.47	0.21	0.36
Control Delay	28.2	38.7	3.2	27.1	42.9	14.1	22.9	13.7	21.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.2	38.7	3.2	27.1	42.9	14.1	22.9	13.7	21.2
Queue Length 50th (m)	23.9	39.5	0.0	18.4	46.0	12.4	64.4	8.1	41.1
Queue Length 95th (m)	39.7	62.4	5.6	31.9	72.9	22.0	83.3	15.7	55.6
Internal Link Dist (m)		240.2			213.8		240.7		213.8
Turn Bay Length (m)	30.0			75.0		20.0		20.0	
Base Capacity (vph)	380	540	551	388	467	436	1570	364	1455
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	0.39	0.37	0.13	0.30	0.50	0.26	0.47	0.21	0.36

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 115.1
Natural Cycle: 110
Control Type: Semi Act-Uncoord

Splits and Phases: 10: Yonge ST & Madelaine DR/Ashford DR



667-675 Yonge Street
10: Yonge ST & Madelaine DR/Ashford DR

HCM Signalized Intersection Capacity Analysis

BG (2029) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	140	188	65	110	152	66	106	630	68	71	413	82
Future Volume (vph)	140	188	65	110	152	66	106	630	68	71	413	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.99		1.00	0.99		1.00	0.99	
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	0.95		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)	1785	1776	1583	1781	1746		1712	3382		1790	3254	
Flt Permitted	0.39	1.00	1.00	0.61	1.00		0.40	1.00		0.30	1.00	
Satd. Flow (perm)	723	1776	1583	1147	1746		715	3382		564	3254	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	149	200	69	117	162	70	113	670	72	76	439	87
RTOR Reduction (vph)	0	0	51	0	13	0	0	6	0	0	13	0
Lane Group Flow (vph)	149	200	18	117	219	0	113	736	0	76	513	0
Confl. Peds. (#/hr)	4		4	4		4	9		37	37		9
Heavy Vehicles (%)	1%	7%	0%	1%	3%	4%	5%	4%	2%	0%	8%	4%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	40.9	30.0	30.0	33.1	26.1		60.3	53.3		57.5	51.9	
Effective Green, g (s)	40.9	30.0	30.0	33.1	26.1		60.3	53.3		57.5	51.9	
Actuated g/C Ratio	0.35	0.26	0.26	0.29	0.23		0.52	0.46		0.50	0.45	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	355	459	409	365	393		432	1555		339	1457	
v/s Ratio Prot	c0.04	0.11		0.02	c0.13		c0.02	c0.22		0.01	0.16	
v/s Ratio Perm	0.11		0.01	0.07			0.12			0.10		
v/c Ratio	0.42	0.44	0.04	0.32	0.56		0.26	0.47		0.22	0.35	
Uniform Delay, d1	27.1	35.9	32.2	31.7	39.8		14.5	21.6		15.8	21.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	0.7	0.0	0.5	1.7		0.3	1.0		0.3	0.7	
Delay (s)	27.9	36.5	32.2	32.2	41.5		14.9	22.6		16.2	21.6	
Level of Service	C	D	C	C	D		B	C		B	C	
Approach Delay (s)		32.8			38.4			21.6			21.0	
Approach LOS		C			D			C			C	
Intersection Summary												
HCM 2000 Control Delay	26.2			HCM 2000 Level of Service			C					
HCM 2000 Volume to Capacity ratio	0.48											
Actuated Cycle Length (s)	115.9			Sum of lost time (s)			20.0					
Intersection Capacity Utilization	88.6%			ICU Level of Service			E					
Analysis Period (min)	15											
c Critical Lane Group												

667-675 Yonge Street
3: Yonge ST & Big Bay Point RD

Queues
BG (2029) PM Peak Hour

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	343	529	208	459	186	229	859	142	245	857	291
Future Volume (vph)	343	529	208	459	186	229	859	142	245	857	291
Lane Group Flow (vph)	354	785	214	473	192	236	886	146	253	884	300
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases	4		8		8	2		2	6		6
Detector Phase	7	4	3	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	6.0	12.0	6.0	12.0	12.0	6.0	29.0	29.0	6.0	29.0	29.0
Minimum Split (s)	10.0	31.0	10.0	25.0	25.0	10.0	35.0	35.0	10.0	35.0	35.0
Total Split (s)	31.0	39.0	17.0	25.0	25.0	20.0	44.0	44.0	20.0	44.0	44.0
Total Split (%)	25.8%	32.5%	14.2%	20.8%	20.8%	16.7%	36.7%	36.7%	16.7%	36.7%	36.7%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max	Max
v/c Ratio	0.82	0.86	0.80	0.78	0.45	0.78	0.74	0.23	0.71	0.74	0.48
Control Delay	41.3	48.7	51.1	56.5	10.0	48.6	39.4	5.0	52.1	39.4	20.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.3	48.7	51.1	56.5	10.0	48.6	39.4	5.0	52.1	39.4	20.0
Queue Length 50th (m)	60.7	89.0	33.5	57.7	0.2	43.6	102.2	0.0	47.3	101.8	31.1
Queue Length 95th (m)	93.2	113.6	#74.9	#88.1	21.1	#78.9	130.3	13.3	#75.1	129.9	59.9
Internal Link Dist (m)		414.7		323.5			305.9			337.7	
Turn Bay Length (m)	60.0		65.0		25.0	40.0		35.0	50.0		15.0
Base Capacity (vph)	499	1030	276	619	435	318	1191	632	374	1191	621
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.76	0.78	0.76	0.44	0.74	0.74	0.23	0.68	0.74	0.48

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 114.5

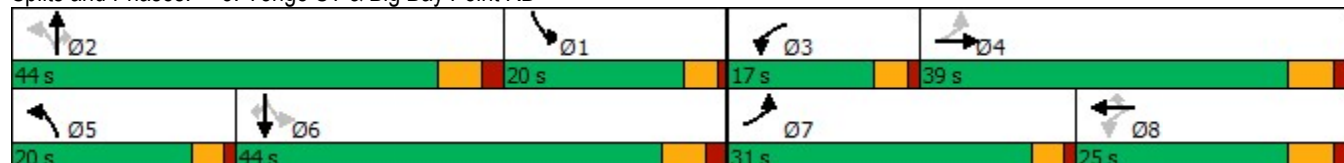
Natural Cycle: 90

Control Type: Semi Act-Uncoord

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Yonge ST & Big Bay Point RD



667-675 Yonge Street
3: Yonge ST & Big Bay Point RD

HCM Signalized Intersection Capacity Analysis

BG (2029) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	343	529	233	208	459	186	229	859	142	245	857	291
Future Volume (vph)	343	529	233	208	459	186	229	859	142	245	857	291
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	3421		1786	3505	1577	1787	3574	1586	1786	3574	1592
Flt Permitted	0.21	1.00		0.20	1.00	1.00	0.17	1.00	1.00	0.30	1.00	1.00
Satd. Flow (perm)	404	3421		382	3505	1577	322	3574	1586	559	3574	1592
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)	354	545	240	214	473	192	236	886	146	253	884	300
RTOR Reduction (vph)	0	43	0	0	0	158	0	0	97	0	0	91
Lane Group Flow (vph)	354	742	0	214	473	34	236	886	49	253	884	209
Confl. Peds. (#/hr)	1		7	7		1	2		5	5		2
Heavy Vehicles (%)	0%	0%	0%	1%	3%	1%	1%	1%	0%	1%	1%	0%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	45.5	29.0		32.2	19.7	19.7	38.2	38.2	38.2	40.2	38.2	38.2
Effective Green, g (s)	45.5	29.0		32.2	19.7	19.7	38.2	38.2	38.2	40.2	38.2	38.2
Actuated g/C Ratio	0.40	0.25		0.28	0.17	0.17	0.33	0.33	0.33	0.35	0.33	0.33
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	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	3.0
Lane Grp Cap (vph)	427	866		260	603	271	296	1192	529	354	1192	531
v/s Ratio Prot	c0.16	c0.22		0.09	0.13		0.10	c0.25		0.09	c0.25	
v/s Ratio Perm	0.17			0.14		0.02	c0.16		0.03	0.16		0.13
v/c Ratio	0.83	0.86		0.82	0.78	0.12	0.80	0.74	0.09	0.71	0.74	0.39
Uniform Delay, d1	27.1	40.8		34.2	45.4	40.1	31.2	33.8	26.2	34.6	33.8	29.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.5	8.4		18.6	6.6	0.2	13.8	4.2	0.3	6.7	4.2	2.2
Delay (s)	39.6	49.2		52.8	52.0	40.3	45.0	38.0	26.6	41.3	38.0	31.5
Level of Service	D	D		D	D	D	D	D	C	D	D	C
Approach Delay (s)		46.2			49.6			38.0			37.2	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			41.9			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			114.5			Sum of lost time (s)				20.0		
Intersection Capacity Utilization			88.2%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

667-675 Yonge Street
13: Yonge ST & Montgomery DR

HCM Unsignalized Intersection Capacity Analysis
BG (2029) PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (veh/h)	29	16	1103	26	37	1089
Future Volume (Veh/h)	29	16	1103	26	37	1089
Sign Control	Stop		Free		Free	Free
Grade	0%		0%			0%
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	31	17	1186	28	40	1171
Pedestrians	5					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			TWLT		TWLT	
Median storage (veh)			2		2	
Upstream signal (m)			238		330	
pX, platoon unblocked	0.84	0.74			0.74	
vC, conflicting volume	1870	612			1219	
vC1, stage 1 conf vol	1205					
vC2, stage 2 conf vol	666					
vCu, unblocked vol	642	0			606	
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 %	92	98			95	
cM capacity (veh/h)	377	808			727	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	48	791	423	40	586	586
Volume Left	31	0	0	40	0	0
Volume Right	17	0	28	0	0	0
cSH	465	1700	1700	727	1700	1700
Volume to Capacity	0.10	0.47	0.25	0.05	0.34	0.34
Queue Length 95th (m)	2.7	0.0	0.0	1.4	0.0	0.0
Control Delay (s)	13.6	0.0	0.0	10.2	0.0	0.0
Lane LOS	B			B		
Approach Delay (s)	13.6	0.0		0.3		
Approach LOS	B					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			41.3%		ICU Level of Service	A
Analysis Period (min)			15			

667-675 Yonge Street
10: Yonge ST & Madelaine DR/Ashford DR

Queues
BG (2029) PM Peak Hour

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	152	260	80	87	121	105	900	127	777
Future Volume (vph)	152	260	80	87	121	105	900	127	777
Lane Group Flow (vph)	165	283	87	95	186	114	1246	138	1077
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	24.0	24.0	7.0	24.0	7.0	44.0	7.0	44.0
Minimum Split (s)	11.0	30.0	30.0	11.0	30.0	11.0	50.0	11.0	50.0
Total Split (s)	14.0	30.0	30.0	14.0	30.0	12.0	64.0	12.0	64.0
Total Split (%)	11.7%	25.0%	25.0%	11.7%	25.0%	10.0%	53.3%	10.0%	53.3%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	1.0	2.0	1.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	None	Max
v/c Ratio	0.46	0.73	0.21	0.36	0.51	0.42	0.76	0.62	0.64
Control Delay	34.6	56.7	7.2	32.3	44.8	15.2	27.9	24.7	24.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.6	56.7	7.2	32.3	44.8	15.2	27.9	24.7	24.2
Queue Length 50th (m)	29.9	66.6	0.0	16.5	38.0	11.4	125.1	13.9	98.6
Queue Length 95th (m)	48.4	#105.2	11.2	29.9	62.3	19.7	153.7	27.0	122.0
Internal Link Dist (m)		240.2			213.8		240.7		213.8
Turn Bay Length (m)	30.0			75.0		20.0		20.0	
Base Capacity (vph)	358	388	406	281	364	276	1650	226	1685
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	0.46	0.73	0.21	0.34	0.51	0.41	0.76	0.61	0.64

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 119.6

Natural Cycle: 105

Control Type: Semi Act-Uncoord

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 10: Yonge ST & Madelaine DR/Ashford DR

			
Ø1	Ø2	Ø3	Ø4
12 s	64 s	14 s	30 s
			
Ø5	Ø6	Ø7	Ø8
12 s	64 s	14 s	30 s

667-675 Yonge Street
10: Yonge ST & Madelaine DR/Ashford DR

HCM Signalized Intersection Capacity Analysis

BG (2029) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	152	260	80	87	121	50	105	900	247	127	777	213
Future Volume (vph)	152	260	80	87	121	50	105	900	247	127	777	213
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.99		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	1.00	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.97		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)	1801	1881	1583	1803	1757		1805	3362		1805	3429	
Flt Permitted	0.49	1.00	1.00	0.32	1.00		0.16	1.00		0.11	1.00	
Satd. Flow (perm)	933	1881	1583	602	1757		310	3362		211	3429	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	165	283	87	95	132	54	114	978	268	138	845	232
RTOR Reduction (vph)	0	0	69	0	12	0	0	21	0	0	21	0
Lane Group Flow (vph)	165	283	18	95	174	0	114	1225	0	138	1056	0
Confl. Peds. (#/hr)	4		4	4		4	9		37	37		9
Heavy Vehicles (%)	0%	1%	0%	0%	4%	0%	0%	1%	0%	0%	1%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	34.5	24.7	24.7	33.1	24.0		65.8	58.0		65.8	58.0	
Effective Green, g (s)	34.5	24.7	24.7	33.1	24.0		65.8	58.0		65.8	58.0	
Actuated g/C Ratio	0.29	0.21	0.21	0.28	0.20		0.55	0.48		0.55	0.48	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	340	388	326	257	352		268	1630		220	1662	
v/s Ratio Prot	c0.04	c0.15		0.03	0.10		0.03	c0.36		c0.04	0.31	
v/s Ratio Perm	0.10		0.01	0.07			0.21			0.30		
v/c Ratio	0.49	0.73	0.06	0.37	0.49		0.43	0.75		0.63	0.64	
Uniform Delay, d1	33.5	44.3	38.1	33.6	42.4		15.6	25.0		18.4	22.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	6.7	0.1	0.9	1.1		1.1	3.2		5.5	1.9	
Delay (s)	34.6	51.1	38.2	34.5	43.5		16.7	28.2		23.9	24.8	
Level of Service	C	D	D	C	D		B	C		C	C	
Approach Delay (s)		43.9			40.5			27.2			24.7	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			30.1			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			119.6			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			88.8%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

667-675 Yonge Street
3: Yonge ST & Big Bay Point RD

Queues
BG (2034) AM Peak Hour

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	222	314	136	575	254	182	726	92	165	510	318
Future Volume (vph)	222	314	136	575	254	182	726	92	165	510	318
Lane Group Flow (vph)	239	509	146	618	273	196	781	99	177	548	342
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases	4		8		8	2		2	6		6
Detector Phase	7	4	3	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	6.0	12.0	6.0	12.0	12.0	6.0	29.0	29.0	6.0	29.0	29.0
Minimum Split (s)	10.0	23.0	10.0	23.0	23.0	10.0	35.0	35.0	10.0	35.0	35.0
Total Split (s)	22.0	43.0	15.0	36.0	36.0	21.0	46.0	46.0	16.0	41.0	41.0
Total Split (%)	18.3%	35.8%	12.5%	30.0%	30.0%	17.5%	38.3%	38.3%	13.3%	34.2%	34.2%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max	Max
v/c Ratio	0.76	0.57	0.46	0.85	0.59	0.67	0.70	0.17	0.63	0.57	0.64
Control Delay	39.0	31.6	25.9	53.7	18.0	39.2	36.8	1.4	49.4	36.7	26.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.0	31.6	25.9	53.7	18.0	39.2	36.8	1.4	49.4	36.7	26.2
Queue Length 50th (m)	37.4	46.3	21.4	75.2	16.2	35.3	88.7	0.0	33.7	60.7	42.7
Queue Length 95th (m)	#67.7	64.6	36.1	98.3	45.4	56.9	114.6	2.5	55.1	81.2	79.0
Internal Link Dist (m)		414.7		323.5			305.9			337.7	
Turn Bay Length (m)	60.0		65.0		25.0	40.0		35.0	50.0		15.0
Base Capacity (vph)	332	1007	328	834	504	322	1111	585	313	964	537
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.51	0.45	0.74	0.54	0.61	0.70	0.17	0.57	0.57	0.64

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 113.2

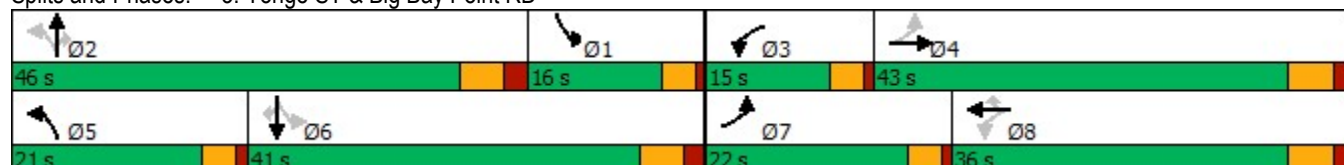
Natural Cycle: 80

Control Type: Semi Act-Uncoord

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Yonge ST & Big Bay Point RD



667-675 Yonge Street
3: Yonge ST & Big Bay Point RD

HCM Signalized Intersection Capacity Analysis
BG (2034) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	222	314	159	136	575	254	182	726	92	165	510	318
Future Volume (vph)	222	314	159	136	575	254	182	726	92	165	510	318
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1562	2904		1546	3124	1366	1577	3124	1366	1577	3065	1393
Flt Permitted	0.18	1.00		0.43	1.00	1.00	0.23	1.00	1.00	0.36	1.00	1.00
Satd. Flow (perm)	300	2904		706	3124	1366	375	3124	1366	591	3065	1393
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	239	338	171	146	618	273	196	781	99	177	548	342
RTOR Reduction (vph)	0	54	0	0	0	146	0	0	64	0	0	99
Lane Group Flow (vph)	239	455	0	146	618	127	196	781	35	177	548	243
Confl. Peds. (#/hr)	1		3	3		1	1		1	1		1
Heavy Vehicles (%)	4%	7%	3%	5%	4%	5%	3%	4%	5%	3%	6%	3%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	46.9	32.7		36.6	26.4	26.4	40.3	40.3	40.3	37.6	35.6	35.6
Effective Green, g (s)	46.9	32.7		36.6	26.4	26.4	40.3	40.3	40.3	37.6	35.6	35.6
Actuated g/C Ratio	0.42	0.29		0.32	0.23	0.23	0.36	0.36	0.36	0.33	0.32	0.32
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	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	3.0
Lane Grp Cap (vph)	308	840		304	729	319	287	1114	487	282	965	438
v/s Ratio Prot	c0.11	0.16		0.04	0.20		0.09	c0.25		c0.05	0.18	
v/s Ratio Perm	c0.21			0.11		0.09	0.16		0.03	0.15		0.17
v/c Ratio	0.78	0.54		0.48	0.85	0.40	0.68	0.70	0.07	0.63	0.57	0.55
Uniform Delay, d1	24.8	33.8		28.5	41.4	36.6	27.7	31.2	24.0	34.6	32.3	32.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.6	0.7		1.2	9.0	0.8	6.6	3.7	0.3	4.3	2.4	5.0
Delay (s)	36.4	34.6		29.7	50.4	37.4	34.2	34.9	24.3	38.9	34.7	37.1
Level of Service	D	C		C	D	D	C	C	C	D	C	D
Approach Delay (s)		35.1			44.1			33.8			36.2	
Approach LOS		D			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			37.4			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			113.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			83.5%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

667-675 Yonge Street
13: Yonge ST & Montgomery DR

HCM Unsignalized Intersection Capacity Analysis
BG (2034) AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (veh/h)	26	10	1056	63	21	882
Future Volume (Veh/h)	26	10	1056	63	21	882
Sign Control	Stop		Free		Free	Free
Grade	0%		0%			0%
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	33	13	1337	80	27	1116
Pedestrians	3					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			TWLTL		TWLTL	
Median storage veh)			2		2	
Upstream signal (m)			238		330	
pX, platoon unblocked	0.89	0.84			0.84	
vC, conflicting volume	1992	712			1420	
vC1, stage 1 conf vol	1380					
vC2, stage 2 conf vol	612					
vCu, unblocked vol	1391	287			1127	
tC, single (s)	6.8	6.9			4.4	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.4	
p0 queue free %	86	98			94	
cM capacity (veh/h)	232	603			451	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	46	891	526	27	558	558
Volume Left	33	0	0	27	0	0
Volume Right	13	0	80	0	0	0
cSH	281	1700	1700	451	1700	1700
Volume to Capacity	0.16	0.52	0.31	0.06	0.33	0.33
Queue Length 95th (m)	4.6	0.0	0.0	1.5	0.0	0.0
Control Delay (s)	20.3	0.0	0.0	13.5	0.0	0.0
Lane LOS	C			B		
Approach Delay (s)	20.3	0.0		0.3		
Approach LOS	C					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			41.2%		ICU Level of Service	A
Analysis Period (min)			15			

667-675 Yonge Street
10: Yonge ST & Madelaine DR/Ashford DR

Queues
BG (2034) AM Peak Hour

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	160	213	69	126	171	111	712	79	468
Future Volume (vph)	160	213	69	126	171	111	712	79	468
Lane Group Flow (vph)	170	227	73	134	259	118	862	84	598
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	26.0	26.0	7.0	26.0	7.0	44.0	7.0	44.0
Minimum Split (s)	11.0	32.0	32.0	11.0	35.0	11.0	50.0	11.0	50.0
Total Split (s)	16.0	41.0	41.0	11.0	36.0	11.0	57.0	11.0	57.0
Total Split (%)	13.3%	34.2%	34.2%	9.2%	30.0%	9.2%	47.5%	9.2%	47.5%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	1.0	2.0	1.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	None	Max
v/c Ratio	0.48	0.48	0.15	0.36	0.63	0.30	0.56	0.27	0.41
Control Delay	29.7	39.6	3.4	28.3	45.1	15.0	24.9	14.9	22.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.7	39.6	3.4	28.3	45.1	15.0	24.9	14.9	22.6
Queue Length 50th (m)	27.6	45.7	0.0	21.3	52.8	13.0	78.3	9.0	48.3
Queue Length 95th (m)	44.5	70.4	6.3	35.9	81.5	24.0	104.0	18.0	67.0
Internal Link Dist (m)		240.2			213.8		240.7		213.8
Turn Bay Length (m)	30.0			75.0		20.0		20.0	
Base Capacity (vph)	361	536	548	370	464	397	1551	313	1444
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	0.47	0.42	0.13	0.36	0.56	0.30	0.56	0.27	0.41

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 115.9
Natural Cycle: 110
Control Type: Semi Act-Uncoord

Splits and Phases: 10: Yonge ST & Madelaine DR/Ashford DR

								
Ø1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8	
11 s	57 s	11 s	41 s	11 s	57 s	16 s	36 s	

667-675 Yonge Street
10: Yonge ST & Madelaine DR/Ashford DR

HCM Signalized Intersection Capacity Analysis
BG (2034) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	160	213	69	126	171	72	111	712	99	79	468	94
Future Volume (vph)	160	213	69	126	171	72	111	712	99	79	468	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.99		1.00	0.98		1.00	0.99	
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	0.98		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)	1785	1776	1583	1782	1747		1714	3358		1797	3252	
Flt Permitted	0.34	1.00	1.00	0.57	1.00		0.35	1.00		0.24	1.00	
Satd. Flow (perm)	642	1776	1583	1066	1747		636	3358		454	3252	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	170	227	73	134	182	77	118	757	105	84	498	100
RTOR Reduction (vph)	0	0	54	0	13	0	0	9	0	0	13	0
Lane Group Flow (vph)	170	227	19	134	246	0	118	853	0	84	585	0
Confl. Peds. (#/hr)	4		4	4		4	9		37	37		9
Heavy Vehicles (%)	1%	7%	0%	1%	3%	4%	5%	4%	2%	0%	8%	4%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	41.9	30.9	30.9	33.6	26.6		60.3	53.3		57.5	51.9	
Effective Green, g (s)	41.9	30.9	30.9	33.6	26.6		60.3	53.3		57.5	51.9	
Actuated g/C Ratio	0.36	0.26	0.26	0.29	0.23		0.52	0.46		0.49	0.44	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	340	469	418	349	397		392	1532		287	1445	
v/s Ratio Prot	c0.05	0.13		0.02	c0.14		c0.02	c0.25		0.01	0.18	
v/s Ratio Perm	0.13		0.01	0.09			0.14			0.13		
v/c Ratio	0.50	0.48	0.05	0.38	0.62		0.30	0.56		0.29	0.40	
Uniform Delay, d1	27.4	36.2	32.0	32.1	40.5		15.1	23.1		16.8	22.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	0.8	0.0	0.7	2.9		0.4	1.5		0.6	0.8	
Delay (s)	28.6	37.0	32.0	32.8	43.4		15.5	24.6		17.3	22.8	
Level of Service	C	D	C	C	D		B	C		B	C	
Approach Delay (s)		33.2			39.8			23.5			22.2	
Approach LOS		C			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			27.5			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			116.8			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			90.0%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

667-675 Yonge Street
3: Yonge ST & Big Bay Point RD

Queues
BG (2034) PM Peak Hour

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	379	584	226	508	206	246	941	154	270	937	321
Future Volume (vph)	379	584	226	508	206	246	941	154	270	937	321
Lane Group Flow (vph)	391	859	233	524	212	254	970	159	278	966	331
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases	4		8		8	2		2	6		6
Detector Phase	7	4	3	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	6.0	12.0	6.0	12.0	12.0	6.0	29.0	29.0	6.0	29.0	29.0
Minimum Split (s)	10.0	31.0	10.0	25.0	25.0	10.0	35.0	35.0	10.0	35.0	35.0
Total Split (s)	31.0	39.0	17.0	25.0	25.0	20.0	44.0	44.0	20.0	44.0	44.0
Total Split (%)	25.8%	32.5%	14.2%	20.8%	20.8%	16.7%	36.7%	36.7%	16.7%	36.7%	36.7%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max	Max
v/c Ratio	0.90	0.91	0.88	0.87	0.50	0.84	0.84	0.26	0.87	0.83	0.54
Control Delay	53.9	53.4	61.8	64.5	13.0	55.5	45.1	6.1	70.5	44.9	22.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.9	53.4	61.8	64.5	13.0	55.5	45.1	6.1	70.5	44.9	22.9
Queue Length 50th (m)	74.5	101.1	39.6	68.1	4.5	48.7	118.3	0.7	54.2	117.6	39.3
Queue Length 95th (m)	#125.5	#135.7	#87.4	#103.0	27.8	#89.2	146.2	16.3	#100.6	145.2	70.2
Internal Link Dist (m)		414.7		323.5			305.9			337.7	
Turn Bay Length (m)	60.0		65.0		25.0	40.0		35.0	50.0		15.0
Base Capacity (vph)	477	1002	267	600	428	311	1157	618	331	1157	608
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.86	0.87	0.87	0.50	0.82	0.84	0.26	0.84	0.83	0.54

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 117.5

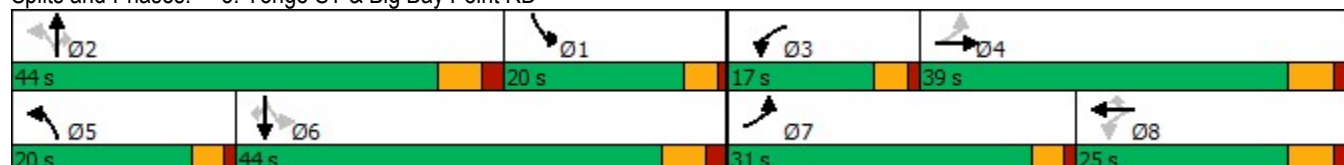
Natural Cycle: 90

Control Type: Semi Act-Uncoord

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Yonge ST & Big Bay Point RD



667-675 Yonge Street
3: Yonge ST & Big Bay Point RD

HCM Signalized Intersection Capacity Analysis

BG (2034) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	379	584	249	226	508	206	246	941	154	270	937	321
Future Volume (vph)	379	584	249	226	508	206	246	941	154	270	937	321
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	3425		1786	3505	1577	1787	3574	1586	1787	3574	1592
Flt Permitted	0.17	1.00		0.20	1.00	1.00	0.18	1.00	1.00	0.22	1.00	1.00
Satd. Flow (perm)	314	3425		372	3505	1577	330	3574	1586	418	3574	1592
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)	391	602	257	233	524	212	254	970	159	278	966	331
RTOR Reduction (vph)	0	40	0	0	0	158	0	0	105	0	0	92
Lane Group Flow (vph)	391	819	0	233	524	54	254	970	54	278	966	239
Confl. Peds. (#/hr)	1		7	7		1	2		5	5		2
Heavy Vehicles (%)	0%	0%	0%	1%	3%	1%	1%	1%	0%	1%	1%	0%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	48.1	31.1		33.2	20.2	20.2	38.1	38.1	38.1	40.1	38.1	38.1
Effective Green, g (s)	48.1	31.1		33.2	20.2	20.2	38.1	38.1	38.1	40.1	38.1	38.1
Actuated g/C Ratio	0.41	0.26		0.28	0.17	0.17	0.32	0.32	0.32	0.34	0.32	0.32
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	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	3.0
Lane Grp Cap (vph)	431	906		261	602	271	296	1158	514	320	1158	516
v/s Ratio Prot	c0.18	0.24		0.10	0.15		0.11	c0.27		c0.11	0.27	
v/s Ratio Perm	c0.19			0.15		0.03	0.17		0.03	c0.18		0.15
v/c Ratio	0.91	0.90		0.89	0.87	0.20	0.86	0.84	0.11	0.87	0.83	0.46
Uniform Delay, d1	31.6	41.7		35.6	47.4	41.7	33.0	36.8	27.8	39.7	36.8	31.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	22.3	12.2		29.4	13.0	0.4	21.0	7.3	0.4	21.2	7.1	3.0
Delay (s)	53.9	53.9		65.0	60.4	42.1	54.0	44.1	28.2	61.0	43.9	34.5
Level of Service	D	D		E	E	D	D	D	C	E	D	C
Approach Delay (s)		53.9			57.5			44.1			45.0	
Approach LOS		D			E			D			D	
Intersection Summary												
HCM 2000 Control Delay			49.2		HCM 2000 Level of Service					D		
HCM 2000 Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			117.5		Sum of lost time (s)					20.0		
Intersection Capacity Utilization			94.5%		ICU Level of Service					F		
Analysis Period (min)			15									
c Critical Lane Group												

667-675 Yonge Street
13: Yonge ST & Montgomery DR

HCM Unsignalized Intersection Capacity Analysis
BG (2034) PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (veh/h)	31	18	1202	28	41	1181
Future Volume (Veh/h)	31	18	1202	28	41	1181
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	33	19	1292	30	44	1270
Pedestrians	5					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			TWLTL		TWLTL	
Median storage veh)			2		2	
Upstream signal (m)			238		330	
pX, platoon unblocked	0.80	0.69			0.69	
vC, conflicting volume	2035	666			1327	
vC1, stage 1 conf vol	1312					
vC2, stage 2 conf vol	723					
vCu, unblocked vol	551	0			585	
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 %	91	97			94	
cM capacity (veh/h)	363	752			690	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	52	861	461	44	635	635
Volume Left	33	0	0	44	0	0
Volume Right	19	0	30	0	0	0
cSH	448	1700	1700	690	1700	1700
Volume to Capacity	0.12	0.51	0.27	0.06	0.37	0.37
Queue Length 95th (m)	3.1	0.0	0.0	1.6	0.0	0.0
Control Delay (s)	14.1	0.0	0.0	10.6	0.0	0.0
Lane LOS	B			B		
Approach Delay (s)	14.1	0.0		0.4		
Approach LOS	B					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			44.1%		ICU Level of Service	A
Analysis Period (min)			15			

667-675 Yonge Street
10: Yonge ST & Madelaine DR/Ashford DR

Queues
BG (2034) PM Peak Hour

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	167	283	83	94	131	110	985	137	843
Future Volume (vph)	167	283	83	94	131	110	985	137	843
Lane Group Flow (vph)	182	308	90	102	201	120	1363	149	1171
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	24.0	24.0	7.0	24.0	7.0	44.0	7.0	44.0
Minimum Split (s)	11.0	30.0	30.0	11.0	30.0	11.0	50.0	11.0	50.0
Total Split (s)	14.0	30.0	30.0	14.0	30.0	12.0	64.0	12.0	64.0
Total Split (%)	11.7%	25.0%	25.0%	11.7%	25.0%	10.0%	53.3%	10.0%	53.3%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	1.0	2.0	1.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	None	Max
v/c Ratio	0.53	0.79	0.22	0.41	0.55	0.49	0.83	0.77	0.70
Control Delay	36.7	61.4	7.8	33.8	46.2	17.6	31.2	45.5	25.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.7	61.4	7.8	33.8	46.2	17.6	31.2	45.5	25.8
Queue Length 50th (m)	33.3	73.6	0.0	17.8	41.6	12.0	145.4	16.8	112.0
Queue Length 95th (m)	53.2	#119.1	12.1	31.7	67.1	20.7	177.8	#50.7	137.8
Internal Link Dist (m)		240.2			213.8		240.7		213.8
Turn Bay Length (m)	30.0			75.0		20.0		20.0	
Base Capacity (vph)	344	388	406	259	364	246	1647	194	1684
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	0.53	0.79	0.22	0.39	0.55	0.49	0.83	0.77	0.70

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 119.9

Natural Cycle: 105

Control Type: Semi Act-Uncoord

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 10: Yonge ST & Madelaine DR/Ashford DR

			
12 s	64 s	14 s	30 s
			
12 s	64 s	14 s	30 s

667-675 Yonge Street
10: Yonge ST & Madelaine DR/Ashford DR

HCM Signalized Intersection Capacity Analysis

BG (2034) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	167	283	83	94	131	54	110	985	269	137	843	235
Future Volume (vph)	167	283	83	94	131	54	110	985	269	137	843	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.99		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	1.00	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.97		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)	1801	1881	1583	1804	1756		1805	3362		1805	3428	
Flt Permitted	0.46	1.00	1.00	0.26	1.00		0.13	1.00		0.08	1.00	
Satd. Flow (perm)	871	1881	1583	503	1756		253	3362		149	3428	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	182	308	90	102	142	59	120	1071	292	149	916	255
RTOR Reduction (vph)	0	0	71	0	13	0	0	21	0	0	21	0
Lane Group Flow (vph)	182	308	19	102	188	0	120	1342	0	149	1150	0
Confl. Peds. (#/hr)	4		4	4		4	9		37	37		9
Heavy Vehicles (%)	0%	1%	0%	0%	4%	0%	0%	1%	0%	0%	1%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	34.7	24.8	24.8	33.3	24.1		65.8	58.0		66.2	58.2	
Effective Green, g (s)	34.7	24.8	24.8	33.3	24.1		65.8	58.0		66.2	58.2	
Actuated g/C Ratio	0.29	0.21	0.21	0.28	0.20		0.55	0.48		0.55	0.49	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	328	388	327	239	352		239	1624		192	1662	
v/s Ratio Prot	c0.05	c0.16		0.03	0.11		0.03	c0.40		c0.05	0.34	
v/s Ratio Perm	0.11		0.01	0.09			0.24			0.38		
v/c Ratio	0.55	0.79	0.06	0.43	0.53		0.50	0.83		0.78	0.69	
Uniform Delay, d1	33.9	45.2	38.2	34.0	42.9		16.9	26.7		21.7	24.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	10.7	0.1	1.2	1.6		1.7	5.0		17.6	2.4	
Delay (s)	36.0	55.8	38.3	35.2	44.5		18.6	31.6		39.3	26.3	
Level of Service	D	E	D	D	D		B	C		D	C	
Approach Delay (s)		46.9			41.4			30.6			27.8	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			33.0			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			90.2%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

Appendix G – Synchro Analysis Output – Total Traffic Volumes

667-675 Yonge Street
3: Yonge ST & Big Bay Point RD

Queues
Total (2024) AM Peak Hour

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	166	233	113	426	190	169	582	76	123	399	237
Future Volume (vph)	166	233	113	426	190	169	582	76	123	399	237
Lane Group Flow (vph)	178	394	122	458	204	182	626	82	132	429	255
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases	4		8		8	2		2	6		6
Detector Phase	7	4	3	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	6.0	12.0	6.0	12.0	12.0	6.0	29.0	29.0	6.0	29.0	29.0
Minimum Split (s)	10.0	23.0	10.0	23.0	23.0	10.0	35.0	35.0	10.0	35.0	35.0
Total Split (s)	22.0	43.0	15.0	36.0	36.0	21.0	46.0	46.0	16.0	41.0	41.0
Total Split (%)	18.3%	35.8%	12.5%	30.0%	30.0%	17.5%	38.3%	38.3%	13.3%	34.2%	34.2%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max	Max
v/c Ratio	0.55	0.51	0.37	0.74	0.48	0.50	0.52	0.13	0.41	0.41	0.45
Control Delay	28.2	27.7	24.5	47.7	10.7	28.7	28.4	0.4	35.3	29.8	16.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.2	27.7	24.5	47.7	10.7	28.7	28.4	0.4	35.3	29.8	16.8
Queue Length 50th (m)	25.3	28.8	16.7	48.7	2.3	25.7	53.2	0.0	19.6	36.7	18.1
Queue Length 95th (m)	43.4	45.2	30.6	71.0	22.8	52.2	86.7	0.0	41.3	61.6	49.5
Internal Link Dist (m)		414.7		323.5			305.9			337.7	
Turn Bay Length (m)	60.0		65.0		25.0	40.0		35.0	50.0		15.0
Base Capacity (vph)	370	1099	347	907	532	403	1209	624	375	1056	570
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.36	0.35	0.50	0.38	0.45	0.52	0.13	0.35	0.41	0.45

Intersection Summary

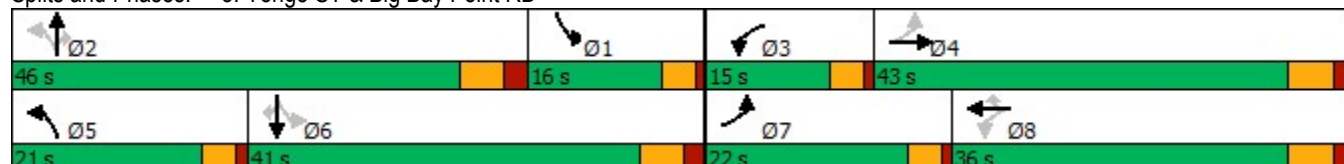
Cycle Length: 120

Actuated Cycle Length: 104.5

Natural Cycle: 80

Control Type: Semi Act-Uncoord

Splits and Phases: 3: Yonge ST & Big Bay Point RD



667-675 Yonge Street
3: Yonge ST & Big Bay Point RD

HCM Signalized Intersection Capacity Analysis

Total (2024) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	166	233	133	113	426	190	169	582	76	123	399	237
Future Volume (vph)	166	233	133	113	426	190	169	582	76	123	399	237
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1562	2894		1545	3124	1366	1577	3124	1366	1577	3065	1393
Flt Permitted	0.27	1.00		0.52	1.00	1.00	0.36	1.00	1.00	0.41	1.00	1.00
Satd. Flow (perm)	448	2894		845	3124	1366	596	3124	1366	688	3065	1393
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	178	251	143	122	458	204	182	626	82	132	429	255
RTOR Reduction (vph)	0	74	0	0	0	153	0	0	50	0	0	90
Lane Group Flow (vph)	178	320	0	122	458	51	182	626	32	132	429	165
Confl. Peds. (#/hr)	1		3	3		1	1		1	1		1
Heavy Vehicles (%)	4%	7%	3%	5%	4%	5%	3%	4%	5%	3%	6%	3%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	39.0	25.2		30.5	20.7	20.7	40.5	40.5	40.5	38.1	36.1	36.1
Effective Green, g (s)	39.0	25.2		30.5	20.7	20.7	40.5	40.5	40.5	38.1	36.1	36.1
Actuated g/C Ratio	0.37	0.24		0.29	0.20	0.20	0.39	0.39	0.39	0.37	0.35	0.35
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	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	3.0
Lane Grp Cap (vph)	320	699		312	620	271	355	1213	530	326	1060	482
v/s Ratio Prot	c0.08	0.11		0.04	c0.15		0.06	c0.20		c0.03	0.14	
v/s Ratio Perm	0.13			0.08		0.04	0.13		0.02	0.11		0.12
v/c Ratio	0.56	0.46		0.39	0.74	0.19	0.51	0.52	0.06	0.40	0.40	0.34
Uniform Delay, d1	23.8	33.7		28.3	39.3	34.8	22.4	24.4	20.0	26.0	25.9	25.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	0.5		0.8	4.6	0.3	1.3	1.6	0.2	0.8	1.1	1.9
Delay (s)	25.9	34.2		29.2	43.9	35.1	23.7	26.0	20.2	26.8	27.1	27.2
Level of Service	C	C		C	D	D	C	C	C	C	C	C
Approach Delay (s)		31.6			39.3			25.0			27.1	
Approach LOS		C			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			30.4			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			104.3			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			74.8%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

667-675 Yonge Street
13: Yonge ST & Montgomery DR

HCM Unsignalized Intersection Capacity Analysis

Total (2024) AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (veh/h)	59	39	837	63	27	691
Future Volume (Veh/h)	59	39	837	63	27	691
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	75	49	1059	80	34	875
Pedestrians	3					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			TWLTL		TWLTL	
Median storage veh)			2		2	
Upstream signal (m)			238		330	
pX, platoon unblocked	0.91	0.90			0.90	
vC, conflicting volume	1608	572			1142	
vC1, stage 1 conf vol	1102					
vC2, stage 2 conf vol	506					
vCu, unblocked vol	1343	299			933	
tC, single (s)	6.8	6.9			4.4	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.4	
p0 queue free %	75	92			94	
cM capacity (veh/h)	296	630			577	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	124	706	433	34	438	438
Volume Left	75	0	0	34	0	0
Volume Right	49	0	80	0	0	0
cSH	375	1700	1700	577	1700	1700
Volume to Capacity	0.33	0.42	0.25	0.06	0.26	0.26
Queue Length 95th (m)	11.4	0.0	0.0	1.5	0.0	0.0
Control Delay (s)	19.3	0.0	0.0	11.6	0.0	0.0
Lane LOS	C			B		
Approach Delay (s)	19.3	0.0		0.4		
Approach LOS	C					
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			37.5%		ICU Level of Service	A
Analysis Period (min)			15			

667-675 Yonge Street
10: Yonge ST & Madelaine DR/Ashford DR

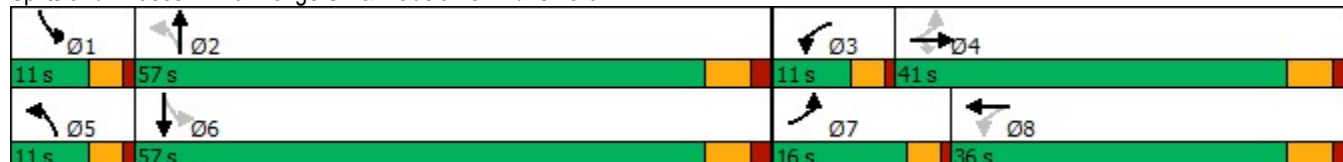
Queues
Total (2024) AM Peak Hour

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	131	167	60	97	135	102	566	64	382
Future Volume (vph)	131	167	60	97	135	102	566	64	382
Lane Group Flow (vph)	139	178	64	103	211	109	686	68	508
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	26.0	26.0	7.0	26.0	7.0	44.0	7.0	44.0
Minimum Split (s)	11.0	32.0	32.0	11.0	35.0	11.0	50.0	11.0	50.0
Total Split (s)	16.0	41.0	41.0	11.0	36.0	11.0	57.0	11.0	57.0
Total Split (%)	13.3%	34.2%	34.2%	9.2%	30.0%	9.2%	47.5%	9.2%	47.5%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	1.0	2.0	1.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	None	Max
v/c Ratio	0.36	0.39	0.13	0.26	0.52	0.24	0.44	0.17	0.35
Control Delay	27.4	37.8	2.6	26.3	40.7	13.8	22.1	13.2	20.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.4	37.8	2.6	26.3	40.7	13.8	22.1	13.2	20.5
Queue Length 50th (m)	22.1	34.7	0.0	16.0	40.5	11.9	57.8	7.2	38.6
Queue Length 95th (m)	37.2	55.9	4.1	28.7	65.8	21.2	74.8	14.3	52.4
Internal Link Dist (m)		240.2			213.8		240.7		213.8
Turn Bay Length (m)	30.0			75.0		20.0		20.0	
Base Capacity (vph)	399	541	552	403	469	446	1567	389	1455
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	0.35	0.33	0.12	0.26	0.45	0.24	0.44	0.17	0.35

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 114.8
Natural Cycle: 110
Control Type: Semi Act-Uncoord

Splits and Phases: 10: Yonge ST & Madelaine DR/Ashford DR



667-675 Yonge Street
10: Yonge ST & Madelaine DR/Ashford DR

HCM Signalized Intersection Capacity Analysis

Total (2024) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	131	167	60	97	135	63	102	566	79	64	382	96
Future Volume (vph)	131	167	60	97	135	63	102	566	79	64	382	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.99		1.00	0.98		1.00	0.99	
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	0.95		1.00	0.98		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)	1784	1776	1583	1780	1741		1711	3358		1786	3235	
Flt Permitted	0.42	1.00	1.00	0.64	1.00		0.41	1.00		0.33	1.00	
Satd. Flow (perm)	796	1776	1583	1209	1741		735	3358		618	3235	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	139	178	64	103	144	67	109	602	84	68	406	102
RTOR Reduction (vph)	0	0	48	0	15	0	0	9	0	0	18	0
Lane Group Flow (vph)	139	178	16	103	196	0	109	677	0	68	490	0
Confl. Peds. (#/hr)	4		4	4		4	9		37	37		9
Heavy Vehicles (%)	1%	7%	0%	1%	3%	4%	5%	4%	2%	0%	8%	4%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	40.4	29.7	29.7	33.0	26.0		60.3	53.3		57.5	51.9	
Effective Green, g (s)	40.4	29.7	29.7	33.0	26.0		60.3	53.3		57.5	51.9	
Actuated g/C Ratio	0.35	0.26	0.26	0.29	0.22		0.52	0.46		0.50	0.45	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	369	456	406	379	391		442	1548		363	1452	
v/s Ratio Prot	c0.03	0.10		0.02	c0.11		c0.01	c0.20		0.01	0.15	
v/s Ratio Perm	0.10		0.01	0.06			0.11			0.08		
v/c Ratio	0.38	0.39	0.04	0.27	0.50		0.25	0.44		0.19	0.34	
Uniform Delay, d1	27.0	35.5	32.3	31.3	39.1		14.3	21.0		15.5	20.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.6	0.0	0.4	1.0		0.3	0.9		0.3	0.6	
Delay (s)	27.6	36.0	32.3	31.7	40.2		14.6	21.9		15.8	21.3	
Level of Service	C	D	C	C	D		B	C		B	C	
Approach Delay (s)		32.3			37.4			20.9			20.7	
Approach LOS		C			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			25.5			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			115.6			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			88.1%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

667-675 Yonge Street
19: Site Access & Montgomery DR

HCM Unsignalized Intersection Capacity Analysis

Total (2024) AM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰			↱	↰	↱
Traffic Volume (veh/h)	64	26	2	27	71	2
Future Volume (Veh/h)	64	26	2	27	71	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	70	28	2	29	77	2
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			98		117	84
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			98		117	84
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		91	100
cM capacity (veh/h)			1495		878	975
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	98	31	79			
Volume Left	0	2	77			
Volume Right	28	0	2			
cSH	1700	1495	880			
Volume to Capacity	0.06	0.00	0.09			
Queue Length 95th (m)	0.0	0.0	2.4			
Control Delay (s)	0.0	0.5	9.5			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.5	9.5			
Approach LOS			A			
Intersection Summary						
Average Delay			3.7			
Intersection Capacity Utilization			15.7%	ICU Level of Service		A
Analysis Period (min)			15			

667-675 Yonge Street
3: Yonge ST & Big Bay Point RD

Queues
Total (2024) PM Peak Hour

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	311	478	192	415	168	222	798	132	222	803	263
Future Volume (vph)	311	478	192	415	168	222	798	132	222	803	263
Lane Group Flow (vph)	321	732	198	428	173	229	823	136	229	828	271
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases	4		8		8	2		2	6		6
Detector Phase	7	4	3	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	6.0	12.0	6.0	12.0	12.0	6.0	29.0	29.0	6.0	29.0	29.0
Minimum Split (s)	10.0	31.0	10.0	25.0	25.0	10.0	35.0	35.0	10.0	35.0	35.0
Total Split (s)	31.0	39.0	17.0	25.0	25.0	20.0	44.0	44.0	20.0	44.0	44.0
Total Split (%)	25.8%	32.5%	14.2%	20.8%	20.8%	16.7%	36.7%	36.7%	16.7%	36.7%	36.7%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max	Max
v/c Ratio	0.74	0.83	0.75	0.72	0.41	0.76	0.67	0.21	0.61	0.68	0.43
Control Delay	35.4	45.8	44.2	52.1	7.7	45.3	36.1	4.1	44.0	36.2	17.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.4	45.8	44.2	52.1	7.7	45.3	36.1	4.1	44.0	36.2	17.3
Queue Length 50th (m)	53.8	79.5	30.7	50.3	0.0	40.7	89.6	0.0	40.7	90.4	23.8
Queue Length 95th (m)	78.8	102.7	#64.7	73.0	15.9	#75.4	118.8	10.9	66.4	119.6	51.0
Internal Link Dist (m)		414.7		323.5			305.9			337.7	
Turn Bay Length (m)	60.0		65.0		25.0	40.0		35.0	50.0		15.0
Base Capacity (vph)	517	1059	283	630	440	325	1221	643	405	1221	633
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.69	0.70	0.68	0.39	0.70	0.67	0.21	0.57	0.68	0.43

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 111.9

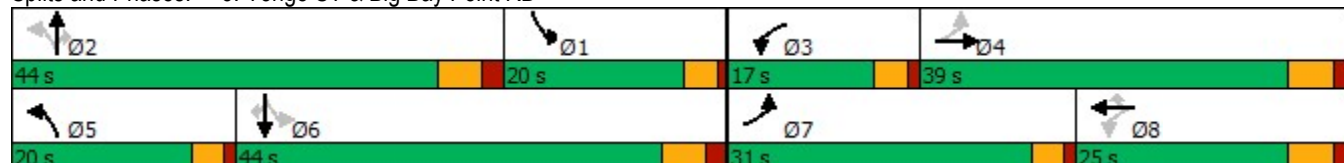
Natural Cycle: 90

Control Type: Semi Act-Uncoord

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Yonge ST & Big Bay Point RD



667-675 Yonge Street
3: Yonge ST & Big Bay Point RD

HCM Signalized Intersection Capacity Analysis

Total (2024) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	311	478	232	192	415	168	222	798	132	222	803	263
Future Volume (vph)	311	478	232	192	415	168	222	798	132	222	803	263
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	3409		1786	3505	1578	1787	3574	1586	1786	3574	1592
Flt Permitted	0.26	1.00		0.21	1.00	1.00	0.17	1.00	1.00	0.34	1.00	1.00
Satd. Flow (perm)	490	3409		394	3505	1578	316	3574	1586	642	3574	1592
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)	321	493	239	198	428	173	229	823	136	229	828	271
RTOR Reduction (vph)	0	52	0	0	0	143	0	0	89	0	0	89
Lane Group Flow (vph)	321	680	0	198	428	30	229	823	47	229	828	182
Confl. Peds. (#/hr)	1		7	7		1	2		5	5		2
Heavy Vehicles (%)	0%	0%	0%	1%	3%	1%	1%	1%	0%	1%	1%	0%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	43.1	27.1		31.1	19.1	19.1	38.2	38.2	38.2	40.2	38.2	38.2
Effective Green, g (s)	43.1	27.1		31.1	19.1	19.1	38.2	38.2	38.2	40.2	38.2	38.2
Actuated g/C Ratio	0.39	0.24		0.28	0.17	0.17	0.34	0.34	0.34	0.36	0.34	0.34
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	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	3.0
Lane Grp Cap (vph)	424	827		259	599	269	297	1222	542	378	1222	544
v/s Ratio Prot	c0.14	c0.20		0.08	0.12		c0.10	0.23		0.08	c0.23	
v/s Ratio Perm	0.16			0.13		0.02	c0.16		0.03	0.14		0.11
v/c Ratio	0.76	0.82		0.76	0.71	0.11	0.77	0.67	0.09	0.61	0.68	0.33
Uniform Delay, d1	26.5	40.0		33.2	43.7	39.1	29.7	31.4	24.9	31.7	31.5	27.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.5	6.6		12.6	4.0	0.2	11.7	3.0	0.3	2.7	3.0	1.6
Delay (s)	34.0	46.7		45.8	47.8	39.3	41.4	34.4	25.2	34.4	34.5	28.9
Level of Service	C	D		D	D	D	D	C	C	C	C	C
Approach Delay (s)		42.8			45.4			34.7			33.4	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			38.2	HCM 2000 Level of Service					D			
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			111.7	Sum of lost time (s)					20.0			
Intersection Capacity Utilization			84.6%	ICU Level of Service					E			
Analysis Period (min)			15									
c Critical Lane Group												

667-675 Yonge Street
13: Yonge ST & Montgomery DR

HCM Unsignalized Intersection Capacity Analysis

Total (2024) PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 		 	 
Traffic Volume (veh/h)	53	40	1012	60	67	1002
Future Volume (Veh/h)	53	40	1012	60	67	1002
Sign Control	Stop		Free		Free	Free
Grade	0%		0%			0%
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	57	43	1088	65	72	1077
Pedestrians	5					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			TWLTL		TWLTL	
Median storage (veh)			2		2	
Upstream signal (m)			238		330	
pX, platoon unblocked	0.85	0.78			0.78	
vC, conflicting volume	1808	582			1158	
vC1, stage 1 conf vol	1126					
vC2, stage 2 conf vol	682					
vCu, unblocked vol	778	0			624	
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 %	85	95			90	
cM capacity (veh/h)	380	842			747	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	100	725	428	72	538	538
Volume Left	57	0	0	72	0	0
Volume Right	43	0	65	0	0	0
cSH	497	1700	1700	747	1700	1700
Volume to Capacity	0.20	0.43	0.25	0.10	0.32	0.32
Queue Length 95th (m)	6.0	0.0	0.0	2.6	0.0	0.0
Control Delay (s)	14.1	0.0	0.0	10.3	0.0	0.0
Lane LOS	B			B		
Approach Delay (s)	14.1	0.0		0.6		
Approach LOS	B					
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			49.0%		ICU Level of Service	A
Analysis Period (min)			15			

667-675 Yonge Street
10: Yonge ST & Madelaine DR/Ashford DR

Queues
Total (2024) PM Peak Hour

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	158	238	76	81	112	101	838	120	726
Future Volume (vph)	158	238	76	81	112	101	838	120	726
Lane Group Flow (vph)	172	259	83	88	174	110	1158	130	1012
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	24.0	24.0	7.0	24.0	7.0	44.0	7.0	44.0
Minimum Split (s)	11.0	30.0	30.0	11.0	30.0	11.0	50.0	11.0	50.0
Total Split (s)	14.0	30.0	30.0	14.0	30.0	12.0	64.0	12.0	64.0
Total Split (%)	11.7%	25.0%	25.0%	11.7%	25.0%	10.0%	53.3%	10.0%	53.3%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	1.0	2.0	1.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	None	Max
v/c Ratio	0.48	0.61	0.19	0.29	0.48	0.38	0.70	0.53	0.60
Control Delay	35.0	49.9	6.3	30.8	43.4	14.1	26.1	18.7	23.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.0	49.9	6.3	30.8	43.4	14.1	26.1	18.7	23.3
Queue Length 50th (m)	31.3	59.8	0.0	15.2	34.9	11.0	111.3	13.1	89.7
Queue Length 95th (m)	50.2	90.3	10.1	28.1	58.1	19.1	137.4	22.2	111.6
Internal Link Dist (m)		240.2			213.8		240.7		213.8
Turn Bay Length (m)	30.0			75.0		20.0		20.0	
Base Capacity (vph)	360	427	436	324	364	297	1649	249	1682
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	0.48	0.61	0.19	0.27	0.48	0.37	0.70	0.52	0.60

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 119.7
Natural Cycle: 105
Control Type: Semi Act-Uncoord

Splits and Phases: 10: Yonge ST & Madelaine DR/Ashford DR

			
Ø1	Ø2	Ø3	Ø4
12 s	64 s	14 s	30 s
			
Ø5	Ø6	Ø7	Ø8
12 s	64 s	14 s	30 s

667-675 Yonge Street
10: Yonge ST & Madelaine DR/Ashford DR

HCM Signalized Intersection Capacity Analysis

Total (2024) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	158	238	76	81	112	48	101	838	227	120	726	205
Future Volume (vph)	158	238	76	81	112	48	101	838	227	120	726	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.99		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	1.00	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.97		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)	1801	1881	1583	1802	1755		1805	3363		1805	3426	
Flt Permitted	0.49	1.00	1.00	0.42	1.00		0.18	1.00		0.13	1.00	
Satd. Flow (perm)	927	1881	1583	803	1755		351	3363		256	3426	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	172	259	83	88	122	52	110	911	247	130	789	223
RTOR Reduction (vph)	0	0	64	0	13	0	0	21	0	0	22	0
Lane Group Flow (vph)	172	259	19	88	161	0	110	1137	0	130	990	0
Confl. Peds. (#/hr)	4		4	4		4	9		37	37		9
Heavy Vehicles (%)	0%	1%	0%	0%	4%	0%	0%	1%	0%	0%	1%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	37.1	27.2	27.2	32.3	24.8		65.7	58.0		65.9	58.1	
Effective Green, g (s)	37.1	27.2	27.2	32.3	24.8		65.7	58.0		65.9	58.1	
Actuated g/C Ratio	0.31	0.23	0.23	0.27	0.21		0.55	0.48		0.55	0.48	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	357	424	357	277	361		284	1618		240	1651	
v/s Ratio Prot	c0.04	c0.14		0.02	0.09		0.02	c0.34		c0.04	0.29	
v/s Ratio Perm	0.11		0.01	0.07			0.19			0.26		
v/c Ratio	0.48	0.61	0.05	0.32	0.45		0.39	0.70		0.54	0.60	
Uniform Delay, d1	32.1	41.9	36.6	34.2	41.9		15.4	24.5		17.3	22.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	2.6	0.1	0.7	0.9		0.9	2.6		2.5	1.6	
Delay (s)	33.1	44.5	36.6	34.8	42.7		16.3	27.1		19.7	24.3	
Level of Service	C	D	D	C	D		B	C		B	C	
Approach Delay (s)		39.4			40.1			26.1			23.8	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			28.6			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			120.5			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			88.7%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

667-675 Yonge Street
19: Site Access & Montgomery DR

HCM Unsignalized Intersection Capacity Analysis

Total (2024) PM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰			↱	↰	↱
Traffic Volume (veh/h)	57	70	6	40	52	4
Future Volume (Veh/h)	57	70	6	40	52	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	62	76	7	43	57	4
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			138		157	100
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			138		157	100
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		93	100
cM capacity (veh/h)			1446		830	956
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	138	50	61			
Volume Left	0	7	57			
Volume Right	76	0	4			
cSH	1700	1446	837			
Volume to Capacity	0.08	0.00	0.07			
Queue Length 95th (m)	0.0	0.1	1.9			
Control Delay (s)	0.0	1.1	9.6			
Lane LOS		A	A			
Approach Delay (s)	0.0	1.1	9.6			
Approach LOS			A			
Intersection Summary						
Average Delay			2.6			
Intersection Capacity Utilization			17.3%	ICU Level of Service		A
Analysis Period (min)			15			

667-675 Yonge Street
3: Yonge ST & Big Bay Point RD

Queues
Total (2029) AM Peak Hour

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	192	270	124	495	219	181	658	83	142	453	274
Future Volume (vph)	192	270	124	495	219	181	658	83	142	453	274
Lane Group Flow (vph)	206	448	133	532	235	195	708	89	153	487	295
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases	4		8		8	2		2	6		6
Detector Phase	7	4	3	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	6.0	12.0	6.0	12.0	12.0	6.0	29.0	29.0	6.0	29.0	29.0
Minimum Split (s)	10.0	23.0	10.0	23.0	23.0	10.0	35.0	35.0	10.0	35.0	35.0
Total Split (s)	22.0	43.0	15.0	36.0	36.0	21.0	46.0	46.0	16.0	41.0	41.0
Total Split (%)	18.3%	35.8%	12.5%	30.0%	30.0%	17.5%	38.3%	38.3%	13.3%	34.2%	34.2%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max	Max
v/c Ratio	0.64	0.54	0.41	0.79	0.53	0.59	0.61	0.15	0.51	0.48	0.53
Control Delay	31.1	29.5	24.9	49.7	13.7	33.7	32.4	0.5	41.5	33.1	21.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.1	29.5	24.9	49.7	13.7	33.7	32.4	0.5	41.5	33.1	21.0
Queue Length 50th (m)	30.8	36.8	18.9	61.2	8.3	31.9	71.1	0.0	26.2	48.3	28.9
Queue Length 95th (m)	50.0	53.9	33.0	83.1	32.6	56.7	101.6	0.3	48.0	71.4	63.0
Internal Link Dist (m)		414.7		323.5			305.9			337.7	
Turn Bay Length (m)	60.0		65.0		25.0	40.0		35.0	50.0		15.0
Base Capacity (vph)	353	1051	341	869	517	361	1158	604	341	1009	552
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.43	0.39	0.61	0.45	0.54	0.61	0.15	0.45	0.48	0.53

Intersection Summary

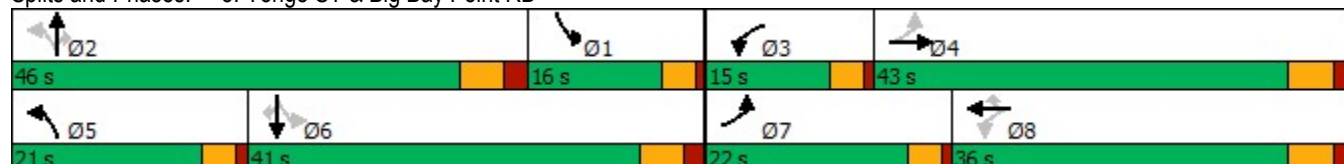
Cycle Length: 120

Actuated Cycle Length: 108.9

Natural Cycle: 80

Control Type: Semi Act-Uncoord

Splits and Phases: 3: Yonge ST & Big Bay Point RD



667-675 Yonge Street
3: Yonge ST & Big Bay Point RD

HCM Signalized Intersection Capacity Analysis

Total (2029) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	192	270	147	124	495	219	181	658	83	142	453	274
Future Volume (vph)	192	270	147	124	495	219	181	658	83	142	453	274
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1562	2898		1546	3124	1366	1577	3124	1366	1577	3065	1393
Flt Permitted	0.23	1.00		0.48	1.00	1.00	0.29	1.00	1.00	0.38	1.00	1.00
Satd. Flow (perm)	376	2898		781	3124	1366	487	3124	1366	635	3065	1393
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	206	290	158	133	532	235	195	708	89	153	487	295
RTOR Reduction (vph)	0	65	0	0	0	150	0	0	56	0	0	94
Lane Group Flow (vph)	206	383	0	133	532	85	195	708	33	153	487	201
Confl. Peds. (#/hr)	1		3	3		1	1		1	1		1
Heavy Vehicles (%)	4%	7%	3%	5%	4%	5%	3%	4%	5%	3%	6%	3%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	43.0	29.0		33.6	23.6	23.6	40.4	40.4	40.4	37.9	35.9	35.9
Effective Green, g (s)	43.0	29.0		33.6	23.6	23.6	40.4	40.4	40.4	37.9	35.9	35.9
Actuated g/C Ratio	0.40	0.27		0.31	0.22	0.22	0.37	0.37	0.37	0.35	0.33	0.33
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	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	3.0
Lane Grp Cap (vph)	316	772		311	677	296	320	1160	507	302	1011	459
v/s Ratio Prot	c0.09	0.13		0.04	c0.17		0.08	c0.23		c0.04	0.16	
v/s Ratio Perm	0.17			0.09		0.06	0.15		0.02	0.13		0.14
v/c Ratio	0.65	0.50		0.43	0.79	0.29	0.61	0.61	0.07	0.51	0.48	0.44
Uniform Delay, d1	24.1	33.7		28.4	40.2	35.6	25.2	27.8	22.0	30.4	29.0	28.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.8	0.5		0.9	6.0	0.5	3.3	2.4	0.2	1.3	1.6	3.0
Delay (s)	28.9	34.2		29.4	46.2	36.1	28.4	30.2	22.3	31.8	30.7	31.6
Level of Service	C	C		C	D	D	C	C	C	C	C	C
Approach Delay (s)		32.5			41.1			29.1			31.1	
Approach LOS		C			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			33.4			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			108.8			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			79.2%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

667-675 Yonge Street
13: Yonge ST & Montgomery DR

HCM Unsignalized Intersection Capacity Analysis

Total (2029) AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	62	41	938	70	29	779
Future Volume (Veh/h)	62	41	938	70	29	779
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	78	52	1187	89	37	986
Pedestrians	3					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			TWLTL		TWLTL	
Median storage veh)			2		2	
Upstream signal (m)			238		330	
pX, platoon unblocked	0.90	0.87			0.87	
vC, conflicting volume	1802	641			1279	
vC1, stage 1 conf vol	1234					
vC2, stage 2 conf vol	567					
vCu, unblocked vol	1377	297			1028	
tC, single (s)	6.8	6.9			4.4	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.4	
p0 queue free %	70	92			93	
cM capacity (veh/h)	264	614			512	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	130	791	485	37	493	493
Volume Left	78	0	0	37	0	0
Volume Right	52	0	89	0	0	0
cSH	342	1700	1700	512	1700	1700
Volume to Capacity	0.38	0.47	0.29	0.07	0.29	0.29
Queue Length 95th (m)	13.8	0.0	0.0	1.9	0.0	0.0
Control Delay (s)	21.8	0.0	0.0	12.6	0.0	0.0
Lane LOS	C			B		
Approach Delay (s)	21.8	0.0		0.5		
Approach LOS	C					
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			40.8%		ICU Level of Service	A
Analysis Period (min)			15			

667-675 Yonge Street
10: Yonge ST & Madelaine DR/Ashford DR

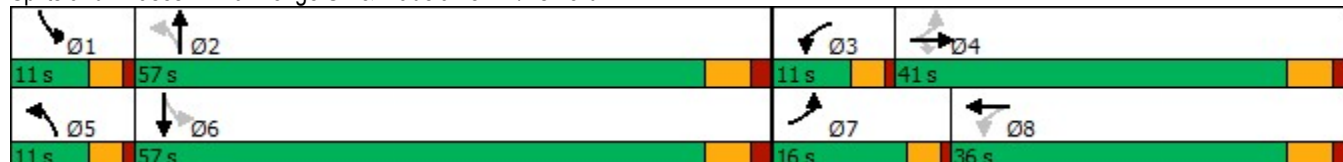
Queues
Total (2029) AM Peak Hour

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	148	188	65	110	152	106	636	71	428
Future Volume (vph)	148	188	65	110	152	106	636	71	428
Lane Group Flow (vph)	157	200	69	117	233	113	772	76	568
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	26.0	26.0	7.0	26.0	7.0	44.0	7.0	44.0
Minimum Split (s)	11.0	32.0	32.0	11.0	35.0	11.0	50.0	11.0	50.0
Total Split (s)	16.0	41.0	41.0	11.0	36.0	11.0	57.0	11.0	57.0
Total Split (%)	13.3%	34.2%	34.2%	9.2%	30.0%	9.2%	47.5%	9.2%	47.5%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	1.0	2.0	1.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	None	Max
v/c Ratio	0.43	0.43	0.14	0.30	0.57	0.27	0.49	0.22	0.39
Control Delay	28.5	38.7	3.2	27.1	42.8	14.3	23.2	13.8	21.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.5	38.7	3.2	27.1	42.8	14.3	23.2	13.8	21.4
Queue Length 50th (m)	25.3	39.5	0.0	18.4	46.1	12.4	67.6	8.1	44.5
Queue Length 95th (m)	41.5	62.4	5.6	31.9	73.0	22.1	87.1	15.8	60.0
Internal Link Dist (m)		240.2			213.8		240.7		213.8
Turn Bay Length (m)	30.0			75.0		20.0		20.0	
Base Capacity (vph)	380	539	550	388	467	414	1561	351	1449
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	0.41	0.37	0.13	0.30	0.50	0.27	0.49	0.22	0.39

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 115.2
Natural Cycle: 110
Control Type: Semi Act-Uncoord

Splits and Phases: 10: Yonge ST & Madelaine DR/Ashford DR



667-675 Yonge Street
10: Yonge ST & Madelaine DR/Ashford DR

HCM Signalized Intersection Capacity Analysis

Total (2029) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	188	65	110	152	67	106	636	89	71	428	106
Future Volume (vph)	148	188	65	110	152	67	106	636	89	71	428	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.99		1.00	0.98		1.00	0.99	
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	0.95		1.00	0.98		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)	1785	1776	1583	1781	1745		1713	3358		1792	3235	
Flt Permitted	0.38	1.00	1.00	0.61	1.00		0.37	1.00		0.28	1.00	
Satd. Flow (perm)	719	1776	1583	1152	1745		669	3358		535	3235	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	157	200	69	117	162	71	113	677	95	76	455	113
RTOR Reduction (vph)	0	0	51	0	14	0	0	9	0	0	18	0
Lane Group Flow (vph)	157	200	18	117	219	0	113	763	0	76	550	0
Confl. Peds. (#/hr)	4		4	4		4	9		37	37		9
Heavy Vehicles (%)	1%	7%	0%	1%	3%	4%	5%	4%	2%	0%	8%	4%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	41.2	30.2	30.2	33.2	26.2		60.3	53.3		57.5	51.9	
Effective Green, g (s)	41.2	30.2	30.2	33.2	26.2		60.3	53.3		57.5	51.9	
Actuated g/C Ratio	0.35	0.26	0.26	0.29	0.23		0.52	0.46		0.50	0.45	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	356	461	411	367	393		410	1541		325	1446	
v/s Ratio Prot	c0.04	0.11		0.02	c0.13		c0.02	c0.23		0.01	0.17	
v/s Ratio Perm	0.11		0.01	0.07			0.13			0.10		
v/c Ratio	0.44	0.43	0.04	0.32	0.56		0.28	0.50		0.23	0.38	
Uniform Delay, d1	27.1	35.8	32.1	31.7	39.8		14.7	22.0		16.0	21.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.7	0.0	0.5	1.7		0.4	1.1		0.4	0.8	
Delay (s)	28.0	36.5	32.2	32.2	41.5		15.1	23.1		16.4	22.2	
Level of Service	C	D	C	C	D		B	C		B	C	
Approach Delay (s)		32.7			38.4			22.1			21.5	
Approach LOS		C			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			26.4			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.50									
Actuated Cycle Length (s)			116.1			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			89.1%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

667-675 Yonge Street
19: Site Access & Montgomery DR

HCM Unsignalized Intersection Capacity Analysis

Total (2029) AM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰			↱	↰	↱
Traffic Volume (veh/h)	73	26	2	31	71	2
Future Volume (Veh/h)	73	26	2	31	71	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	79	28	2	34	77	2
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			107		131	93
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			107		131	93
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		91	100
cM capacity (veh/h)			1484		862	964
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	107	36	79			
Volume Left	0	2	77			
Volume Right	28	0	2			
cSH	1700	1484	864			
Volume to Capacity	0.06	0.00	0.09			
Queue Length 95th (m)	0.0	0.0	2.4			
Control Delay (s)	0.0	0.4	9.6			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.4	9.6			
Approach LOS			A			
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			16.1%	ICU Level of Service		A
Analysis Period (min)			15			

667-675 Yonge Street
3: Yonge ST & Big Bay Point RD

Queues
Total (2029) PM Peak Hour

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	343	528	208	459	186	238	872	143	245	875	291
Future Volume (vph)	343	528	208	459	186	238	872	143	245	875	291
Lane Group Flow (vph)	354	799	214	473	192	245	899	147	253	902	300
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases	4		8		8	2		2	6		6
Detector Phase	7	4	3	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	6.0	12.0	6.0	12.0	12.0	6.0	29.0	29.0	6.0	29.0	29.0
Minimum Split (s)	10.0	31.0	10.0	25.0	25.0	10.0	35.0	35.0	10.0	35.0	35.0
Total Split (s)	31.0	39.0	17.0	25.0	25.0	20.0	44.0	44.0	20.0	44.0	44.0
Total Split (%)	25.8%	32.5%	14.2%	20.8%	20.8%	16.7%	36.7%	36.7%	16.7%	36.7%	36.7%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max	Max
v/c Ratio	0.81	0.87	0.81	0.78	0.45	0.81	0.76	0.23	0.72	0.76	0.49
Control Delay	40.9	49.0	52.1	56.0	9.9	51.1	40.3	5.1	53.2	40.4	20.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.9	49.0	52.1	56.0	9.9	51.1	40.3	5.1	53.2	40.4	20.1
Queue Length 50th (m)	60.7	90.3	33.5	57.7	0.2	45.9	105.1	0.0	47.7	105.5	31.4
Queue Length 95th (m)	92.7	115.5	#75.6	#88.1	21.1	#84.0	132.5	13.3	#76.3	133.2	59.9
Internal Link Dist (m)		414.7		323.5			305.9			337.7	
Turn Bay Length (m)	60.0		65.0		25.0	40.0		35.0	50.0		15.0
Base Capacity (vph)	499	1027	273	621	436	316	1184	629	366	1184	618
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.78	0.78	0.76	0.44	0.78	0.76	0.23	0.69	0.76	0.49

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 115.1

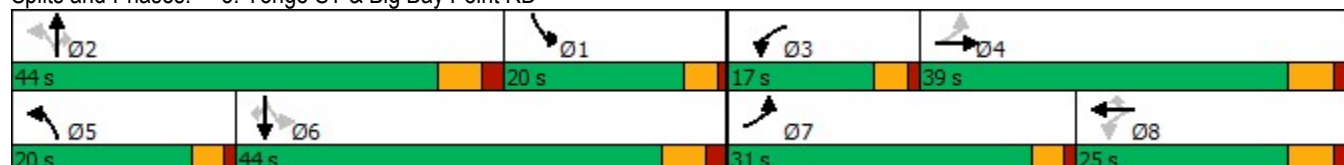
Natural Cycle: 90

Control Type: Semi Act-Uncoord

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Yonge ST & Big Bay Point RD



667-675 Yonge Street
3: Yonge ST & Big Bay Point RD

HCM Signalized Intersection Capacity Analysis

Total (2029) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	343	528	247	208	459	186	238	872	143	245	875	291
Future Volume (vph)	343	528	247	208	459	186	238	872	143	245	875	291
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	3413		1786	3505	1577	1787	3574	1586	1786	3574	1592
Flt Permitted	0.22	1.00		0.20	1.00	1.00	0.17	1.00	1.00	0.29	1.00	1.00
Satd. Flow (perm)	412	3413		374	3505	1577	324	3574	1586	538	3574	1592
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)	354	544	255	214	473	192	245	899	147	253	902	300
RTOR Reduction (vph)	0	48	0	0	0	158	0	0	98	0	0	91
Lane Group Flow (vph)	354	751	0	214	473	34	245	899	49	253	902	209
Confl. Peds. (#/hr)	1		7	7		1	2		5	5		2
Heavy Vehicles (%)	0%	0%	0%	1%	3%	1%	1%	1%	0%	1%	1%	0%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	45.9	29.4		32.6	20.1	20.1	38.2	38.2	38.2	40.2	38.2	38.2
Effective Green, g (s)	45.9	29.4		32.6	20.1	20.1	38.2	38.2	38.2	40.2	38.2	38.2
Actuated g/C Ratio	0.40	0.26		0.28	0.17	0.17	0.33	0.33	0.33	0.35	0.33	0.33
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	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	3.0
Lane Grp Cap (vph)	428	871		259	612	275	298	1186	526	350	1186	528
v/s Ratio Prot	c0.16	c0.22		0.09	0.13		c0.11	0.25		0.09	c0.25	
v/s Ratio Perm	0.17			0.14		0.02	c0.17		0.03	0.16		0.13
v/c Ratio	0.83	0.86		0.83	0.77	0.12	0.82	0.76	0.09	0.72	0.76	0.40
Uniform Delay, d1	27.1	40.9		34.3	45.3	40.1	31.6	34.3	26.5	35.3	34.4	29.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.4	8.8		18.9	6.0	0.2	16.5	4.6	0.3	7.2	4.6	2.2
Delay (s)	39.5	49.7		53.2	51.4	40.3	48.1	38.9	26.9	42.5	39.0	31.8
Level of Service	D	D		D	D	D	D	D	C	D	D	C
Approach Delay (s)		46.6			49.4			39.3			38.1	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			42.5			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			115.1			Sum of lost time (s)				20.0		
Intersection Capacity Utilization			88.7%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

667-675 Yonge Street
13: Yonge ST & Montgomery DR

HCM Unsignalized Intersection Capacity Analysis

Total (2029) PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	55	41	1101	62	71	1087
Future Volume (Veh/h)	55	41	1101	62	71	1087
Sign Control	Stop		Free		Free	Free
Grade	0%		0%			0%
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	59	44	1184	67	76	1169
Pedestrians	5					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			TWLTL		TWLTL	
Median storage (veh)			2		2	
Upstream signal (m)			238		330	
pX, platoon unblocked	0.83	0.74			0.74	
vC, conflicting volume	1959	630			1256	
vC1, stage 1 conf vol	1222					
vC2, stage 2 conf vol	736					
vCu, unblocked vol	725	0			634	
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 %	84	95			89	
cM capacity (veh/h)	365	801			704	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	103	789	462	76	584	584
Volume Left	59	0	0	76	0	0
Volume Right	44	0	67	0	0	0
cSH	476	1700	1700	704	1700	1700
Volume to Capacity	0.22	0.46	0.27	0.11	0.34	0.34
Queue Length 95th (m)	6.5	0.0	0.0	2.9	0.0	0.0
Control Delay (s)	14.6	0.0	0.0	10.7	0.0	0.0
Lane LOS	B			B		
Approach Delay (s)	14.6	0.0		0.7		
Approach LOS	B					
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			51.9%		ICU Level of Service	A
Analysis Period (min)			15			

667-675 Yonge Street
10: Yonge ST & Madelaine DR/Ashford DR

Queues
Total (2029) PM Peak Hour

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	171	259	80	87	121	105	914	130	786
Future Volume (vph)	171	259	80	87	121	105	914	130	786
Lane Group Flow (vph)	186	282	87	95	187	114	1261	141	1099
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	24.0	24.0	7.0	24.0	7.0	44.0	7.0	44.0
Minimum Split (s)	11.0	30.0	30.0	11.0	30.0	11.0	50.0	11.0	50.0
Total Split (s)	14.0	30.0	30.0	14.0	30.0	12.0	64.0	12.0	64.0
Total Split (%)	11.7%	25.0%	25.0%	11.7%	25.0%	10.0%	53.3%	10.0%	53.3%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	1.0	2.0	1.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	None	Max
v/c Ratio	0.52	0.72	0.21	0.35	0.51	0.43	0.76	0.65	0.65
Control Delay	36.2	56.2	7.2	32.1	44.6	24.4	28.2	44.8	24.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.2	56.2	7.2	32.1	44.6	24.4	28.2	44.8	24.5
Queue Length 50th (m)	34.1	66.4	0.0	16.5	38.0	11.4	127.6	14.3	101.4
Queue Length 95th (m)	54.1	#104.1	11.2	29.9	62.3	19.7	156.8	#29.4	125.4
Internal Link Dist (m)		240.2			213.8		240.7		213.8
Turn Bay Length (m)	30.0			75.0		20.0		20.0	
Base Capacity (vph)	358	391	408	284	365	269	1651	222	1684
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	0.52	0.72	0.21	0.33	0.51	0.42	0.76	0.64	0.65

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 119.5

Natural Cycle: 105

Control Type: Semi Act-Uncoord

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 10: Yonge ST & Madelaine DR/Ashford DR

 Ø2	 Ø1	 Ø3	 Ø4
64 s	12 s	14 s	30 s
 Ø6	 Ø5	 Ø7	 Ø8
64 s	12 s	14 s	30 s

667-675 Yonge Street
10: Yonge ST & Madelaine DR/Ashford DR

HCM Signalized Intersection Capacity Analysis

Total (2029) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	171	259	80	87	121	51	105	914	247	130	786	225
Future Volume (vph)	171	259	80	87	121	51	105	914	247	130	786	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.99		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	1.00	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.97		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)	1801	1881	1583	1803	1756		1805	3364		1805	3424	
Flt Permitted	0.49	1.00	1.00	0.32	1.00		0.16	1.00		0.11	1.00	
Satd. Flow (perm)	927	1881	1583	615	1756		296	3364		203	3424	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	186	282	87	95	132	55	114	993	268	141	854	245
RTOR Reduction (vph)	0	0	69	0	13	0	0	20	0	0	22	0
Lane Group Flow (vph)	186	282	18	95	174	0	114	1241	0	141	1077	0
Confl. Peds. (#/hr)	4		4	4		4	9		37	37		9
Heavy Vehicles (%)	0%	1%	0%	0%	4%	0%	0%	1%	0%	0%	1%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	34.8	24.9	24.9	33.2	24.1		65.6	58.0		65.6	58.0	
Effective Green, g (s)	34.8	24.9	24.9	33.2	24.1		65.6	58.0		65.6	58.0	
Actuated g/C Ratio	0.29	0.21	0.21	0.28	0.20		0.55	0.48		0.55	0.48	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	342	391	329	261	353		258	1631		213	1660	
v/s Ratio Prot	c0.05	c0.15		0.03	0.10		0.03	c0.37		c0.04	0.31	
v/s Ratio Perm	0.11		0.01	0.07			0.21			0.32		
v/c Ratio	0.54	0.72	0.06	0.36	0.49		0.44	0.76		0.66	0.65	
Uniform Delay, d1	33.7	44.1	37.9	33.5	42.3		32.4	25.1		39.7	23.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.8	6.4	0.1	0.9	1.1		1.2	3.4		7.5	2.0	
Delay (s)	35.5	50.6	38.0	34.3	43.4		33.6	28.5		47.2	25.1	
Level of Service	D	D	D	C	D		C	C		D	C	
Approach Delay (s)		43.5			40.4			29.0			27.6	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			31.8			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			119.6			Sum of lost time (s)				20.0		
Intersection Capacity Utilization			90.0%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

667-675 Yonge Street
19: Site Access & Montgomery DR

HCM Unsignalized Intersection Capacity Analysis

Total (2029) PM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰			↱	↰	↱
Traffic Volume (veh/h)	62	70	6	44	52	4
Future Volume (Veh/h)	62	70	6	44	52	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	67	76	7	48	57	4
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			143		167	105
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			143		167	105
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		93	100
cM capacity (veh/h)			1440		819	949
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	143	55	61			
Volume Left	0	7	57			
Volume Right	76	0	4			
cSH	1700	1440	827			
Volume to Capacity	0.08	0.00	0.07			
Queue Length 95th (m)	0.0	0.1	1.9			
Control Delay (s)	0.0	1.0	9.7			
Lane LOS		A	A			
Approach Delay (s)	0.0	1.0	9.7			
Approach LOS			A			
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			17.5%	ICU Level of Service		A
Analysis Period (min)			15			

667-675 Yonge Street
3: Yonge ST & Big Bay Point RD

Queues
Total (2034) AM Peak Hour

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	222	314	136	575	254	195	745	92	165	517	318
Future Volume (vph)	222	314	136	575	254	195	745	92	165	517	318
Lane Group Flow (vph)	239	513	146	618	273	210	801	99	177	556	342
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases	4		8		8	2		2	6		6
Detector Phase	7	4	3	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	6.0	12.0	6.0	12.0	12.0	6.0	29.0	29.0	6.0	29.0	29.0
Minimum Split (s)	10.0	35.0	10.0	35.0	35.0	10.0	35.0	35.0	10.0	35.0	35.0
Total Split (s)	22.0	43.0	15.0	36.0	36.0	21.0	46.0	46.0	16.0	41.0	41.0
Total Split (%)	18.3%	35.8%	12.5%	30.0%	30.0%	17.5%	38.3%	38.3%	13.3%	34.2%	34.2%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max	Max
v/c Ratio	0.76	0.57	0.46	0.85	0.59	0.72	0.72	0.17	0.63	0.58	0.64
Control Delay	39.3	31.5	26.1	53.9	18.0	42.7	37.7	1.4	50.1	37.2	26.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.3	31.5	26.1	53.9	18.0	42.7	37.7	1.4	50.1	37.2	26.9
Queue Length 50th (m)	37.6	46.6	21.5	75.6	16.3	38.4	92.5	0.0	33.9	62.3	43.7
Queue Length 95th (m)	#67.7	64.6	36.1	98.3	45.4	#62.2	118.1	2.5	55.1	82.4	79.9
Internal Link Dist (m)		414.7		323.5			305.9			337.7	
Turn Bay Length (m)	60.0		65.0		25.0	40.0		35.0	50.0		15.0
Base Capacity (vph)	331	1005	325	830	503	315	1107	584	306	955	531
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.51	0.45	0.74	0.54	0.67	0.72	0.17	0.58	0.58	0.64

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 113.6

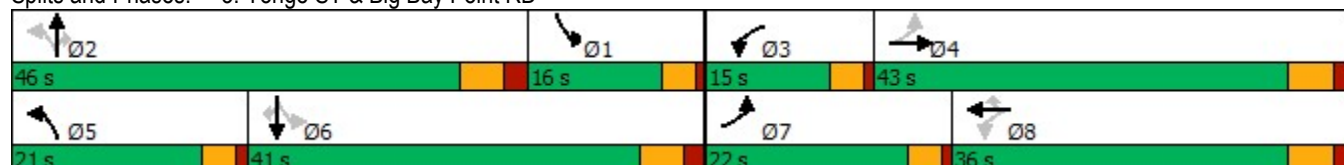
Natural Cycle: 90

Control Type: Semi Act-Uncoord

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Yonge ST & Big Bay Point RD



667-675 Yonge Street
3: Yonge ST & Big Bay Point RD

HCM Signalized Intersection Capacity Analysis

Total (2034) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	222	314	163	136	575	254	195	745	92	165	517	318
Future Volume (vph)	222	314	163	136	575	254	195	745	92	165	517	318
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1562	2902		1546	3124	1366	1577	3124	1366	1577	3065	1393
Flt Permitted	0.18	1.00		0.43	1.00	1.00	0.21	1.00	1.00	0.35	1.00	1.00
Satd. Flow (perm)	300	2902		698	3124	1366	354	3124	1366	579	3065	1393
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	239	338	175	146	618	273	210	801	99	177	556	342
RTOR Reduction (vph)	0	57	0	0	0	146	0	0	64	0	0	98
Lane Group Flow (vph)	239	456	0	146	618	127	210	801	35	177	556	244
Confl. Peds. (#/hr)	1		3	3		1	1		1	1		1
Heavy Vehicles (%)	4%	7%	3%	5%	4%	5%	3%	4%	5%	3%	6%	3%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	47.0	32.8		36.7	26.5	26.5	40.3	40.3	40.3	37.4	35.4	35.4
Effective Green, g (s)	47.0	32.8		36.7	26.5	26.5	40.3	40.3	40.3	37.4	35.4	35.4
Actuated g/C Ratio	0.41	0.29		0.32	0.23	0.23	0.36	0.36	0.36	0.33	0.31	0.31
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	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	3.0
Lane Grp Cap (vph)	307	839		302	730	319	287	1110	485	279	956	434
v/s Ratio Prot	c0.11	0.16		0.04	0.20		0.10	c0.26		c0.06	0.18	
v/s Ratio Perm	c0.21			0.11		0.09	c0.16		0.03	0.15		0.18
v/c Ratio	0.78	0.54		0.48	0.85	0.40	0.73	0.72	0.07	0.63	0.58	0.56
Uniform Delay, d1	24.9	34.0		28.7	41.5	36.7	28.2	31.7	24.2	34.8	32.8	32.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.8	0.7		1.2	9.0	0.8	9.2	4.1	0.3	4.7	2.6	5.2
Delay (s)	36.7	34.7		29.9	50.5	37.5	37.5	35.8	24.5	39.5	35.4	37.7
Level of Service	D	C		C	D	D	D	D	C	D	D	D
Approach Delay (s)		35.3			44.2			35.1			36.8	
Approach LOS		D			D			D			D	

Intersection Summary

HCM 2000 Control Delay	38.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	113.4	Sum of lost time (s)	20.0
Intersection Capacity Utilization	84.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

667-675 Yonge Street
13: Yonge ST & Montgomery DR

HCM Unsignalized Intersection Capacity Analysis

Total (2034) AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	65	42	1056	78	32	882
Future Volume (Veh/h)	65	42	1056	78	32	882
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	82	53	1337	99	41	1116
Pedestrians	3					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			TWLT		TWLT	
Median storage (veh)			2		2	
Upstream signal (m)			238		330	
pX, platoon unblocked	0.89	0.84			0.84	
vC, conflicting volume	2030	721			1439	
vC1, stage 1 conf vol	1390					
vC2, stage 2 conf vol	640					
vCu, unblocked vol	1423	289			1143	
tC, single (s)	6.8	6.9			4.4	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.4	
p0 queue free %	64	91			91	
cM capacity (veh/h)	228	599			443	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	135	891	545	41	558	558
Volume Left	82	0	0	41	0	0
Volume Right	53	0	99	0	0	0
cSH	301	1700	1700	443	1700	1700
Volume to Capacity	0.45	0.52	0.32	0.09	0.33	0.33
Queue Length 95th (m)	17.6	0.0	0.0	2.4	0.0	0.0
Control Delay (s)	26.3	0.0	0.0	14.0	0.0	0.0
Lane LOS	D			B		
Approach Delay (s)	26.3	0.0		0.5		
Approach LOS	D					
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			44.5%		ICU Level of Service	A
Analysis Period (min)			15			

667-675 Yonge Street
10: Yonge ST & Madelaine DR/Ashford DR

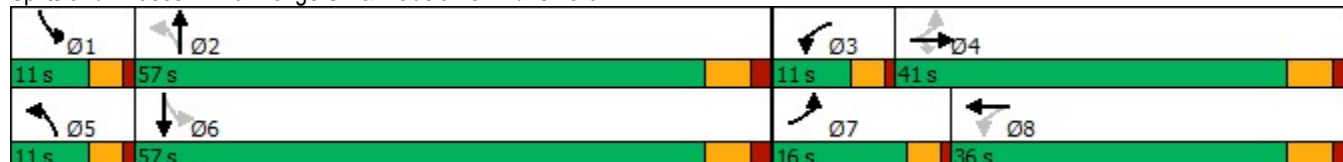
Queues
Total (2034) AM Peak Hour

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	168	213	69	126	171	111	718	79	483
Future Volume (vph)	168	213	69	126	171	111	718	79	483
Lane Group Flow (vph)	179	227	73	134	260	118	869	84	640
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	26.0	26.0	7.0	26.0	7.0	44.0	7.0	44.0
Minimum Split (s)	11.0	32.0	32.0	11.0	35.0	11.0	50.0	11.0	50.0
Total Split (s)	16.0	41.0	41.0	11.0	36.0	11.0	57.0	11.0	57.0
Total Split (%)	13.3%	34.2%	34.2%	9.2%	30.0%	9.2%	47.5%	9.2%	47.5%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	1.0	2.0	1.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	None	Max
v/c Ratio	0.51	0.48	0.15	0.36	0.63	0.31	0.56	0.27	0.45
Control Delay	30.2	39.5	3.4	28.2	45.3	15.3	25.0	15.1	22.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.2	39.5	3.4	28.2	45.3	15.3	25.0	15.1	22.9
Queue Length 50th (m)	29.2	45.7	0.0	21.3	53.1	13.0	79.2	9.0	52.1
Queue Length 95th (m)	46.7	70.4	6.3	35.9	81.8	24.0	105.4	18.0	72.0
Internal Link Dist (m)		240.2			213.8		240.7		213.8
Turn Bay Length (m)	30.0			75.0		20.0		20.0	
Base Capacity (vph)	360	535	547	371	464	377	1549	309	1438
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	0.50	0.42	0.13	0.36	0.56	0.31	0.56	0.27	0.45

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 116.1
Natural Cycle: 110
Control Type: Semi Act-Uncoord

Splits and Phases: 10: Yonge ST & Madelaine DR/Ashford DR



667-675 Yonge Street
10: Yonge ST & Madelaine DR/Ashford DR

HCM Signalized Intersection Capacity Analysis

Total (2034) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	213	69	126	171	73	111	718	99	79	483	118
Future Volume (vph)	168	213	69	126	171	73	111	718	99	79	483	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.99		1.00	0.98		1.00	0.99	
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	0.95		1.00	0.98		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)	1785	1776	1583	1782	1746		1715	3359		1797	3236	
Flt Permitted	0.34	1.00	1.00	0.57	1.00		0.33	1.00		0.24	1.00	
Satd. Flow (perm)	639	1776	1583	1070	1746		594	3359		447	3236	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	179	227	73	134	182	78	118	764	105	84	514	126
RTOR Reduction (vph)	0	0	54	0	13	0	0	9	0	0	17	0
Lane Group Flow (vph)	179	227	19	134	247	0	118	860	0	84	623	0
Confl. Peds. (#/hr)	4		4	4		4	9		37	37		9
Heavy Vehicles (%)	1%	7%	0%	1%	3%	4%	5%	4%	2%	0%	8%	4%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	42.1	31.1	31.1	33.7	26.7		60.3	53.3		57.5	51.9	
Effective Green, g (s)	42.1	31.1	31.1	33.7	26.7		60.3	53.3		57.5	51.9	
Actuated g/C Ratio	0.36	0.27	0.27	0.29	0.23		0.52	0.46		0.49	0.44	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	341	472	420	350	398		373	1530		284	1435	
v/s Ratio Prot	c0.05	0.13		0.02	c0.14		c0.02	c0.26		0.01	0.19	
v/s Ratio Perm	0.14		0.01	0.09			0.14			0.13		
v/c Ratio	0.52	0.48	0.05	0.38	0.62		0.32	0.56		0.30	0.43	
Uniform Delay, d1	27.5	36.2	31.9	32.1	40.6		15.3	23.3		16.9	22.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	0.8	0.0	0.7	3.0		0.5	1.5		0.6	1.0	
Delay (s)	29.0	36.9	32.0	32.8	43.6		15.8	24.8		17.5	23.4	
Level of Service	C	D	C	C	D		B	C		B	C	
Approach Delay (s)		33.2			39.9			23.7			22.7	
Approach LOS		C			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			27.7			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			117.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			90.5%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

667-675 Yonge Street
19: Site Access & Montgomery DR

HCM Unsignalized Intersection Capacity Analysis

Total (2034) AM Peak Hour

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰			↱	↰	↱
Traffic Volume (veh/h)	84	26	2	36	71	2
Future Volume (Veh/h)	84	26	2	36	71	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	91	28	2	39	77	2
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			119		148	105
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			119		148	105
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		91	100
cM capacity (veh/h)			1469		843	949
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	119	41	79			
Volume Left	0	2	77			
Volume Right	28	0	2			
cSH	1700	1469	845			
Volume to Capacity	0.07	0.00	0.09			
Queue Length 95th (m)	0.0	0.0	2.5			
Control Delay (s)	0.0	0.4	9.7			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.4	9.7			
Approach LOS			A			
Intersection Summary						
Average Delay			3.3			
Intersection Capacity Utilization			16.7%	ICU Level of Service		A
Analysis Period (min)			15			

667-675 Yonge Street
3: Yonge ST & Big Bay Point RD

Queues
Total (2034) PM Peak Hour

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	379	583	226	508	205	255	954	155	270	955	321
Future Volume (vph)	379	583	226	508	205	255	954	155	270	955	321
Lane Group Flow (vph)	391	872	233	524	211	263	984	160	278	985	331
Turn Type	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases	4		8		8	2		2	6		6
Detector Phase	7	4	3	8	8	5	2	2	1	6	6
Switch Phase											
Minimum Initial (s)	6.0	12.0	6.0	12.0	12.0	6.0	29.0	29.0	6.0	29.0	29.0
Minimum Split (s)	10.0	31.0	10.0	25.0	25.0	10.0	35.0	35.0	10.0	35.0	35.0
Total Split (s)	31.0	39.0	17.0	25.0	25.0	20.0	44.0	44.0	20.0	44.0	44.0
Total Split (%)	25.8%	32.5%	14.2%	20.8%	20.8%	16.7%	36.7%	36.7%	16.7%	36.7%	36.7%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	Max	None	Max	Max
v/c Ratio	0.90	0.92	0.88	0.86	0.49	0.86	0.85	0.26	0.88	0.86	0.55
Control Delay	53.8	54.2	62.5	63.7	12.8	58.6	46.3	6.2	72.4	46.4	23.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.8	54.2	62.5	63.7	12.8	58.6	46.3	6.2	72.4	46.4	23.0
Queue Length 50th (m)	74.3	102.7	39.9	68.1	4.3	50.8	120.7	0.8	54.2	120.8	39.3
Queue Length 95th (m)	#125.3	#138.6	#87.9	#103.0	27.6	#93.8	#150.4	16.5	#102.0	#150.8	70.2
Internal Link Dist (m)		414.7		323.5			305.9			337.7	
Turn Bay Length (m)	60.0		65.0		25.0	40.0		35.0	50.0		15.0
Base Capacity (vph)	475	999	266	606	430	311	1152	616	324	1152	605
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.87	0.88	0.86	0.49	0.85	0.85	0.26	0.86	0.86	0.55

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 117.9

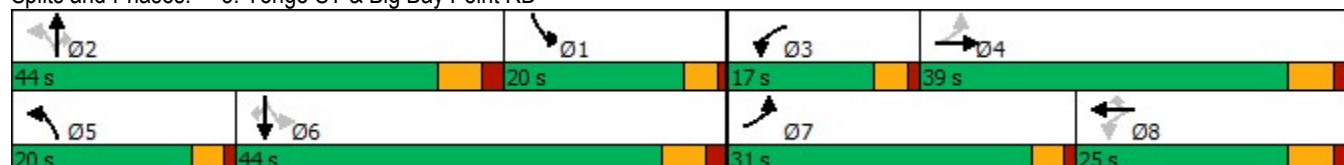
Natural Cycle: 90

Control Type: Semi Act-Uncoord

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Yonge ST & Big Bay Point RD



667-675 Yonge Street
3: Yonge ST & Big Bay Point RD

HCM Signalized Intersection Capacity Analysis

Total (2034) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	379	583	263	226	508	205	255	954	155	270	955	321
Future Volume (vph)	379	583	263	226	508	205	255	954	155	270	955	321
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	3418		1786	3505	1577	1787	3574	1586	1787	3574	1592
Flt Permitted	0.17	1.00		0.20	1.00	1.00	0.18	1.00	1.00	0.21	1.00	1.00
Satd. Flow (perm)	315	3418		367	3505	1577	334	3574	1586	396	3574	1592
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)	391	601	271	233	524	211	263	984	160	278	985	331
RTOR Reduction (vph)	0	44	0	0	0	158	0	0	105	0	0	92
Lane Group Flow (vph)	391	828	0	233	524	53	263	984	55	278	985	239
Confl. Peds. (#/hr)	1		7	7		1	2		5	5		2
Heavy Vehicles (%)	0%	0%	0%	1%	3%	1%	1%	1%	0%	1%	1%	0%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	48.4	31.4		33.5	20.5	20.5	38.0	38.0	38.0	40.0	38.0	38.0
Effective Green, g (s)	48.4	31.4		33.5	20.5	20.5	38.0	38.0	38.0	40.0	38.0	38.0
Actuated g/C Ratio	0.41	0.27		0.28	0.17	0.17	0.32	0.32	0.32	0.34	0.32	0.32
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	6.0	6.0	4.0	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	3.0
Lane Grp Cap (vph)	431	910		260	609	274	298	1151	511	317	1151	513
v/s Ratio Prot	c0.18	c0.24		0.10	0.15		0.12	c0.28		c0.12	0.28	
v/s Ratio Perm	0.19			0.16		0.03	0.17		0.03	c0.18		0.15
v/c Ratio	0.91	0.91		0.90	0.86	0.19	0.88	0.85	0.11	0.88	0.86	0.47
Uniform Delay, d1	31.6	41.9		35.6	47.3	41.6	33.4	37.4	28.0	40.4	37.4	31.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	22.3	12.8		30.0	11.9	0.3	24.9	8.2	0.4	22.7	8.2	3.0
Delay (s)	53.9	54.6		65.6	59.2	42.0	58.4	45.6	28.5	63.1	45.6	34.9
Level of Service	D	D		E	E	D	E	D	C	E	D	C
Approach Delay (s)		54.4			57.0			46.0			46.4	
Approach LOS		D			E			D			D	
Intersection Summary												
HCM 2000 Control Delay			50.2		HCM 2000 Level of Service					D		
HCM 2000 Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			117.9		Sum of lost time (s)					20.0		
Intersection Capacity Utilization			95.3%		ICU Level of Service					F		
Analysis Period (min)			15									
c Critical Lane Group												

667-675 Yonge Street
13: Yonge ST & Montgomery DR

HCM Unsignalized Intersection Capacity Analysis

Total (2034) PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (veh/h)	57	43	1200	64	75	1179
Future Volume (Veh/h)	57	43	1200	64	75	1179
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	61	46	1290	69	81	1268
Pedestrians	5					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage (veh)			2			2
Upstream signal (m)			238			330
pX, platoon unblocked	0.81	0.69			0.69	
vC, conflicting volume	2126	684			1364	
vC1, stage 1 conf vol	1330					
vC2, stage 2 conf vol	796					
vCu, unblocked vol	654	0			638	
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 %	83	94			88	
cM capacity (veh/h)	349	753			659	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	107	860	499	81	634	634
Volume Left	61	0	0	81	0	0
Volume Right	46	0	69	0	0	0
cSH	453	1700	1700	659	1700	1700
Volume to Capacity	0.24	0.51	0.29	0.12	0.37	0.37
Queue Length 95th (m)	7.3	0.0	0.0	3.3	0.0	0.0
Control Delay (s)	15.4	0.0	0.0	11.2	0.0	0.0
Lane LOS	C			B		
Approach Delay (s)	15.4	0.0		0.7		
Approach LOS	C					
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			55.2%		ICU Level of Service	B
Analysis Period (min)			15			

667-675 Yonge Street
10: Yonge ST & Madelaine DR/Ashford DR

Queues
Total (2034) PM Peak Hour

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	186	282	83	94	131	110	999	140	852
Future Volume (vph)	186	282	83	94	131	110	999	140	852
Lane Group Flow (vph)	202	307	90	102	202	120	1378	152	1194
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	pm+pt	NA
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases	4		4	8		2		6	
Detector Phase	7	4	4	3	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	7.0	24.0	24.0	7.0	24.0	7.0	44.0	7.0	44.0
Minimum Split (s)	11.0	30.0	30.0	11.0	30.0	11.0	50.0	11.0	50.0
Total Split (s)	14.0	30.0	30.0	14.0	30.0	12.0	64.0	12.0	64.0
Total Split (%)	11.7%	25.0%	25.0%	11.7%	25.0%	10.0%	53.3%	10.0%	53.3%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	1.0	2.0	1.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Max	None	Max
v/c Ratio	0.59	0.79	0.22	0.41	0.56	0.51	0.82	0.80	0.71
Control Delay	39.0	61.0	7.8	33.8	46.3	18.3	30.8	50.2	26.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.0	61.0	7.8	33.8	46.3	18.3	30.8	50.2	26.1
Queue Length 50th (m)	37.4	73.4	0.0	17.8	41.8	12.0	146.0	18.4	115.1
Queue Length 95th (m)	58.5	#119.1	12.1	31.7	67.4	20.7	178.0	#54.4	141.3
Internal Link Dist (m)		240.2			213.8		240.7		213.8
Turn Bay Length (m)	30.0			75.0		20.0		20.0	
Base Capacity (vph)	342	389	402	259	363	239	1680	191	1689
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	0.59	0.79	0.22	0.39	0.56	0.50	0.82	0.80	0.71

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Natural Cycle: 105

Control Type: Semi Act-Uncoord

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 10: Yonge ST & Madelaine DR/Ashford DR

			
Ø1	Ø2	Ø3	Ø4
12 s	64 s	14 s	30 s
			
Ø5	Ø6	Ø7	Ø8
12 s	64 s	14 s	30 s

667-675 Yonge Street
10: Yonge ST & Madelaine DR/Ashford DR

HCM Signalized Intersection Capacity Analysis

Total (2034) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	186	282	83	94	131	55	110	999	269	140	852	247
Future Volume (vph)	186	282	83	94	131	55	110	999	269	140	852	247
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	0.99		1.00	0.99		1.00	0.99	
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	0.97		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)	1801	1881	1561	1801	1755		1805	3436		1805	3438	
Flt Permitted	0.45	1.00	1.00	0.27	1.00		0.13	1.00		0.07	1.00	
Satd. Flow (perm)	862	1881	1561	508	1755		240	3436		142	3438	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	202	307	90	102	142	60	120	1086	292	152	926	268
RTOR Reduction (vph)	0	0	71	0	13	0	0	20	0	0	22	0
Lane Group Flow (vph)	202	307	19	102	189	0	120	1358	0	152	1172	0
Confl. Peds. (#/hr)	4		11	11		4	3		7	7		3
Heavy Vehicles (%)	0%	1%	0%	0%	4%	0%	0%	1%	0%	0%	1%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	34.8	24.8	24.8	33.2	24.0		65.8	58.0		66.2	58.2	
Effective Green, g (s)	34.8	24.8	24.8	33.2	24.0		65.8	58.0		66.2	58.2	
Actuated g/C Ratio	0.29	0.21	0.21	0.28	0.20		0.55	0.48		0.55	0.49	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	328	388	322	239	351		233	1660		189	1667	
v/s Ratio Prot	c0.05	c0.16		0.03	0.11		0.03	c0.40		c0.05	0.34	
v/s Ratio Perm	0.13		0.01	0.09			0.25			0.39		
v/c Ratio	0.62	0.79	0.06	0.43	0.54		0.52	0.82		0.80	0.70	
Uniform Delay, d1	34.7	45.1	38.2	34.0	43.0		17.2	26.5		24.2	24.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.4	10.5	0.1	1.2	1.6		1.9	4.6		21.4	2.5	
Delay (s)	38.2	55.7	38.3	35.3	44.6		19.2	31.1		45.6	26.7	
Level of Service	D	E	D	D	D		B	C		D	C	
Approach Delay (s)		47.2			41.5			30.1			28.8	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			33.3			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			91.4%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

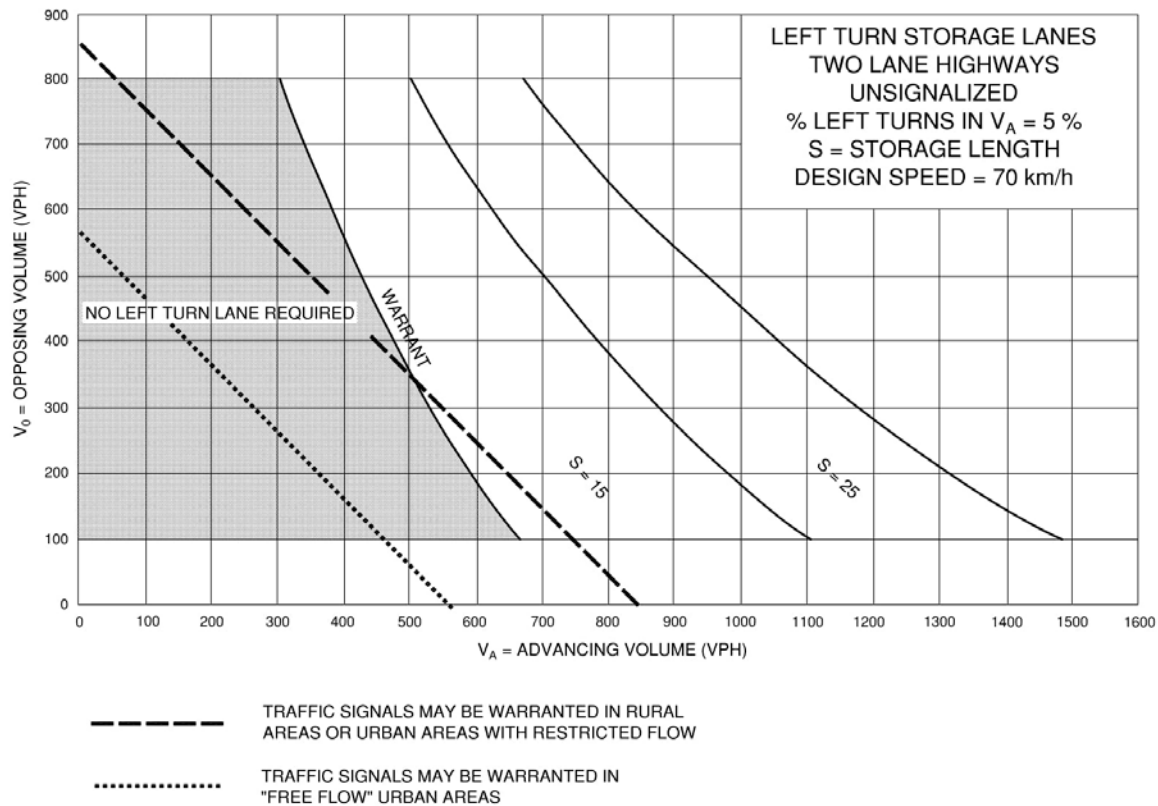
667-675 Yonge Street
19: Site Access & Montgomery DR

HCM Unsignalized Intersection Capacity Analysis

Total (2034) PM Peak Hour

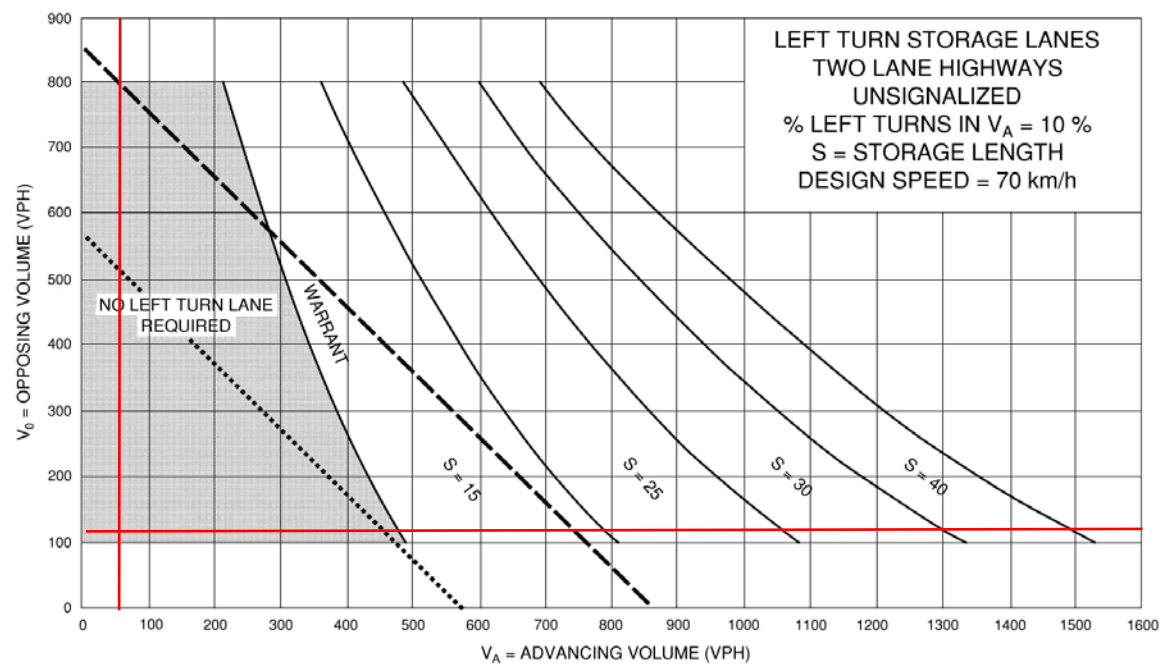
						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	68	70	6	48	52	4
Future Volume (Veh/h)	68	70	6	48	52	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	74	76	7	52	57	4
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			150		178	112
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			150		178	112
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		93	100
cM capacity (veh/h)			1431		808	941
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	150	59	61			
Volume Left	0	7	57			
Volume Right	76	0	4			
cSH	1700	1431	815			
Volume to Capacity	0.09	0.00	0.07			
Queue Length 95th (m)	0.0	0.1	1.9			
Control Delay (s)	0.0	0.9	9.8			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.9	9.8			
Approach LOS			A			
Intersection Summary						
Average Delay			2.4			
Intersection Capacity Utilization			17.9%	ICU Level of Service	A	
Analysis Period (min)			15			

Appendix H – MTO Left Turn Warrant Analysis

Exhibit 9A-10**Montgomery Drive / Site Access**

Total (2034) - Westbound

PM Peak Hour (Critical Scenario)



Appendix I – Transportation Tomorrow Survey Excerpt



TTS Cross Tabulation

Cross Tabulation Query Form - Trip - 2016 v1.1

Filter Variables

2006 GTA zone of desti... 2006 GTA zone of hous... (Optional) Table Attribute

Group Attributes

Row Grouping Column Grouping Table Grouping

Grouping file: Choose File No file chosen

Filter Selection +

☒ 2006 GTA zone of household In 8529
And
☒ Trip purpose of destination In W, R
And
☒ Start time of trip In 700 - 900

Add Delete

Output

☒ Comma-delimited table ☐ Column format Expansion Factor On Click to Select Load Load

Execute Query Select All Save As

Wed Nov 24 2021 12:41:36 GMT-0500 (Eastern Standard Time) - Run Time: 2504ms

Cross Tabulation Query Form - Trip - 2016 v1.1
Row: 2006 GTA zone of destination - gta06_dest
Column: 2006 GTA zone of household - gta06_hhld

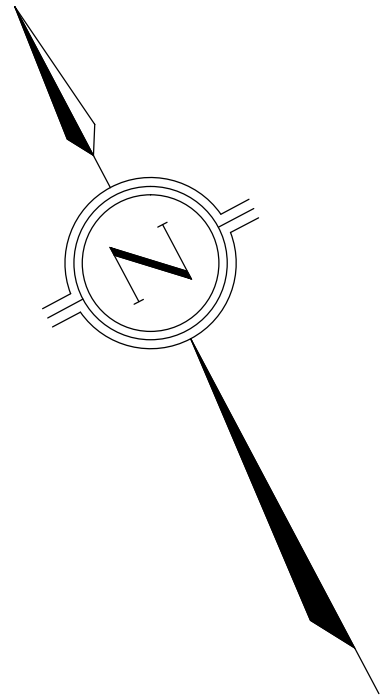
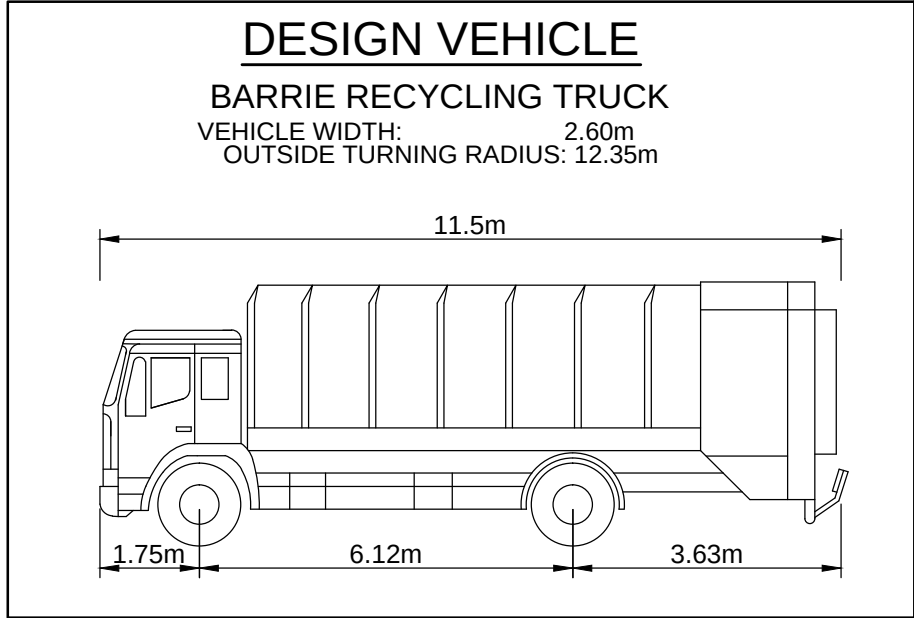
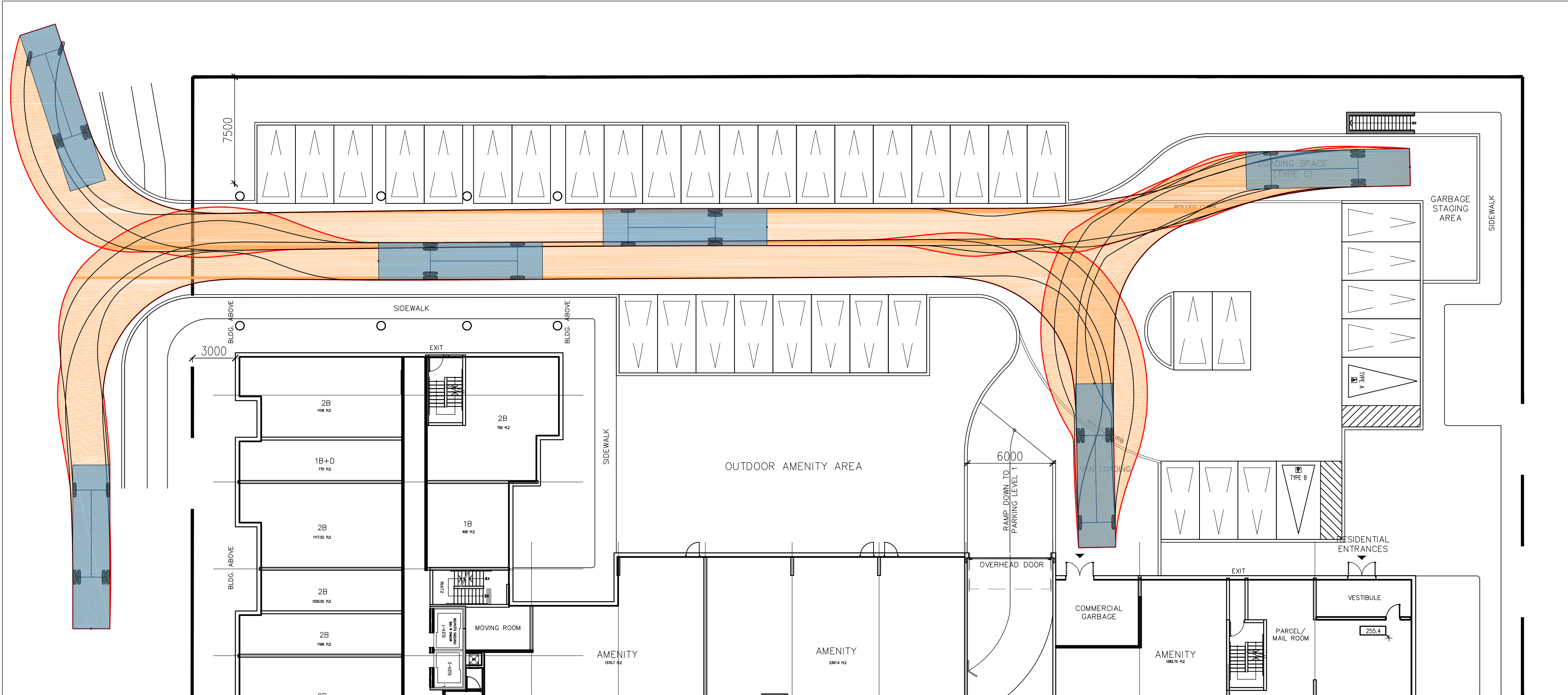
Filters:
(2006 GTA zone of household - gta06_hhld In 8529
and
Trip purpose of destination - purp_dest In W, R
and
Start time of trip - start_time In 700 - 900)

Trip 2016
Table:

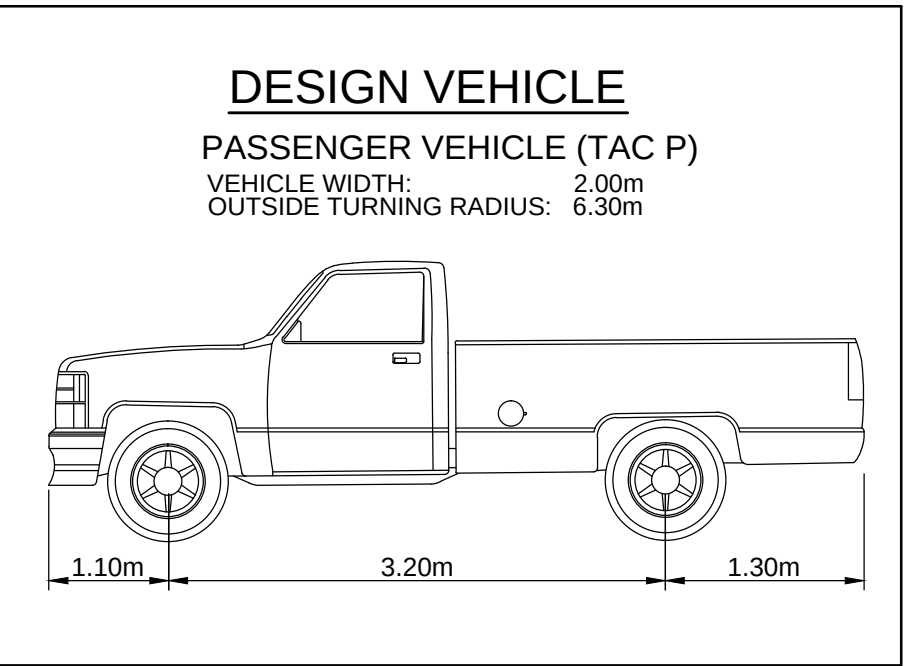
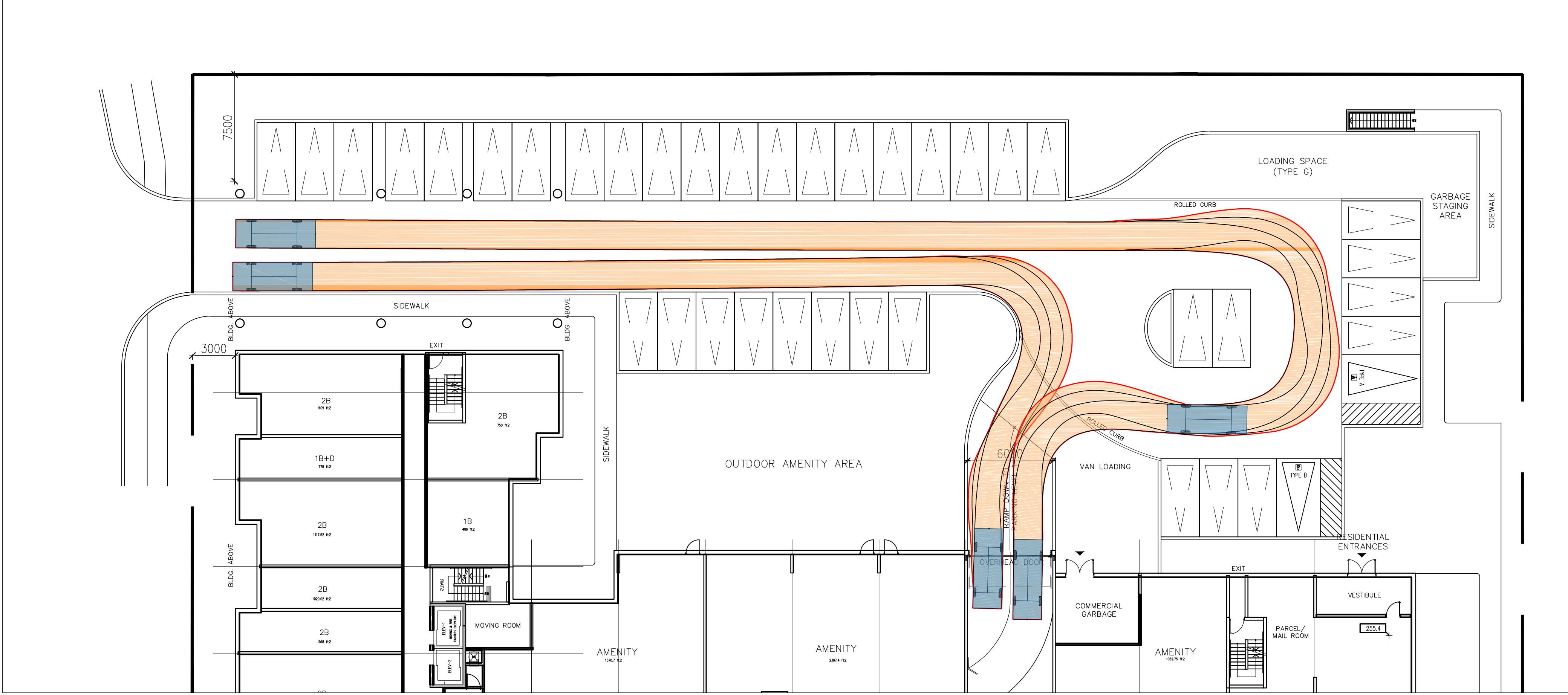
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8523,33
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8530,14
8531,27
8551,11
8559,38
8562,45
8586,35
8591,11
8595,21
8597,14
8603,31
8621,12
8627,33
8640,68
8665,29
8684,22

Appendix J – Truck Turning Analysis

DESIGN VEHICLE - FRONT LOAD GARBAGE TRUCK



DESIGN VEHICLE - TAC PASSENGER VEHICLE



GENERAL NOTES
1. THIS DRAWING IS NOT INTENDED FOR CONSTRUCTION.
2. DO NOT SCALE DRAWINGS.
3. THE DRAWINGS ARE THE PROPERTY OF JD ENGINEERING AND MUST BE RETURNED ON COMPLETION OF THE PROJECT.
4. BASE DRAWING PROVIDED BY ARCHITECTURE UNFOLDED ON JANUARY 12, 2022.

1.	FEB 2022	JN	ZONING AND SPA
NO.	DATE	APPROVED	REVISIONS



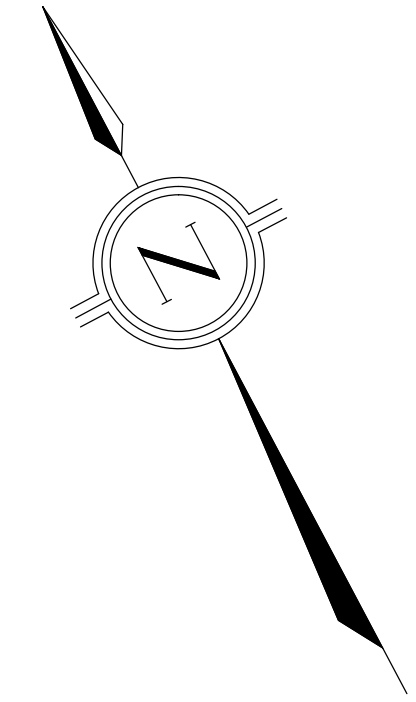
JD Northcote Engineering Inc.
Phone: 705.725.4035
86 Cumberland Street
Barrie, ON L4N 2P6
www.JDEngineering.ca

AREA MUNICIPALITY
CITY OF BARRIE

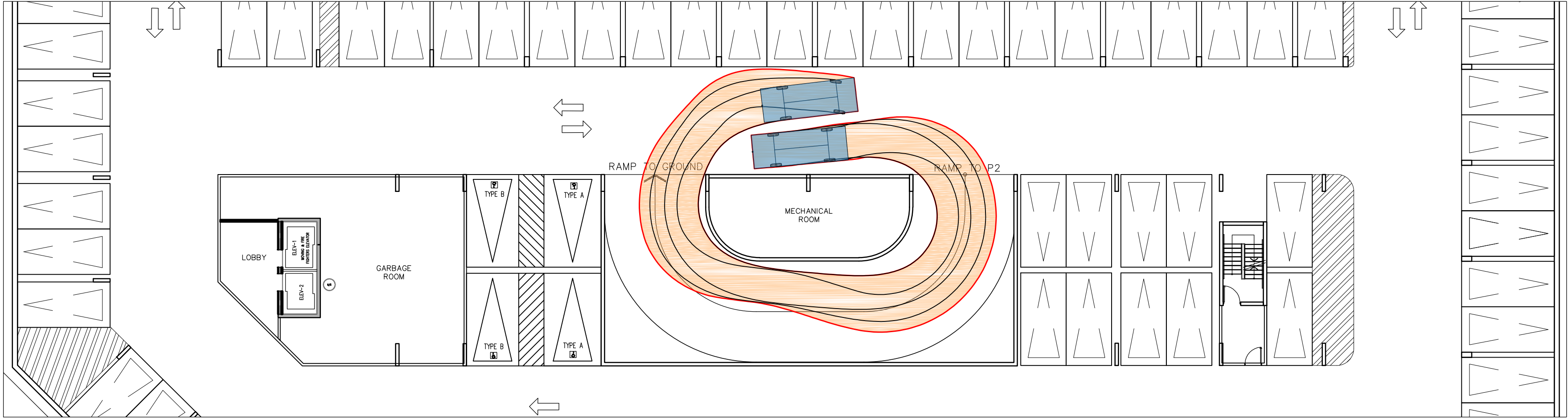
667 YONGE STREET

**VEHICLE TURNING MOVEMENT ANALYSIS
GROUND FLOOR**

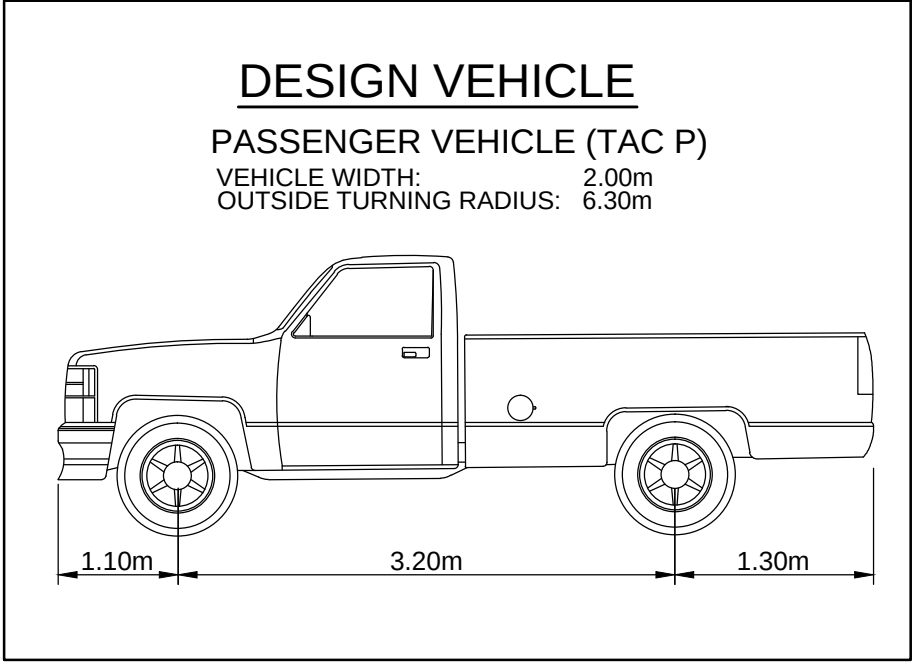
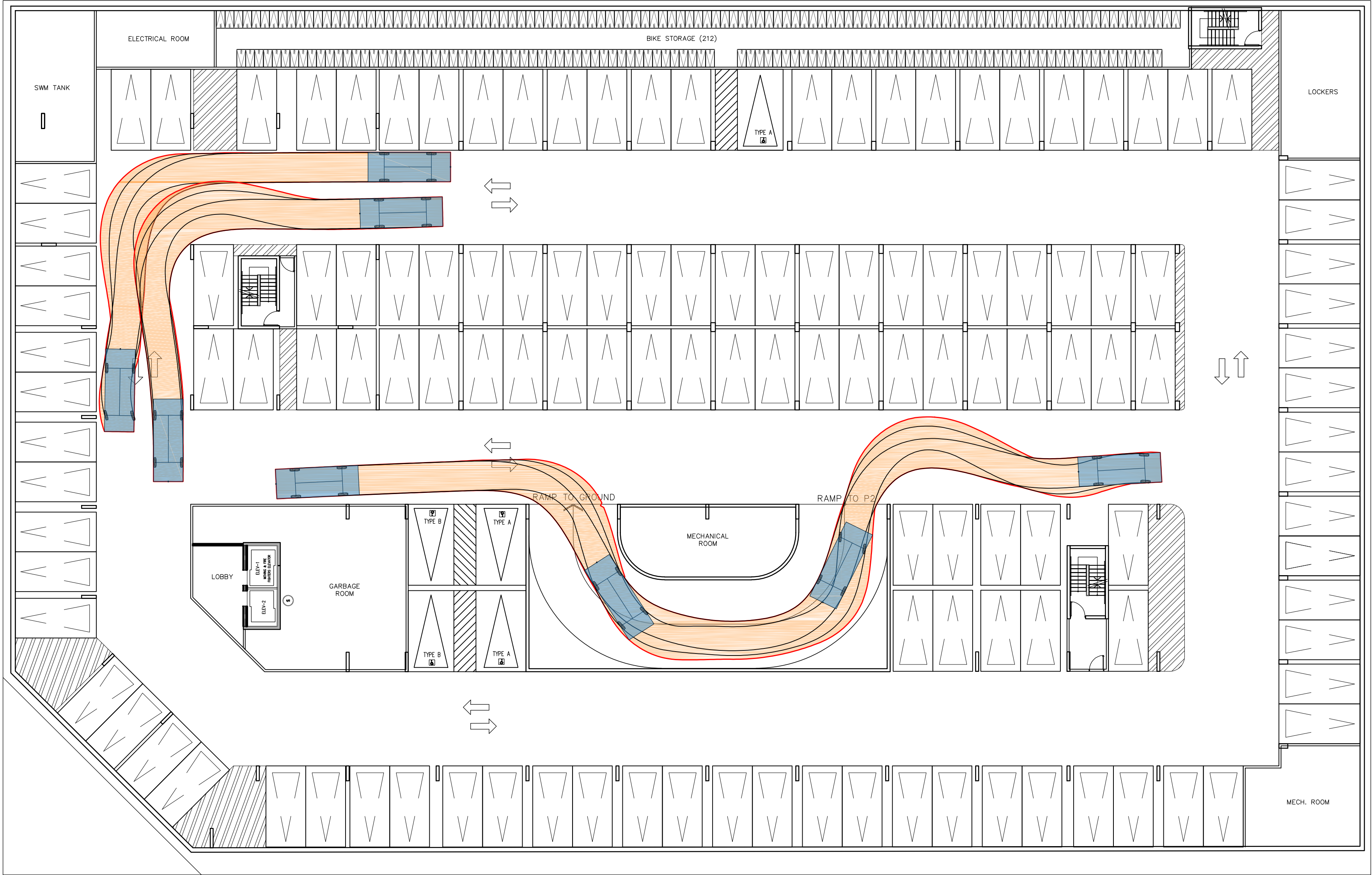
DESIGN: JN	DATE: 02/22
DRAWN: JN	DATE: 02/22
REVIEWED: JN	DATE: 02/22
SCALE HOR: 1:200	SCALE VERT: N/A
SHEET NO. 21174 - TURN A	



DESIGN VEHICLE - TAC PASSENGER VEHICLE



DESIGN VEHICLE - TAC PASSENGER VEHICLE



GENERAL NOTES
1. THIS DRAWING IS NOT INTENDED FOR CONSTRUCTION.
2. DO NOT SCALE DRAWINGS.
3. THE DRAWINGS ARE THE PROPERTY OF JD ENGINEERING AND MUST BE RETURNED ON COMPLETION OF THE PROJECT.
4. BASE DRAWING PROVIDED BY ARCHITECTURE UNFOLDED ON JANUARY 12, 2022.

1.	FEB 2022	JN	ZONING AND SPA
NO.	DATE	APPROVED	REVISIONS



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667 YONGE STREET

**VEHICLE TURNING MOVEMENT ANALYSIS
P1 & P2 RAMP**

DESIGN: JN	DATE: 02/22
DRAWN: JN	DATE: 02/22
REVIEWED: JN	DATE: 02/22
SCALE HOR. 1:200	SCALE VERT. N/A
SHEET NO. 21174 - TURN B	