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The Village of Innis Landing

TRANSPORTATION IMPACT STUDY

Schlegel Villages Inc.

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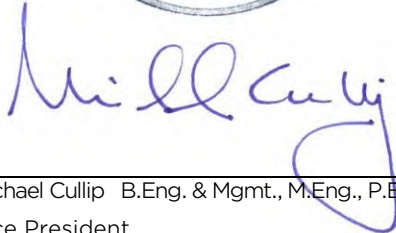
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1	July 17, 2024	Final Report

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1 Introduction

Tatham Engineering Limited was retained by Schlegel Villages Inc. to prepare a transportation impact study in support of the proposed long-term care and senior's residential development to be located at the 800 Yonge Street in the City of Barrie. The location of the development site is illustrated in Figure 1.

1.1 REPORT OBJECTIVE

The objective of this report is to present the findings of the transportation impact study and address the requirements of the City of Barrie with respect to the potential transportation impacts of the development on the area road network. In particular, the following will be discussed:

- the operations of the road system through the study area prior to the proposed development;
- the growth in the traffic volumes not otherwise attributed to the development (i.e. from overall growth in the area and/or other developments);
- the number of new trips the proposed development is likely to generate;
- the operations of the study area road system upon completion of the development; and
- the resulting impacts and need for mitigating measures (if required) to ensure acceptable overall road operations.

Prior to commencement of the study, a Terms of Reference detailing the above scope was submitted to the City. The accepted Terms of Reference is provided in Appendix A.

1.2 REPORT STRUCTURE

The report is structured as follows:

- Chapter 1: introduction and report objective;
- Chapter 2: existing conditions, detailing the road system and corresponding traffic operations;
- Chapter 3: future conditions, prior to the completion of the proposed development (referred to as future background conditions) and the expected growth in traffic levels and the resulting operating conditions;
- Chapter 4: proposed development and associated details including land use, access, traffic volumes and parking;



- Chapter 5: future conditions, with completion of the proposed development (referred to as future total conditions);
- Chapter 6: transportation demand management, detailing alternative transportation options and a transportation demand management plan; and
- Chapter 7: summary of the report and key findings.



2 Existing Conditions

This chapter will describe the road network, traffic volumes and operations for the existing conditions.

2.1 ROAD NETWORK

The road network to be addressed by this study consists of the following roads and intersections:

Roads	Intersections
▪ Yonge Street	▪ Yonge Street with Country Lane/Turnberry Lane
▪ Mapleview Drive	▪ Yonge Street with Barrie South GO Access
▪ Goodwin Drive	▪ Yonge Street with Mapleview Drive
▪ Country Lane	▪ Mapleview Drive with Goodwin Drive

Aerial imagery of the study area road network is provided in Figure 2.

2.1.1 Roads

A description of the road network is provided below. The functional classification of each road has been based on *Map 4B – Mobility Network* of the *City of Barrie Official Plan 2051*¹, whereas the planning capacity is based on information contained within the *City of Barrie Transportation Master Plan*² (TMP).

Yonge Street

Yonge Street has the following configuration/characteristics:

- 5-lane arterial road, providing 2 lanes of travel per direction plus a centre two-way left turn lane (TWLTL);
- urban cross-section (curb and gutter and streetlights) with a sidewalk present on both sides of the road;
- oriented northwest-southeast through the study area (referenced north-south for this study);
- an assumed planning capacity of 850 vehicles per hour per lane (vphpl); and

¹ *The City of Barrie Official Plan 2051*. City of Barrie, April 11, 2023.

² *City of Barrie Transportation Master Plan*. WSP, June 2019.



- a posted speed limit of 60 km/h and a design speed of 80 km/h (posted speed + 20 km/h per City standards for an arterial road).

Mapleview Drive

Mapleview Drive has the following configuration/characteristics:

- 5-lane arterial road, providing 2 lanes of travel per direction plus a centre two-way left turn lane (TWLTL);
- urban cross-section with a paved multi-use trail on the north side of the road;
- an assumed planning capacity of 850 vphpl; and
- a posted speed limit of 50 km/h and a design speed of 70 km/h.

Goodwin Drive

Goodwin Drive has the following configuration/characteristics:

- 2-lane local road, oriented north-south through the study area;
- urban cross-section with curb, gutter and a sidewalk on the east side of the road;
- an assumed planning capacity of 400 vphpl; and
- a speed limit of 50 km/h and a design speed of 60 km/h (+ 10 km/h for local roads).

Country Lane

Country Lane has the following configuration/characteristics:

- 2-lane minor collector road, oriented northeast-southwest through the study area (referenced as east-west);
- urban cross-section with a sidewalk on both sides of the road;
- an assumed planning capacity of 400 vphpl; and
- a speed limit of 50 km/h, with a design speed of 70 km/h (as per City standards for a collector road).

2.1.2 Intersections

Yonge Street & Country Lane/Turnberry Lane

The intersection of Yonge Street with Country Lane/Turnberry Lane is a 4-leg, signalized intersection. The north and south approaches (Yonge Street) each consist of a left turn lane, a through lane and a shared through-right turn lane. The east (Turnberry Lane) and west (Country



Lane) approaches each consist of a left turn lane and a shared through-right turn lane. An advanced left turn phase is provided on the north and south approaches.

Yonge Street & Barrie South GO Access

The intersection of Yonge Street with the Barrie South GO access is a 3-leg, signalized intersection. The north approach (Yonge Street) consists of a left turn lane and two through lanes. The south approach consists of a through lane and a shared through-right turn lane. The east approach (GO access) consists of two left turn lanes and a right turn lane. An advanced left turn phase is provided for the southbound left turn movement.

Yonge Street & Mapleview Drive

The intersection of Yonge Street and Mapleview Drive is a 4-leg, signalized intersection. The north and south approaches (Yonge Street) and the west approach (Mapleview Drive) each consist of a left turn lane, a through lane and a shared through-right turn lane. The east approach (Mapleview Drive) consists of a left turn lane, two through lanes and a right turn lane. An advanced left turn phase is provided on each approach.

Mapleview Drive & Goodwin Drive

The intersection of Mapleview Drive with Goodwin Drive is a 3-leg, unsignalized intersection with Goodwin Drive operating under stop control. The north approach (Goodwin Drive) consists of a left turn lane and a right turn lane. The east approach (Mapleview Drive) consists of a through lane and a shared through-right turn lane. The west approach (Mapleview Drive) consists of a left turn lane and two through lanes.

2.2 ACTIVE TRANSPORTATION

As noted above in Section 2.1.1, the study area is well served by existing active transportation infrastructure. At least one sidewalk and/or multi-use pathway is provided along each road corridor. With the exception of the noted multi-use pathway (adjacent to Mapleview Drive), there is limited dedicated cycling infrastructure provided. The existing active transportation network within the study area is illustrated in Figure 3.

2.3 TRANSIT NETWORK

Several public transit routes operate within the study area providing access to both local and regional transit services. Route maps are provided in Figure 4 with additional details provided below.



Local Transit

Barrie Transit (the City's local public transit operator) currently operates 3 local, fixed-route bus routes within the study area – Route 8A-southbound, Route 8B-northbound, and Route 12. Each transit route operates 7 days per week with headways of 30 minutes during weekdays and Saturdays and approximately 60 minutes during weekday evenings and Sundays. The routes include stops at the Barrie South GO station (which functions as a transit hub within the southeast of the City) and downtown terminal, providing connections to all other Barrie Transit routes.

In addition to the fixed transit routes, the study area is located within *On-Demand Zone D*. On-demand transit functions in a similar fashion to that of a taxi or ridesharing service, where riders are able to book a transit trip within a specific on-demand zone and have a dedicated shuttle dispatched to either complete their entire trip (if within the same zone) or provide a connection to one of the fixed routes. The on-demand service states that a shuttle will arrive within 20 minutes of booking a transit trip.

Regional Transit

The Barrie South GO station also provides access to regional bus and train services operated by GO Transit (a regional public transit provider offering service across the GTHA).

GO Transit Route 68 provides bus service between Allandale Waterfront GO and Aurora GO with 40 intermediate stops (including Barrie South GO). The route operates at a headway of approximately 60 minutes, 7 days per week. Route 68 connects with the Route 65 GO bus, which provides access to Union Station in downtown Toronto. Connections to the remainder of the GO Transit network are available at Union Station.

GO train service on the Barrie Line operates between Allandale Waterfront GO and Union Station, with 9 intermediate stops (including Barrie South GO). Weekday service is provided one-way at 30 to 60 minute headways during peak commuter hours (5:30 AM to 9:30 AM southbound and 3:30 PM to 7:00 PM northbound), with limited two-way departures outside of these hours. There are 9 trains serving Barrie per direction every weekday and 6 trains per direction on weekends.

2.4 TRAFFIC VOLUMES

2.4.1 Traffic Counts

To determine existing traffic volumes, traffic count data was obtained for each of the noted study intersections from the *Barrie West Development Traffic Impact Study*³ (Barrie West TIS). The

³ *Barrie West Development Traffic Impact Study*. Tatham Engineering Limited, December 7, 2022.



2022 counted traffic volumes are illustrated in Figure 5, with count details summarized in Table 1 and detailed count sheets provided in Appendix B.

Table 1: Traffic Counts

INTERSECTION	COUNT DATE	AM PERIOD	PM PERIOD
Yonge Street & Country Lane/Turnberry Lane	Thursday, September 29, 2022	6:00 AM to 9:00 AM	4:00 PM to 7:00 PM
Yonge Street & Barrie South GO	Thursday, September 29, 2022	5:00 AM to 9:00 AM	4:00 PM to 8:00 PM
Yonge Street & Mapleview Drive	Thursday, February 10, 2022	7:30 AM to 9:30 AM	4:00 PM to 6:00 PM
Mapleview Drive & Goodwin Drive	Thursday, February 10, 2022	7:30 AM to 9:30 AM	4:00 PM to 6:00 PM

New traffic counts were not completed given pending road reconstruction work on Mapleview Drive east of Yonge Street at the time of this study, thus potentially leading to disruptions to typical travel patterns in the area. As per the Terms of Reference, City staff has agreed with this approach.

2.4.2 Adjustments

The volumes on Yonge Street between the Barrie South GO access and Mapleview Drive were compared and appropriately adjusted to ensure balance through the adjacent intersections (the Yonge Street volumes at the Barrie South GO access were approximately 15% higher on average than those at Mapleview Drive and thus the volumes were increased accordingly). In addition, the traffic data was projected forward to a 2024 base year using background growth rates established for each road (as detailed in Section 3.4.1) and considering additional volumes generated by completion of a portion of the nearby GO Village development (as detailed in Section 3.4.2).

The resulting 2024 traffic volumes are illustrated in Figure 6.

2.5 TRAFFIC OPERATIONS

The assessment of existing conditions provides the baseline from which the future traffic operations (both without and with the subject development) can be assessed. As the capacity, and hence operations, of a road system is effectively dictated by its intersections, the traffic assessment has focused on the operations of the study area intersections. The analysis is based on the 2024 traffic volumes, the existing intersection configuration and control and procedures



outlined in the *2000 Highway Capacity Manual*⁴ (using Synchro v.11 software). For each intersection, the analysis considers:

- the average delay (measured in seconds);
- level of service (LOS); and
- volume to capacity (v/c) for each movement if signalized, or for critical movements only if unsignalized

With respect to the noted metrics:

- level of service 'A' corresponds to the best operating condition with minimal delays whereas level of service 'F' corresponds to poor operations resulting from high intersection delays (additional details regarding Level of Service definitions are provided in Appendix C); and
- a v/c ratio of less than 1.0 indicates the intersection movement is operating at less than capacity while v/c of 1.0 indicates capacity has been reached.

To ensure the traffic model more accurately represents existing conditions, the peak hour factors and heavy vehicle percentages calculated from the observed traffic count data were incorporated into the Synchro model. Where the observed heavy vehicle percentage was less than Synchro's default value (2%), the default value was used. Signal timing plans for the signalized intersections within the study area were obtained from the City of Barrie and implemented into the traffic model to reflect the existing traffic control.

A summary of the analysis is provided in Table 2 with detailed worksheets available in Appendix D. In accordance with the City's *Transportation Impact Study Guidelines*⁵, the following conditions have been presented in bold in the operational summary tables:

- any individual movements operating at LOS F;
- any intersections operating with an overall LOS D (or worse); and
- any movement or intersection operating with $v/c \geq 0.85$.

As indicated, the study area intersections all currently provide good overall operations (LOS C or better) with individual movements providing acceptable operations (LOS D or better). There remains reserve capacity ($v/c \leq 0.68$) throughout the network to accommodate future growth in traffic volumes.

⁴ *Highway Capacity Manual*. Transportation Research Board, Washington DC, 2000.

⁵ *City of Barrie Transportation Impact Study Guidelines*. City of Barrie, December 1, 2021.



Table 2: Intersection Operations – 2024

INTERSECTION, MOVEMENTS & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Yonge Street & Country Lane/ Turnberry Lane	EB L	signal	42	D	0.21	44	D	0.18
	EB TR	signal	41	D	0.08	44	D	0.09
	WB L	signal	43	D	0.29	46	D	0.26
	WB TR	signal	41	D	0.09	43	D	0.05
	NB L	signal	4	A	0.07	3	A	0.05
	NB TR	signal	6	A	0.29	5	A	0.30
	SB L	signal	5	A	0.03	4	A	0.04
	SB TR	signal	7	A	0.30	6	A	0.26
	overall	signal	10	B	0.29	8	A	0.29
Yonge Street & Barrie South GO Access	WB L	signal	50	D	0.15	47	D	0.28
	WB R	signal	50	D	0.03	46	D	0.04
	NB TR	signal	5	A	0.28	6	A	0.31
	SB L	signal	2	A	0.06	3	A	0.07
	SB T	signal	3	A	0.27	3	A	0.23
	overall	signal	6	A	0.27	8	A	0.31
Yonge Street & Mapleview Drive	EB L	signal	34	C	0.39	32	C	0.35
	EB TR	signal	42	D	0.59	43	D	0.68
	WB L	signal	34	C	0.41	34	C	0.35
	WB T	signal	43	D	0.63	40	D	0.40
	WB R	signal	38	D	0.09	37	D	0.09
	NB L	signal	11	B	0.06	12	B	0.17
	NB TR	signal	14	B	0.23	17	B	0.31
	SB L	signal	8	A	0.21	11	B	0.27
	SB TR	signal	13	B	0.25	17	B	0.35
	overall	signal	26	C	0.34	27	C	0.43
Mapleview Drive & Goodwin Drive	SB LR	stop	9	A	0.02	12	B	0.02

2.6 ROAD NETWORK IMPROVEMENTS

Based on the results of the operational analysis under existing conditions, no road improvements are required to accommodate the existing traffic volumes.



3 Future Background Conditions

This chapter will describe the road network and background traffic volumes expected for the following horizons:

- 2027 which has been adopted as an interim horizon reflecting build-out of the first phase of the subject development;
- 2031 which has been adopted to reflect build-out of the second (and final) phase of the subject development; and
- 2036 and 2041 which will address longer-term impacts of the development (5 and 10 years beyond build-out).

3.1 ROAD NETWORK

Several upgrades to the study area road network are proposed or currently underway. The proposed improvements are based on the recommendations contained within the *Hewitt's Secondary Plan Class Environmental Assessment*⁶ (Hewitt's Class EA) report and are further detailed below.

Mapleview Drive & Goodwin Drive

As per the *Hewitt's Class EA*, the intersection of Mapleview Drive and Goodwin Drive is proposed to be upgraded to a signalized intersection. Additionally, a south leg will be constructed to connect to a new north-south minor collector road – referred to as Moberly Drive in *Schedule 4B* of the City's *Official Plan* – providing access to developments south of Mapleview Drive.

Given the significant development currently underway south of Mapleview Drive, the construction of the south leg and signalization works noted above are assumed to be complete by the 2027 horizon. Following this, the east and west approaches will consist of a left turn lane, a through lane and a shared through-right turn lane. The north and south approaches will consist of a left turn lane and a shared through-right turn lane (the north approach is to be reconfigured in conjunction with the construction of the south approach to ensure lane balance). It has been assumed that the signal timings will include an advanced left turn phase for the eastbound and westbound left turn movements (as exists at similarly configured intersections along Mapleview Drive).

⁶ *Hewitt's Secondary Plan Class Environmental Assessment (Phase 3 & 4) Study*. Hatch, October 2017.



Yonge Street & Barrie South GO Access

As per the *Hewitt's Class EA*, a northbound right turn lane is proposed at the intersection of Yonge Street with the Barrie South GO access by 2021. As evident from the traffic operational review in Section 2.5, the addition of a dedicated right turn lane is not currently necessary (in that the intersection otherwise provides acceptable operations under the current configuration). Therefore, for the purpose of this report, this upgrade will be implemented at a horizon when the operations dictate the need for such.

Yonge Street & Mapleview Drive

As per the *Hewitt's Class EA*, the intersection of Yonge Street with Mapleview Drive is proposed to be upgraded with a dedicated southbound right turn lane by 2021 and northbound and eastbound right turn lanes by 2031. This would result in a six-lane cross-section on each approach consisting of one left turn lane, two through lanes, one right turn lane and two receiving lanes. As evident in Section 2.5, the addition of dedicated right turn lanes is not necessary under existing conditions. For the purposes of this report, these upgrades will be implemented at a horizon when operations dictate the need for such.

3.2 ACTIVE TRANSPORTATION

As detailed in the City's TMP, several upgrades to cycling infrastructure are proposed within the study area, including:

- addition of a dedicated cycling track along Yonge Street;
- addition of bicycle lanes along Country Lane; and
- addition of a signed cycling route along Goodwin Drive.

The timeline for these improvements is not specified.

3.3 TRANSIT NETWORK

Significant improvements are proposed to the public transit services near the subject site in the coming years. Details of such are provided below.

3.3.1 Local Transit

Near-Term

Barrie Transit is in the process of revising its existing transit network in an effort to increase coverage areas, increase service frequency, reduce travel times and reduce operating costs.



Based on information presented in the *Barrie Transit's New Network*⁷ report to City staff and as adopted by City Council, the new network will consist of:

- an “express” route operating on a 30-minute headway, travelling between Royal Victoria Regional Health Centre/Georgian College and Park Place via Highway 400;
- three “frequent” routes operating on a 15-minute headway, providing connections between most major destinations and hubs within the City;
- five “local” routes operating on a 30-minute headway, providing service through many parts of the City not already covered by a frequent transit route; and
- seven “transit-on-demand” (ToD) zones, serving nearly every major corridor within the City not already served by the above fixed routes.

As of June 2024, the revised network was partially implemented (reflective of the conditions described in Section 2.3) with full implementation to be completed in 2025. A map of the 2025 transit network is illustrated in Figure 7. As indicated, the subject site will be served by one frequent route (Route 102) and two local routes (Route 12 and Route 14), each of which will stop at the Barrie South GO transit hub.

Long-Term

Further improvements to the proposed 2025 transit network were presented in the *Barrie Transit's New Network* report. These improvements include:

- expansion of service areas (both fixed-route and ToD) into future development areas in the City's south end; and
- increased frequency on most of the fixed transit routes, with proposed peak headways of up to every 9 minutes on frequent routes and 20 minutes on local routes.

These longer-term improvements have not yet been formally adopted and remain conceptual. A map of the conceptual 2031 transit network is provided in Figure 7. The improvements, as proposed, would see the subject site served by an additional frequent route.

3.3.2 Regional Transit

As part of Metrolinx *GO Expansion* project (formerly known as *Regional Express Rail*), significant upgrade works are underway on the Barrie Line to improve train service, including construction of a second track, station upgrades/reconstructions, and electrification of the corridor. These upgrades will allow for provision of two-way, all-day train service every 30 minutes between

⁷ *Barrie Transit's New Network Staff Report*. May 31, 2023.



Allandale Waterfront GO and Bradford GO, with service every 15 minutes provided between Bradford GO and Union Station.

3.4 TRAFFIC VOLUMES

Background traffic volumes expected for the 2027, 2031, 2036 and 2041 horizon years have been determined based on existing traffic volumes, projected growth and consideration for other development-specific traffic volumes.

3.4.1 Background Growth

Growth rates along Mapleview Drive and Yonge Street (as derived from the City's current EMME traffic model developed in support of the 2019 TMP) are summarized in Table 3. The high growth rates on each road up to 2031 are reflective of the build-out of the Hewitt Secondary Plan Area developments and associated increases in traffic volumes. The negative growth anticipated on Yonge Street indicates an expected reduction in traffic volumes over time, which is itself influenced by many factors, including changes in travel mode away from private automobiles, provision of HOV lanes, and new/improved travel routes beyond the noted corridor, etc.

Table 3: EMME Annual Growth Rates

ROAD	2016 TO 2031	2031 TO 2041
Mapleview Drive	6.4%	2.3%
Yonge Street	6.4%	-1.5%

In consideration of the noted rates, and per direction from City staff, a growth rate of 6% per annum has been applied to volumes on Mapleview Drive and Yonge Street through the 2031 horizon. Beyond this horizon, a growth rate of 2% per annum has been applied.

No background growth was applied to Country Lane or Goodwin Drive as they both serve built-out subdivisions and thus are not expected to see significant year-over-year traffic growth (beyond that attributed to the background developments detailed below).

Traffic volumes using the Barrie South GO access were scaled based on the increases in traffic on Yonge Street, reflective of the assumed increase in traffic to/from the station due to noted transit service improvements detailed in Section 3.3.

3.4.2 Background Developments

The Hewitt Secondary Plan Area (HSPA) is located in the southeast area of Barrie and consists of approximately 860 hectares of undeveloped land annexed from the Township of Innisfil in



2010. The location of the HSPA is illustrated in Figure 8. Prior to development of the lands, the Hewitt Landowners Group conducted a *Master Transportation Study*⁸ to determine the overall impacts of the developments proposed within the HSPA. The study serves as a framework for subsequent traffic studies pertaining to each individual development within the HSPA. Included within the study are trip estimates for all proposed developments and volume projections for key intersections at the 2031 horizon (the estimated year of full build-out of all developments within the HSPA). Based on observations made in September 2022 and June 2024, many of the developments within the HSPA are underway.

It is assumed that much of the HSPA development has been considered in the City's EMME model, resulting in the increased growth rate expected on Mapleview Drive and Yonge Street up to the 2031 horizon year (6% versus a typical growth rate of 1 to 2%). Notwithstanding this, the following developments have been considered individually due to their proximity to the subject site and as directed by City staff. The location of each development is illustrated in Figure 9. Trip assignment through the study area for each noted development is based on that presented in their respective traffic impact studies (excerpts of which are provided in Appendix E), with detailed assignment figures for each development presented in Appendix F.

673 Mapleview Drive East

673 Mapleview Drive East is a commercial development located at the southwest corner of the intersection of Yonge Street with Mapleview Drive. The development consists of a 4,024 m² grocery store and approximately 3,600 m² of general commercial space.

Per the *673 Mapleview Drive East Urban Transportation Considerations*⁹ study, the site is expected to generate a total of 300 trips during the weekday AM peak hour and 420 trips during the weekday PM peak hour. Full build-out assumed by the 2027 horizon.

GO Village

GO Village is a large residential development located adjacent to the Barrie South GO station between the station and Saint Peter's Catholic Secondary School. The development consists of approximately 1,300 residential units (consisting of a mix of mid-rise condominium units and traditional, stacked and stacked back-to-back townhouse units) and approximately 2,800 m² of commercial space. The site is being developed in 4 phases, with Phase 1 complete and Phase 2 nearing completion as of June 2024.

⁸ *Updated Master Transportation Study - Draft Plan of Subdivisions*, Hewitt Landowners Group. LEA Consulting, February 2019.

⁹ *673 Mapleview Drive East Proposed Commercial Development - Urban Transportation Considerations*. BA Group, April 12, 2022.



Per the *Barrie Heritage Phase IV Traffic Impact Study*¹⁰, the site is expected to generate 640 and 925 trips during the weekday AM and PM peak hours, respectively. As noted, a portion of the development has been built out since completion of the noted traffic study but after completion of the 2022 traffic counts. Based on the development completed to date, approximately 75% of the 1,300 residential units and 100% of the commercial development are yet to be constructed. As such, 25% of the residential volumes were added to the network under the 2024 existing conditions (and were included in the assessment of existing conditions, as detailed in Section 2.5). It is assumed that all remaining development at the site will be completed by 2027.

Barrie West

The Barrie West development is a large mixed-use development site consisting of the properties known municipally as 658 Mapleview Drive East, 662 Mapleview Drive East and 800 Yonge Street, on which the subject development is located. In addition to the proposed development (detailed further in Chapter 4), two other development sites are to be located within this site. These developments are:

- a 4,064 m² Metro grocery store (referred to as the Southwest Parcel); and
- a mixed-use development assumed to consist of 900 residential units and 2,230 m² of commercial space (referred to as the Southeast Parcel).

As per the *Barrie West TIS*, the Southwest Parcel is expected to generate 125 trips during the weekday AM peak hour and 392 trips during the weekday PM peak hour. The Southeast Parcel is expected to generate 300 trips during the weekday AM peak hour and 446 trips during the weekday PM peak hour. It is assumed that the Southwest Parcel will be fully built out by the 2027 horizon, whereas the Southeast Parcel is assumed to be 50% built out by the 2027 horizon and fully built out by the 2031 horizon.

Access to these developments will be provided in part by a new private road that will connect Yonge Street with Goodwin Drive. For the purpose of this study, the private road is referred to as Street A. The Barrie West development sites (as well as the subject site) will have direct access to Street A, which will connect to Yonge Street (opposite the GO access) and Goodwin Drive with the following configurations (consistent with that assumed in the *Barrie West TIS*):

- Yonge Street – exclusive left, through and right turn lanes (the access will form the 4th leg of the existing Yonge Street/Barrie South GO intersection); and
- Goodwin Drive – one shared left/right turn lane, operating under stop control.

¹⁰ *Barrie Heritage Phase IV Traffic Impact Study*. BA Group, August 2016.



Background Development Traffic

The total background development traffic added to the road network is illustrated in Figure 10, reflective of full build-out of all noted developments. As noted above, trip assignment figures for each individual background development are illustrated in Appendix F.

3.4.3 Background Traffic Volumes

Future background traffic volumes for each future horizon have been established based on the existing 2024 volumes, the noted background growth rates, and additional traffic to be generated by the background developments in the area. Future volumes at the intersection of Maplevue Drive with Goodwin Drive/Moberly Drive have been established based on those presented in the *673 Maplevue Drive East* report. A minimum of 5 vehicles have been considered on the eastbound and westbound through movements at the intersection of Yonge Street with Street A and Barrie South GO access. The resulting future traffic volumes are illustrated in Figure 11 through Figure 14.

3.5 TRAFFIC OPERATIONS

The operations of the key intersections were reviewed at each horizon year considering the future background conditions detailed above. Timing plans at each signalized intersection have been adjusted as needed to ensure that optimal operations are provided. Detailed operations worksheets are provided in Appendix G with further details provided below.

3.5.1 2027 Horizon

Operations at the 2027 horizon are summarized in Table 4. As indicated, each intersection provides good overall operations (LOS C or better) with low to average delays and reserve capacity remaining ($v/c \leq 0.76$). Individual movements are noted to provide acceptable operations (LOS D or better) with low to moderate delays and reserve capacity ($v/c \leq 0.85$).

Table 4: Intersection Operations – 2027 Background

INTERSECTION, MOVEMENTS & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Yonge Street & Country Lane/ Turnberry Lane	EB L	signal	26	C	0.12	29	C	0.10
	EB TR	signal	26	C	0.09	29	C	0.12
	WB L	signal	29	C	0.49	33	C	0.47
	WB TR	signal	26	C	0.16	29	C	0.09
	NB L	signal	9	A	0.15	7	A	0.10
	NB TR	signal	14	B	0.58	13	B	0.64



INTERSECTION, MOVEMENTS & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
	SB L	signal	8	A	0.15	7	A	0.28
	SB TR	signal	13	B	0.59	9	A	0.49
	overall	signal	15	B	0.55	13	B	0.58
Yonge Street & Barrie South GO Access/ Street A	EB L	signal	31	C	0.37	30	C	0.36
	EB T	signal	29	C	0.04	28	C	0.02
	EB R	signal	29	C	0.02	28	C	0.04
	WB L	signal	32	C	0.41	33	C	0.55
	WB T	signal	29	C	0.04	28	C	0.02
	WB R	signal	29	C	0.03	28	C	0.06
	NB L	signal	5	A	0.06	6	A	0.10
	NB TR	signal	7	A	0.47	9	A	0.54
	SB L	signal	4	A	0.14	5	A	0.15
	SB TR	signal	8	A	0.57	9	A	0.50
	overall	signal	9	A	0.54	12	B	0.51
Yonge Street & Mapleview Drive	EB L	signal	39	D	0.73	47	D	0.85
	EB TR	signal	37	D	0.62	41	D	0.79
	WB L	signal	30	C	0.51	28	C	0.48
	WB T	signal	40	D	0.70	34	C	0.47
	WB R	signal	33	C	0.17	31	C	0.14
	NB L	signal	14	B	0.16	18	B	0.43
	NB TR	signal	19	B	0.37	24	C	0.52
	SB L	signal	13	B	0.46	22	C	0.68
	SB TR	signal	19	B	0.49	27	C	0.68
	overall	signal	27	C	0.60	31	C	0.76
Mapleview Drive & Goodwin Drive/ Moberly Drive	EB L	signal	3	A	0.03	5	A	0.05
	EB TR	signal	4	A	0.25	9	A	0.49
	WB L	signal	-	-	-	6	A	0.05
	WB TR	signal	6	A	0.36	8	A	0.35
	NB L	signal	29	C	0.36	27	C	0.46
	NB TR	signal	27	C	0.15	25	C	0.21
	SB L	signal	27	C	0.10	25	C	0.21
	SB TR	signal	27	C	0.23	25	C	0.29
	overall	signal	8	A	0.36	11	B	0.47
Goodwin Drive & Street A	WB LR	stop	9	A	0.02	9	A	0.06



3.5.2 2031 Horizon

Operations at the 2031 horizon are summarized in Table 5. As indicated, most intersections (excluding Mapleview Drive and Yonge Street) are expected to provide good overall operations (LOS C or better) with low to average delays and reserve capacity remaining ($v/c \leq 0.68$). Individual movements at these intersections are also expected to provide good operations (LOS C or better) with low to average delays and reserve capacity remaining ($v/c \leq 0.78$).

With respect to the intersection of Mapleview Drive and Yonge Street, it is expected to provide good overall operations (LOS C) during the weekday AM peak hour and acceptable operations (LOS D) during the weekday PM peak hour. During the weekday PM peak hour, several movements are noted to operate over 85% capacity, with the intersection overall operating at 98% capacity.

Table 5: Intersection Operations – 2031 Background

INTERSECTION, MOVEMENTS & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Yonge Street & Country Lane/ Turnberry Lane	EB L	signal	26	C	0.12	29	C	0.10
	EB TR	signal	26	C	0.09	29	C	0.12
	WB L	signal	29	C	0.49	33	C	0.47
	WB TR	signal	26	C	0.16	29	C	0.09
	NB L	signal	11	B	0.22	7	A	0.13
	NB TR	signal	16	B	0.72	16	B	0.78
	SB L	signal	9	A	0.20	11	B	0.36
	SB TR	signal	16	B	0.73	11	B	0.61
	overall	signal	17	B	0.65	15	B	0.68
Yonge Street & Barrie South GO Access/ Street A	EB L	signal	31	C	0.41	27	C	0.35
	EB T	signal	28	C	0.03	25	C	0.02
	EB R	signal	28	C	0.03	25	C	0.05
	WB L	signal	30	C	0.37	29	C	0.51
	WB T	signal	28	C	0.03	25	C	0.02
	WB R	signal	28	C	0.04	25	C	0.07
	NB L	signal	8	A	0.13	8	A	0.19
	NB TR	signal	11	B	0.63	15	B	0.71
	SB L	signal	6	A	0.22	9	A	0.27
	SB TR	signal	12	B	0.74	14	B	0.69
	overall	signal	13	B	0.67	16	B	0.63



INTERSECTION, MOVEMENTS & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Yonge Street & Mapleview Drive	EB L	signal	47	D	0.82	65	E	0.95
	EB TR	signal	39	D	0.67	47	D	0.86
	WB L	signal	33	C	0.61	41	D	0.68
	WB T	signal	43	D	0.75	40	D	0.58
	WB R	signal	34	C	0.32	37	D	0.30
	NB L	signal	18	B	0.26	34	C	0.70
	NB TR	signal	26	C	0.51	34	C	0.71
	SB L	signal	19	B	0.65	51	D	0.91
	SB TR	signal	25	C	0.64	34	C	0.82
	overall	signal	32	C	0.75	41	D	0.98
Mapleview Drive & Goodwin Drive/ Moberly Drive	EB L	signal	5	A	0.18	8	A	0.36
	EB TR	signal	5	A	0.32	15	B	0.69
	WB L	signal	-	-	-	9	A	0.17
	WB TR	signal	9	A	0.50	14	B	0.54
	NB L	signal	28	C	0.46	31	C	0.62
	NB TR	signal	26	C	0.26	25	C	0.40
	SB L	signal	25	C	0.11	24	C	0.19
	SB TR	signal	27	C	0.40	26	C	0.48
	overall	signal	11	B	0.48	17	B	0.67
Goodwin Drive & Street A	WB LR	stop	9	A	0.04	12	B	0.10

3.5.3 2036 Horizon

Operations at the 2036 horizon are summarized in Table 6. As indicated, most intersections (excluding Mapleview Drive and Yonge Street) are expected to continue to provide good overall operations (LOS C or better) with low to average delays and reserve capacity remaining ($v/c \leq 0.73$). Individual movements at these intersections are also expected to provide good operations (LOS C or better) with low to average delays and reserve capacity remaining ($v/c \leq 0.84$).

With respect to the intersection of Mapleview Drive and Yonge Street, it is expected to provide acceptable operations (LOS D) during both the weekday AM and PM peak hours. During the weekday PM peak hour, several movements are noted to operate over 85% capacity, with the overall intersection operating over capacity (v/c of 1.04). As such, improvements are required to address the capacity constraints.



Table 6: Intersection Operations – 2036 Background

INTERSECTION, MOVEMENTS & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Yonge Street & Country Lane/ Turnberry Lane	EB L	signal	26	C	0.12	29	C	0.10
	EB TR	signal	26	C	0.09	29	C	0.12
	WB L	signal	29	C	0.49	33	C	0.47
	WB TR	signal	26	C	0.16	29	C	0.09
	NB L	signal	12	B	0.24	8	A	0.15
	NB TR	signal	18	B	0.78	19	B	0.84
	SB L	signal	11	B	0.23	12	B	0.36
	SB TR	signal	18	B	0.79	12	B	0.66
	overall	signal	19	B	0.70	16	B	0.73
Yonge Street & Barrie South GO Access/ Street A	EB L	signal	31	C	0.41	27	C	0.32
	EB T	signal	28	C	0.03	24	C	0.01
	EB R	signal	28	C	0.03	25	C	0.05
	WB L	signal	31	C	0.41	29	C	0.53
	WB T	signal	28	C	0.03	24	C	0.01
	WB R	signal	28	C	0.05	25	C	0.08
	NB L	signal	8	A	0.16	9	A	0.22
	NB TR	signal	12	B	0.69	17	B	0.79
	SB L	signal	7	A	0.28	11	B	0.32
	SB TR	signal	12	B	0.77	16	B	0.76
	overall	signal	13	B	0.72	18	B	0.70
Yonge Street & Mapleview Drive	EB L	signal	56	E	0.87	77	E	0.99
	EB TR	signal	44	D	0.74	53	D	0.91
	WB L	signal	34	C	0.65	46	D	0.73
	WB T	signal	47	D	0.80	43	D	0.62
	WB R	signal	38	D	0.41	39	D	0.35
	NB L	signal	22	C	0.33	64	E	0.88
	NB TR	signal	31	C	0.60	45	D	0.85
	SB L	signal	26	C	0.75	81	F	0.98
	SB TR	signal	28	C	0.70	41	D	0.89
	overall	signal	36	D	0.83	50	D	1.04
Mapleview Drive & Goodwin Drive/ Moberly Drive	EB L	signal	5	A	0.20	8	A	0.38
	EB TR	signal	5	A	0.35	16	B	0.74
	WB L	signal	-	-	-	11	B	0.19
	WB TR	signal	11	B	0.54	15	B	0.58



INTERSECTION, MOVEMENTS & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
	NB L	signal	28	C	0.46	31	C	0.62
	NB TR	signal	26	C	0.26	25	C	0.40
	SB L	signal	25	C	0.10	24	C	0.19
	SB TR	signal	27	C	0.39	26	C	0.47
	overall	signal	12	B	0.52	17	B	0.70
Goodwin Drive & Street A	WB LR	stop	9	A	0.04	12	B	0.09

Operations of the intersection of Mapleview Drive with Yonge Street were reassessed with right turn lanes added on all approaches (as recommended in the Hewitt's Class EA), the results of which are summarized in Table 7. Signal timings were again optimized to ensure peak performance of the intersection.

Table 7: Intersection Operations – 2036 Background + Improvements

INTERSECTION, MOVEMENTS & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Yonge Street & Mapleview Drive	EB L	signal	51	D	0.84	66	E	0.95
	EB T	signal	42	D	0.64	47	D	0.80
	EB R	signal	34	C	0.04	34	C	0.12
	WB L	signal	34	C	0.59	43	D	0.66
	WB T	signal	50	D	0.82	52	D	0.75
	WB R	signal	40	D	0.44	46	D	0.45
	NB L	signal	21	C	0.23	28	C	0.59
	NB T	signal	31	C	0.55	41	D	0.76
	NB R	signal	24	C	0.04	28	C	0.06
	SB L	signal	24	C	0.71	48	D	0.85
	SB T	signal	24	C	0.49	33	C	0.70
	SB R	signal	22	C	0.27	26	C	0.29
	overall	signal	34	C	0.79	43	D	0.94

As indicated, operations at the intersection improve notably following the addition of the right turn lanes on the remaining approaches, with overall delay and utilized capacity during peak periods decreasing by up to 7 seconds and 10%, respectively, whereas individual movements see reductions in delay of up to 36 seconds and reductions in utilized capacity of up to 29%,



respectively. While the overall intersection still operates at LOS D during the weekday PM peak hour, it no longer operates over capacity. While there are several left turns operating at capacity, such is a reflection of assigning minimum green times to these movements during advanced phases (thereby maximizing green time and minimizing delays to the remaining movements).

3.5.4 2041 Horizon

Operations at the 2041 horizon are summarized in Table 8. As indicated, most intersections (excluding Maplevue Drive and Yonge Street) are expected to continue to provide overall good operations (LOS C or better) with low to average delays and reserve capacity remaining ($v/c \leq 0.73$). Individual movements at these intersections are also expected to provide good operations (LOS C or better) with low to average delays and reserve capacity remaining ($v/c \leq 0.84$).

Table 8: Intersection Operations – 2041 Background

INTERSECTION, MOVEMENTS & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Yonge Street & Country Lane/ Turnberry Lane	EB L	signal	26	C	0.12	29	C	0.10
	EB TR	signal	26	C	0.09	29	C	0.12
	WB L	signal	29	C	0.49	33	C	0.47
	WB TR	signal	26	C	0.16	29	C	0.09
	NB L	signal	13	B	0.24	9	A	0.17
	NB TR	signal	21	C	0.85	23	C	0.91
	SB L	signal	12	B	0.23	15	B	0.36
	SB TR	signal	20	C	0.86	13	B	0.71
overall			21	C	0.74	19	B	0.78
Yonge Street & Barrie South GO Access/ Street A	EB L	signal	31	C	0.39	26	C	0.30
	EB T	signal	28	C	0.03	24	C	0.01
	EB R	signal	28	C	0.03	24	C	0.05
	WB L	signal	31	C	0.44	30	C	0.56
	WB T	signal	28	C	0.03	24	C	0.01
	WB R	signal	28	C	0.05	25	C	0.09
	NB L	signal	9	A	0.14	11	B	0.22
	NB TR	signal	13	B	0.75	21	C	0.87
	SB L	signal	9	A	0.36	13	B	0.36
	SB TR	signal	15	B	0.84	19	B	0.83
overall			15	B	0.78	19	B	0.76
Yonge Street & Maplevue Drive	EB L	signal	56	E	0.87	79	E	0.99
	EB T	signal	44	D	0.69	50	D	0.84



INTERSECTION, MOVEMENTS & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
	EB R	signal	34	C	0.05	34	D	0.15
	WB L	signal	34	C	0.64	49	D	0.73
	WB T	signal	53	D	0.86	54	D	0.78
	WB R	signal	41	D	0.50	48	D	0.52
	NB L	signal	24	C	0.29	42	D	0.75
	NB T	signal	34	C	0.64	52	D	0.89
	NB R	signal	26	C	0.04	31	C	0.07
	SB L	signal	38	D	0.85	74	E	0.95
	SB T	signal	27	C	0.56	39	D	0.80
	SB R	signal	24	C	0.31	29	C	0.33
	overall	signal	38	D	0.89	50	D	1.02
Mapleview Drive & Goodwin Drive/ Moberly Drive	EB L	signal	6	A	0.21	9	A	0.39
	EB TR	signal	5	A	0.38	18	B	0.80
	WB L	signal	-	-	-	11	B	0.19
	WB TR	signal	11	B	0.58	16	B	0.63
	NB L	signal	28	C	0.46	31	C	0.62
	NB TR	signal	26	C	0.26	25	C	0.40
	SB L	signal	25	C	0.10	24	C	0.19
	SB TR	signal	27	C	0.39	26	C	0.47
	overall	signal	11	B	0.55	18	B	0.74
Goodwin Drive & Street A	WB LR	stop	9	A	0.04	12	B	0.09

With respect to the intersection of Mapleview Drive and Yonge Street, it is expected to provide acceptable operations (LOS D) during both the weekday AM and PM peak hours. Some movements (particularly left turns) are noted to operate over 85% capacity with elevated delays during both peak hours, with the overall intersection to operate slightly over capacity during the weekday PM peak hour. While further intersection improvements (such as double-left turn lanes and/or additional through lanes) would improve operations and address capacity constraints, such are predicated on continuous growth on the road network (when compared to the 2024 traffic volumes, the 2041 background volumes through the intersection reflect an increase of 125%). Long term improvements in alternative travel modes along with expansion/improvements to the wider road network may result in lower growth on the study area road network than that considered herein. Considering this, no further improvements are recommended to accommodate the 2041 background conditions.



3.6 ROAD NETWORK IMPROVEMENTS

To accommodate increasing traffic volumes through the intersection of Mapleview Drive with Yonge Street, the implementation of exclusive right turn lanes on all approaches (as recommended in the Hewitt's Class EA) is required by the 2036 horizon. Beyond this, only periodic optimization of the signal timing in use at each signalized intersection is required to accommodate the future background traffic volumes through the 2041 horizon.



4 Proposed Development

This chapter will provide additional details with respect to the proposed development, including its location, land-use, site access, anticipated trip generation, and assignment of said trips to the adjacent road network.

4.1 SITE LOCATION

The subject site is located at the southwest corner of the intersection of Yonge Street with Country Lane in the City of Barrie, as illustrated in Figure 1. The site has a municipal address of 800 Yonge Street, and is generally bounded by Country Lane to the north, Yonge Street to the east, existing residential development to the west, and other development lands within the Barrie West development site to the south (i.e. the Southeast and Southwest Parcels).

4.2 LAND USE

The development will consist of 4 phases as follows:

- Phase I 192-bed long-term care facility;
- Phase II & III 485 retirement suites and 120 senior's apartment units; and
- Phase IV 360 market apartment units.

A site plan is provided in Figure 15.

4.3 PHASING

Per communications with the client, the completion of each phase of the development will depend on market conditions, with the site anticipated to be fully built-out by 2038, as summarized in Table 9. It is noted that the development phases will not be constructed in sequential order (Phase IV will be constructed after Phase I and before Phases II and III).

Table 9: Development Phasing

DEVELOPMENT PHASE		ESTIMATED BUILD OUT HORIZON	STUDY BUILD OUT HORIZON
Phase I	LTC facility	2027	2027
Phase II	retirement village	2033	2036
Phase III	retirement village	2038	2036
Phase IV	market apartments	2030	2031



For the purposes of this study, it is assumed that Phase I will be completed by 2027, Phase IV by 2031 and Phases II and III by 2036 (see Table 9). This allows for the impacts of the first two phases of development to be identified and addressed as required. Given the longer build-out timelines associated with the later development phases (i.e. Phase II and III) and uncertainty in long-term traffic forecasts, the potential impacts of these phases and related improvements will be revisited with future updates to the traffic study.

4.4 SITE ACCESS

Access to the site will be provided via the following:

- Access 1 – full moves access located on Country Lane (approximately 110 metres west of Yonge Street);
- Access 2 – right-in/right-out access on Yonge Street; and
- Access 3 – full moves access to Street A serving the Barrie West development sites.

Street A will allow site traffic to access both Yonge Street and Goodwin Drive.

Each access has been reviewed in context of Ontario Provincial Standard Drawing (OPSD) for urban industrial, commercial and apartment entrances (OPSD 350.010) and the recommended practices for access design as published in the Transportation Association of Canada (TAC) *Geometric Design Guide for Canadian Roads*¹¹. It is noted that these guidelines are compliant with the City's design standards (the City of Barrie's Engineering Standards adhere to TAC standards).

4.4.1 Access Geometry

A commercial access point providing two-way traffic access should have a width in the order of 7.2 to 12.0 metres with curb radii between 4.5 and 12.0 metres. As per the site plan, each access will have a minimum width of 7.2 metres (measured at property line) with appropriate curb radii, thus satisfying these requirements.

4.4.2 Corner Clearance

Corner clearance is the minimum suggested distance between an intersection and an adjacent driveway along a road. The distance is typically measured from the near curb of a street intersection to the near edge of an access or driveway throat. Inadequate corner clearance can result in interrupted traffic flow, poor access operations and safety concerns. Appropriate corner clearance is of particular concern at intersections where stop or signal control is present (i.e. stop

¹¹ *Geometric Design Guide for Canadian Roads*. Transportation Association of Canada, June 2017.



control and traffic signals can create queues which encroach on the operations of the adjacent driveway). For commercial driveways adjacent to major intersections, TAC guidelines recommend a minimum corner clearance 15 metres on a local road, 55 metres on a collector road and 70 metres on an arterial road.

The following corner clearance is provided at each access:

- 95 metres between Access 1 and Yonge Street;
- 100 metres between Access 2 and Country Lane; and
- 165 metres between Access 3 and Yonge Street.

In consideration of TAC guidelines, the proposed corner clearance is sufficient.

4.4.3 Setback from Property Line

TAC guidelines recommend that the curb radius for any driveway be located within the frontage of the property served by said access (i.e. the curb radius should not extend beyond the adjacent property line). In this respect, the suggested minimum setback is equal to the curb radius. The setback is measured from the property line to the near edge of the access.

With respect to the subject site, each access point is located such that the curb radii remain within the frontage of the property. As such, the setbacks from the adjacent property lines are appropriate.

4.4.4 Sight Lines

Sight lines at Access 1 and Access 2 (both of which provide direct access to the municipal road network) were reviewed to ensure that sufficient sight distance is provided. The sight line assessment has considered both minimum stopping sight distance and intersection sight distance, as defined below and dictated per TAC standards:

- the minimum stopping sight distance provides sufficient distance for an approaching motorist to observe a stationary hazard in the road and bring their vehicle to a complete stop prior to the hazard; and
- the intersection sight distance allows a vehicle to enter a main road from a side street (or site access) and attain the appropriate operating speed without significantly impacting the operating speed of an approaching vehicle.

The minimum stopping sight and intersection sight distance requirements for design speeds of 70 km/h and 80 km/h (reflective of the posted speed limits within the study area and per City standards for each class of road) are summarized in Table 10. The available sight distances at each access (as determined through field measurements) are also summarized in Table 10.



Table 10: Site Access Sight Lines

LOCATION	DESIGN SPEED	STOPPING SIGHT DISTANCE	INTERSECTION SIGHT DISTANCE		AVAILABLE SIGHT DISTANCE TO/FROM		
			Left Turn	Right Turn	North	East	West
Access 1 (Country Lane)	70 km/h	105 m	150 m	130 m	-	>200 m	165 m
Access 2 (Yonge Street)	80 km/h	130 m	n/a	145 m	>200 m	-	-

As indicated, the available sight lines at each access are sufficient for the design speed on each road. It is noted that the sight lines to/from the east along Country Lane at Access 1 extend through the intersection at Yonge Street; any vehicles passing through the intersection will have sufficient sight distance to react to a hazard at the access, whereas those turning from Yonge Street will be travelling at a reduced initial speed having just completed a turning manoeuvre. As Access 2 will be configured as a right-in/right-out, only the sight lines to/from the north are relevant.

4.5 CIRCULATION

4.5.1 Vehicles

Internal circulation within the site will be provided by a series of drive aisles connecting the various access points, surface and underground parking areas, and buildings. The internal aisles will have a minimum width of 6.4 metres in accordance with the requirements of the City's *Zoning By-law*¹² for an aisle providing two-way operations. The fire route will maintain a minimum clear width of 6 metres with minimum centreline curve radii of 12 metres.

To ensure that sufficient manoeuvring space is available within the site, a vehicle turning assessment was completed using AutoTURN software for various design vehicles, namely a fire truck, garbage truck, single-unit delivery truck, and passenger vehicle. Completed vehicle turning templates are provided in Appendix H. As indicated, sufficient manoeuvring space is provided within the site at each development stage to accommodate typical design vehicles.

4.5.2 Pedestrians

A system of sidewalks and pathways will be provided throughout the site, providing connections between the various buildings, to parking areas, and to the external sidewalk network.

¹² *City of Barrie Comprehensive Zoning By-law 2009-141*. City of Barrie, consolidated January 2024.



4.6 SITE PARKING

Parking provision at the proposed development has been reviewed in accordance with the requirements dictated in the City's *Zoning By-law* and as outlined in the *Integrated Accessibility Standards*¹³ of the *Accessibility for Ontarians with Disabilities Act*.

4.6.1 Standard Parking

As per the City's *Zoning By-law*, the development is required to supply parking at the following rates:

- assisted living – 1 space per 2 beds;
- apartments – 1 space per unit (in a mixed-use zone); and
- medical office – 1 space per 15 m² GFA.

Based on the noted rates, the required parking supply for each development phase has been calculated (rounded up to the nearest whole space for each use) and is summarized in Table 11. As indicated, the development is required to supply a total of 832 parking spaces.

Table 11: Parking Requirements

DEVELOPMENT PHASE	LAND USE	SIZE	PARKING SUPPLY	
			Required	Provided
Phase I	assisted living	192 beds	96 spaces	107 spaces
Phases II & III	assisted living	485 suites	243 spaces	218 spaces
	apartments	120 units	120 spaces	
	medical office	190 m ² GFA	13 spaces	
Phase IV	apartments	360 units	360 spaces	553 spaces
Total			832 spaces	877 spaces

Based on the site plan, a total of 877 parking spaces will be provided, thus satisfying the City's requirements. It is noted that of these spaces, 71 are provided as tandem parking spaces in the Phase IV underground parking lot (i.e. accessed through another parking space). While such spaces are not typically permitted to be included in the parking supply calculation, it is

¹³ O. Reg. 191/11 – *Integrated Accessibility Standards*.



understood that the zoning for the subject site permits tandem parking to be included in the site parking supply.

With respect to the phasing of the site, Phase I and Phase IV will provide an excess of parking when constructed (as noted in Table 11), which will be reallocated to Phase II and Phase III as appropriate to ensure sufficient parking supply is provided across the whole development.

4.6.2 Barrier-Free Parking

As per the *Integrated Accessibility Standards*, barrier-free parking is required to be supplied at a rate of 2 spaces plus 2% of the total required parking supply. Based on the proposed parking supply for the development, and considering the proposed construction sequence, barrier-free parking is to be supplied as follows:

- Phases I, II and III – 12 barrier-free spaces ($472 \text{ spaces} \times 2\% = 10 + 2 = 12 \text{ spaces}$); and
- Phase IV – 10 barrier-free spaces ($360 \text{ spaces} \times 2\% = 8 + 2 = 10 \text{ spaces}$).

As indicated, the site is required to supply a total of 22 barrier-free parking spaces. As per the site plan, a total of 25 barrier-free parking spaces are provided.

4.7 SITE TRAFFIC

4.7.1 Trip Generation

The number of vehicle trips to be generated by the proposed development for the weekday AM and weekday PM peak hours has been determined based on type of use, development size and trip generation rates per the *ITE Trip Generation Manual*¹⁴. Based on the proposed uses, the following ITE land uses have been applied:

- multifamily housing – high-rise (ITE land use code 222);
- senior adult housing – multifamily (ITE 252);
- assisted living (ITE 254); and
- nursing home (ITE 620).

The associated trip rates for each of the above noted land uses are summarized in Table 12 with resulting trip estimates provided in

Table 13.

¹⁴ *Trip Generation Manual, 11th Edition*. Institute of Transportation Engineers, September 2021.



Table 12: Trip Rates – The Village at Innis Landing

LAND USE	ITE CODE	VARIABLE	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			In	Out	Total	In	Out	Total
multifamily housing – high-rise	222	units	0.09	0.18	0.27	0.18	0.14	0.32
senior adult housing – multifamily	252	units	0.07	0.13	0.20	0.14	0.11	0.25
assisted living	254	beds	0.11	0.07	0.18	0.09	0.15	0.24
nursing home	620	beds	0.10	0.04	0.14	0.05	0.09	0.14

Table 13: Trip Estimates – The Village at Innis Landing

PHASE	LAND USE (ITE CODE)	SIZE	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			In	Out	Total	In	Out	Total
I	long-term care (ITE 620)	192 beds	19	8	27	9	18	27
II & III	assisted living (ITE 254)	485 beds	52	35	87	45	71	116
II & III	senior's apartments (ITE 252)	120 units	8	16	24	17	13	30
IV	market residential (ITE 222)	360 units	33	64	97	64	51	115
Total Gross Trips			112	123	235	135	153	288
Internal Trips (10%)			11	12	23	14	15	29
Total Net Trips			102	110	212	121	138	259

As indicated, the proposed development is anticipated to generate 235 trips during the weekday AM peak hour and 288 trips during the weekday PM peak hour.

It is noted that not all of these trips are expected to be new trips on the road network. Interactions between the subject site and the proposed commercial uses at the adjacent Barrie West development site (such as trips between residential units, the grocery store, and other



commercial/retail shops) will result in internal trips that do not impact the municipal road network. To account for this, a 10% reduction has been applied to the gross trip generation of the subject site, consistent with the approach adopted in the *Barrie West TIS*. The resulting internal trips and net trips are also noted in

Table 13.

4.7.2 Trip Modal Split

Modal split is the proportion of trips to/from a specific location or area across different modes of transportation, such as automobiles, public transit, walking, cycling, etc. Data from the 2016 *Transportation Tomorrow Survey* (TTS) was used to determine the existing modal split in the area. The TTS is a comprehensive travel survey conducted every 5 years within the Greater Golden Horseshoe which is used to understand travel patterns between different survey zones, including primary modes of travel (i.e. modal split). The 2021 TTS was delayed by the COVID-19 pandemic thus the 2016 TTS represents the most current data available.

Regarding the subject development, it is located within 2006 GTA Zone 8529. This zone is generally bounded by Big Bay Point Road to the north, the Barrie GO rail line to the east, Lover's Creek to the west, and Maplevue Drive to the south. Trips to and from this zone were separated by type to determine the proportion of each type of trip. The following modal split was realized:

- public transit (local, GO train, or both) – 1.6%;
- active transportation (walking, cycling, etc.) – 4.8%; and
- automobile (driver or passenger) – 93.6%.

As indicated, 93.6% of all trips used a personal automobile to complete the trip, either as a driver or passenger. It is noted that the above modal split excludes home based school trips. Given the presence of several schools within Zone 8529 (and associated trips made by students), the number of non-auto trips was found to substantially increase as most school aged children will typically walk or ride a school bus to/from school; the subsequent increase in non-auto modes was considered to be an inaccurate representation of the zone's true modal split.

The City's TMP identifies a City-wide modal split target of 7% public transit and 12% active transportation by 2041 – resulting in a total non-automobile modal share of 19% of all trips city-wide. Based on the proposed transit improvements identified in Section 3.3, expansion of the City's active transportation network (more sidewalks and bicycle infrastructure) identified in the City's TMP and proximity of the subject site to a major transit hub (Barrie South GO), it is considered reasonable that the City's modal split targets can be achieved by the 2041 horizon. For the interim horizon years, modal split proportions have been linearly interpolated between



the current (i.e. 2016) modal split and target (i.e. 2041) split values. The modal split applied at each horizon is summarized in Table 14.

Table 14: Modal Splits by Horizon Year

YEAR	PUBLIC TRANSIT	ACTIVE TRANSPORTATION	AUTOMOBILE
2016	1.6%	4.8%	93.6%
2027	4.0%	8.0%	88.0%
2031	4.8%	9.1%	86.0%
2036	5.9%	10.6%	83.5%
2041	7.0%	12.0%	81.0%

By applying the above rates to the trip generation determined in Section 4.7.1, the total automobile and non-automobile trips generated by the site can be determined for each horizon. The resulting modal trip generation is summarized in Table 15.

Table 15: Modal Trip Estimates – The Village of Innis Landing

YEAR	PUBLIC TRANSIT		ACTIVE TRANSPORTATION		AUTOMOBILE	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
2027	1	1	2	2	21	21
2031	6	7	11	13	94	109
2036	7	8	13	15	192	237
2041	9	10	15	17	189	233

4.7.3 Trip Assignment & Distribution

The distribution of automobile trips generated by the site has been developed based on trip distribution data provided in the 2016 TTS. In addition to the use identified in Section 4.7.2, the TTS can also be used to identify travel patterns between different zones within the study area, determining how many trips are travelling between zones of interest.

In the case of the subject development (located within 2006 GTA Zone 8529), approximately 75% of all trips to and from this zone were found to be trips made internally within the City of Barrie,



thus 25% of all trips to and from this zone are trips made outside Barrie. The following overall distribution of trips to and from the zone is provided below (assuming a central position within the zone):

- 25% to/from the north (22% internal, 3% external);
- 26% to/from the south (5% internal, 21% external);
- 13% to/from the east (13% internal, 0% external); and
- 36% to/from the west (35% internal, 1% external).

Based on the above, and in consideration of the expected travel routes and the location of the site within Zone 8529 (near the southeast corner), the following assignment was applied to the trips generated by the subject development, consistent with the approach adopted in the *Barrie West TIS*:

- 30% to/from the north;
- 20% to/from the south;
- 10% to/from the east; and
- 40% to/from the west.

The resulting site-generated traffic assigned to the adjacent road network at each horizon are illustrated in Figure 16 through Figure 19.



5 Future Total Conditions

This chapter will address the resulting impacts of the proposed development on the adjacent road system. The following areas will be addressed:

- operations of the key intersections; and
- potential improvements to the study area road network, if necessary.

5.1 TRAFFIC VOLUMES

To assess the impacts of the increased traffic volumes resulting from the proposed development, the site-generated traffic volumes at each horizon were added to the respective background traffic volumes. The resulting total traffic volumes are illustrated in Figure 20 through Figure 23.

5.2 TRAFFIC OPERATIONS

The key intersections were analyzed again at each horizon year under the projected future total volumes. In addition, the future site access points were reviewed to ensure they provide acceptable operations as proposed. The site access to Street A (Access 3) was not assessed given its location internal to the overall Barrie West development area (i.e. the access is to a private road rather than a municipal road). As previously noted, the site volumes that use Access 3 will access the wider road network via the proposed connection of Street A to Yonge Street and Goodwin Drive (both of which are included in the assessment).

Signal timing plans have been optimized as necessary to ensure peak performance is maintained. Detailed operations worksheets are provided in Appendix I with further details below.

5.2.1 2027 Horizon

Operations at the 2027 horizon are summarized in Table 16. As indicated, the study area intersections are expected to provide good overall operations (LOS C or better) with low to average delays and reserve capacity remaining ($v/c \leq 0.76$). Individual movements are noted to provide acceptable operations (LOS D or better) with low to moderate delays and reserve capacity remaining ($v/c \leq 0.85$). Compared to background conditions, the operations under total conditions are comparable, with nominal changes in delay (0 to 1 seconds more delay) and utilized capacity (up to 2% more utilization).

With respect to the site access points, both will provide excellent operations (LOS B or better) with low delays and reserve capacity remaining ($v/c \leq 0.03$).



Table 16: Intersection Operations – 2027 Total

INTERSECTION, MOVEMENTS & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Yonge Street & Country Lane/ Turnberry Lane	EB L	signal	26	C	0.13	29	C	0.12
	EB TR	signal	26	C	0.09	29	C	0.13
	WB L	signal	29	C	0.49	33	C	0.47
	WB TR	signal	26	C	0.16	29	C	0.09
	NB L	signal	9	A	0.17	7	A	0.10
	NB TR	signal	14	B	0.58	13	B	0.64
	SB L	signal	8	A	0.15	7	A	0.28
	SB TR	signal	13	B	0.60	9	A	0.49
	overall	signal	15	B	0.55	13	B	0.58
Yonge Street & Barrie South GO Access/ Street A	EB L	signal	31	C	0.37	30	C	0.36
	EB T	signal	29	C	0.04	28	C	0.02
	EB R	signal	29	C	0.02	28	C	0.04
	WB L	signal	32	C	0.41	33	C	0.55
	WB T	signal	29	C	0.04	28	C	0.02
	WB R	signal	29	C	0.03	28	C	0.06
	NB L	signal	5	A	0.06	6	A	0.10
	NB TR	signal	7	A	0.47	9	A	0.54
	SB L	signal	4	A	0.14	5	A	0.15
	SB TR	signal	8	A	0.57	9	A	0.50
	overall	signal	9	A	0.54	12	B	0.51
Yonge Street & Mapleview Drive	EB L	signal	39	D	0.73	47	D	0.85
	EB TR	signal	37	D	0.62	41	D	0.79
	WB L	signal	30	C	0.51	28	C	0.48
	WB T	signal	40	D	0.70	34	C	0.47
	WB R	signal	33	C	0.17	31	C	0.14
	NB L	signal	14	B	0.17	18	B	0.43
	NB TR	signal	19	B	0.37	24	C	0.52
	SB L	signal	13	B	0.46	23	C	0.68
	SB TR	signal	19	B	0.49	27	C	0.68
	overall	signal	27	C	0.60	31	C	0.76
Mapleview Drive & Goodwin Drive	EB L	signal	3	A	0.04	5	A	0.05
	EB TR	signal	4	A	0.25	9	A	0.48
	WB L	signal	-	-	-	6	A	0.05
	WB TR	signal	6	A	0.36	8	A	0.36



INTERSECTION, MOVEMENTS & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
	NB L	signal	29	C	0.36	28	C	0.48
	NB TR	signal	27	C	0.15	26	C	0.21
	SB L	signal	27	C	0.10	26	C	0.22
	SB TR	signal	27	C	0.23	26	C	0.29
	overall	signal	8	A	0.36	11	B	0.47
Goodwin Drive & Street A	WB LR	stop	9	A	0.02	9	A	0.06
Country Lane & Access 1	NB LR	stop	13	B	0.01	13	B	0.03
Yonge Street & Access 2	SB R	stop	9	A	0.00	9	A	0.01

5.2.2 2031 Horizon

Operations at the 2031 horizon are summarized in Table 17. As indicated, most intersections (excluding Mapleview Drive and Yonge Street) are expected to continue to provide good overall operations (LOS C or better) with low to average delays and reserve capacity remaining ($v/c \leq 0.69$). Individual movements at these intersections are also expected to provide good operations (LOS C or better) with low to average delays and reserve capacity remaining ($v/c \leq 0.78$).

With respect to the intersection of Mapleview Drive and Yonge Street, it is expected to provide good overall operations (LOS C) during the weekday AM peak hour and acceptable operations (LOS D) during the weekday PM peak hour. During the weekday PM peak hour, several movements are noted to operate above 85% capacity, with the overall intersection operating at 100% capacity.

As compared to background conditions, the operations under total conditions remain comparable, with nominal changes in delay (0 to 7 seconds more delay) and utilized capacity (up to 7% more utilization).

The site access points will continue to provide excellent operations (LOS B or better) with low delays and reserve capacity remaining ($v/c \leq 0.03$) through the 2031 horizon.



Table 17: Intersection Operations – 2031 Total

INTERSECTION, MOVEMENTS & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Yonge Street & Country Lane/ Turnberry Lane	EB L	signal	26	C	0.13	29	C	0.11
	EB TR	signal	26	C	0.09	29	C	0.12
	WB L	signal	29	C	0.49	33	C	0.47
	WB TR	signal	26	C	0.16	29	C	0.09
	NB L	signal	11	B	0.24	8	A	0.14
	NB TR	signal	17	B	0.73	16	B	0.79
	SB L	signal	9	A	0.21	11	B	0.36
	SB TR	signal	16	B	0.74	11	B	0.61
	overall	signal	17	B	0.66	15	B	0.69
Yonge Street & Barrie South GO Access/ Street A	EB L	signal	31	C	0.51	28	C	0.41
	EB T	signal	27	C	0.03	25	C	0.02
	EB R	signal	28	C	0.05	25	C	0.06
	WB L	signal	30	C	0.35	29	C	0.50
	WB T	signal	27	C	0.03	25	C	0.02
	WB R	signal	28	C	0.04	25	C	0.07
	NB L	signal	8	A	0.20	9	A	0.27
	NB TR	signal	11	B	0.63	15	B	0.72
	SB L	signal	6	A	0.23	9	A	0.28
	SB TR	signal	13	B	0.75	14	B	0.69
	overall	signal	13	B	0.69	16	B	0.64
Yonge Street & Mapleview Drive	EB L	signal	47	D	0.82	65	E	0.95
	EB TR	signal	39	D	0.67	47	D	0.86
	WB L	signal	33	C	0.61	41	D	0.68
	WB T	signal	43	D	0.75	40	D	0.58
	WB R	signal	34	C	0.33	37	D	0.32
	NB L	signal	19	B	0.27	34	C	0.70
	NB TR	signal	26	C	0.52	34	C	0.72
	SB L	signal	19	B	0.68	58	E	0.94
	SB TR	signal	25	C	0.64	36	D	0.83
	overall	signal	32	C	0.77	41	D	1.00
Mapleview Drive & Goodwin Drive	EB L	signal	5	A	0.22	8	A	0.39
	EB TR	signal	5	A	0.31	15	B	0.68
	WB L	signal	-	-	-	11	B	0.17
	WB TR	signal	11	B	0.51	16	B	0.56



INTERSECTION, MOVEMENTS & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
	NB L	signal	29	C	0.48	34	C	0.67
	NB TR	signal	27	C	0.26	26	C	0.40
	SB L	signal	26	C	0.11	25	C	0.19
	SB TR	signal	28	C	0.44	27	C	0.52
	overall	signal	11	B	0.49	17	B	0.68
Goodwin Drive & Street A	WB LR	stop	9	A	0.07	12	B	0.13
Country Lane & Access 1	NB LR	stop	12	B	0.01	12	B	0.03
Yonge Street & Access 2	SB R	stop	9	A	0.00	9	A	0.00

5.2.3 2036 Horizon

Operations at the 2036 horizon are summarized in Table 18. Improvements identified at intersection of Mapleview Drive with Yonge Street under background conditions for the same horizon have been considered. As indicated, most intersections (excluding Mapleview Drive and Yonge Street) are expected to continue to provide good overall operations (LOS C or better) with low to average delays and reserve capacity remaining ($v/c \leq 0.75$). Individual movements at these intersections are also expected to provide good operations (LOS C or better) with low to average delays and reserve capacity remaining ($v/c \leq 0.86$).

With respect to the intersection of Mapleview Drive and Yonge Street, it is expected to provide good overall operations (LOS C) during the weekday AM peak hour and acceptable operations (LOS D) during the weekday PM peak hour, operating at 96% capacity or lower. Individual movements are expected to provide acceptable operations (LOS E or better) with low to moderate delays and reserve capacity remaining ($v/c \leq 0.95$).

The operations under total conditions at each intersection are comparable to those reported under background conditions for the same horizon, with nominal changes in delay (0 to 8 seconds more delay) and moderate changes in utilized capacity (up to 14% more utilization).

The site access points will both continue to provide excellent operations (LOS B or better) with low delays and reserve capacity remaining ($v/c \leq 0.07$) through the 2036 horizon.



Table 18: Intersection Operations – 2036 Total

INTERSECTION, MOVEMENTS & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Yonge Street & Country Lane/ Turnberry Lane	EB L	signal	26	C	0.13	29	C	0.12
	EB TR	signal	25	C	0.09	29	C	0.12
	WB L	signal	29	C	0.49	33	C	0.47
	WB TR	signal	26	C	0.16	29	C	0.09
	NB L	signal	12	B	0.23	8	A	0.17
	NB TR	signal	19	B	0.81	19	B	0.86
	SB L	signal	11	B	0.23	13	B	0.36
	SB TR	signal	21	C	0.84	12	B	0.67
	overall	signal	19	B	0.71	17	B	0.74
Yonge Street & Barrie South GO Access/ Street A	EB L	signal	33	C	0.56	29	C	0.47
	EB T	signal	27	C	0.02	26	C	0.02
	EB R	signal	27	C	0.05	26	C	0.07
	WB L	signal	29	C	0.36	31	C	0.55
	WB T	signal	27	C	0.02	26	C	0.02
	WB R	signal	27	C	0.05	26	C	0.08
	NB L	signal	9	A	0.23	9	A	0.33
	NB TR	signal	13	B	0.71	16	B	0.77
	SB L	signal	8	A	0.29	11	B	0.33
	SB TR	signal	17	B	0.85	17	B	0.77
	overall	signal	16	B	0.76	18	B	0.70
Yonge Street & Mapleview Drive	EB L	signal	51	D	0.84	66	E	0.95
	EB T	signal	42	D	0.65	47	D	0.80
	EB R	signal	34	C	0.04	34	C	0.12
	WB L	signal	34	C	0.59	44	D	0.66
	WB T	signal	51	D	0.82	52	D	0.75
	WB R	signal	41	D	0.45	46	D	0.47
	NB L	signal	21	C	0.23	30	C	0.61
	NB T	signal	31	C	0.57	43	D	0.79
	NB R	signal	24	C	0.04	29	C	0.06
	SB L	signal	26	C	0.74	57	E	0.89
	SB T	signal	25	C	0.51	34	C	0.72
	SB R	signal	22	C	0.28	26	C	0.29
	overall	signal	34	C	0.82	44	D	0.96



INTERSECTION, MOVEMENTS & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Mapleview Drive & Goodwin Drive	EB L	signal	7	A	0.29	9	A	0.48
	EB TR	signal	6	A	0.36	16	B	0.74
	WB L	signal	-	-	-	12	B	0.20
	WB TR	signal	13	B	0.58	17	B	0.61
	NB L	signal	27	C	0.39	40	D	0.73
	NB TR	signal	25	C	0.22	26	C	0.39
	SB L	signal	25	C	0.08	25	C	0.19
	SB TR	signal	27	C	0.39	28	C	0.56
overall			12	B	0.53	19	B	0.74
Goodwin Drive & Street A	WB LR	stop	11	B	0.09	12	B	0.17
Country Lane & Access 1	NB LR	stop	13	B	0.02	13	B	0.06
Yonge Street & Access 2	SB R	stop	11	B	0.00	9	A	0.01

5.2.4 2041 Horizon

Operations at the 2041 horizon are summarized in Table 19. As indicated, most intersections (excluding Mapleview Drive and Yonge Street) are expected to continue to provide good overall operations (LOS C or better) with low to average delays and reserve capacity remaining ($v/c \leq 0.81$). Individual movements at these intersections are expected to provide acceptable operations (LOS D or better) with low to moderate delays and reserve capacity remaining ($v/c \leq 0.91$).

With respect to the intersection of Mapleview Drive and Yonge Street, it is expected to provide acceptable operations (LOS D) during both the weekday AM and PM peak hours. Some movements (particularly left turns) are noted to operate over 85% capacity with elevated delays during both peak hours (the southbound left turn is noted to operate at LOS F with an 82 second delay), with the overall intersection operating slightly over capacity during the weekday PM peak hour. As noted under background conditions, the capacity constraints identified during the weekday PM peak hour are contingent on substantial growth in traffic volumes by the 2041 horizon. Should traffic growth ultimately be lower than projected, operations at the intersection are expected to be better than otherwise reported.

Compared to background conditions, the operations under total conditions at each intersection are similar at this horizon, with nominal changes in delay (0 to 8 seconds more delay) and moderate changes in utilized capacity (up to 13% more utilization).



The site access points will both continue to provide excellent operations (LOS B or better) with low delays and reserve capacity remaining ($v/c \leq 0.07$) through the 2041 horizon.

Table 19: Intersection Operations – 2041 Total

INTERSECTION, MOVEMENTS & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
Yonge Street & Country Lane/ Turnberry Lane	EB L	signal	26	C	0.13	29	C	0.12
	EB TR	signal	25	C	0.09	29	C	0.12
	WB L	signal	29	C	0.49	33	C	0.47
	WB TR	signal	26	C	0.16	29	C	0.09
	NB L	signal	14	B	0.23	9	A	0.19
	NB TR	signal	22	C	0.88	24	C	0.93
	SB L	signal	13	B	0.23	15	B	0.36
	SB TR	signal	25	C	0.91	13	B	0.73
	overall	signal	24	C	0.76	19	B	0.79
Yonge Street & Barrie South GO Access/ Street A	EB L	signal	32	C	0.54	29	C	0.44
	EB T	signal	27	C	0.03	25	C	0.01
	EB R	signal	27	C	0.05	26	C	0.07
	WB L	signal	30	C	0.41	32	C	0.58
	WB T	signal	27	C	0.02	25	C	0.01
	WB R	signal	27	C	0.05	26	C	0.09
	NB L	signal	12	A	0.23	12	B	0.32
	NB TR	signal	14	B	0.78	19	B	0.85
	SB L	signal	9	A	0.35	13	B	0.36
	SB TR	signal	21	C	0.92	19	B	0.84
	overall	signal	19	B	0.81	21	C	0.76
Yonge Street & Mapleview Drive	EB L	signal	56	E	0.88	79	E	1.00
	EB T	signal	44	D	0.69	50	D	0.84
	EB R	signal	34	C	0.05	34	C	0.15
	WB L	signal	34	C	0.64	49	D	0.74
	WB T	signal	53	D	0.86	54	D	0.78
	WB R	signal	42	D	0.51	48	D	0.54
	NB L	signal	24	C	0.30	45	D	0.78
	NB T	signal	34	C	0.65	54	D	0.91
	NB R	signal	26	C	0.04	31	C	0.07
	SB L	signal	44	D	0.88	82	F	0.98
	SB T	signal	27	C	0.57	40	D	0.82
	SB R	signal	24	C	0.31	29	C	0.33



INTERSECTION, MOVEMENTS & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	v/c	Delay	LOS	v/c
	overall	signal	39	D	0.92	51	D	1.04
Mapleview Drive & Goodwin Drive	EB L	signal	7	A	0.31	9	A	0.50
	EB TR	signal	6	A	0.39	18	B	0.80
	WB L	signal	-	-	-	12	B	0.20
	WB TR	signal	14	B	0.63	18	B	0.66
	NB L	signal	27	C	0.39	40	D	0.72
	NB TR	signal	25	C	0.22	26	C	0.39
	SB L	signal	25	C	0.08	25	C	0.18
	SB TR	signal	27	C	0.39	28	C	0.56
	overall	signal	13	B	0.56	19	B	0.78
Goodwin Drive & Street A	WB LR	stop	11	B	0.09	12	B	0.17
Country Lane & Access 1	NB LR	stop	13	B	0.02	12	B	0.06
Yonge Street & Access 2	SB R	stop	11	B	0.00	10	A	0.01

5.3 ROAD NETWORK IMPROVEMENTS

5.3.1 Intersection Operations

Based on the operational review under total conditions, no additional improvements are required to accommodate the proposed development, beyond those identified under background conditions.

5.3.2 Turn Lane Requirements

The need for exclusive turn lanes at the new site access points has been reviewed based on MTO warrants. The review is based on the following:

- MTO guidelines for auxiliary turn lanes at unsignalized intersections; and
- the 2041 total traffic volumes (reflecting the highest reviewed volumes on the road network).

The review only considers Access 1 and 2, which connect directly to the municipal road network.

Left Turn Lanes

In considering the need for an exclusive left turn lane, MTO warrants for auxiliary left turn lanes on 2-lane, undivided highways were considered. The warrants are based on design speed, advancing volume (i.e. traffic travelling in the same direction as the left-turning traffic), opposing



volume (i.e. traffic travelling in the opposite direction as the left-turning traffic) and percentage of left turns in the advancing volume.

Given the low volumes on Country Lane (fewer than 100 vehicles per hour, per direction) and low anticipated left turning volumes (4 to 9 vph), a westbound left turn lane is not necessary at on Country Lane at Access 1.

Given the right-in/right-out configuration of Access 2, a left turn lane is not necessary at the access.

Right Turn Lanes

With respect to right turn lanes, as per MTO standards, such are generally warranted where right turn volumes exceed 60 vehicles per hour (vph) and/or impede the operations of through traffic. Based on the 2041 volume projections (see Figure 23), anticipated right turning volumes at each access are as follows:

- Access 1 – 3 to 6 vph; and
- Access 2 – 18 to 27 vph.

As indicated, the right turning volumes at each access do not exceed the 60 vph threshold. As such, a dedicated right turn lane is not warranted at either access.



6 Transportation Demand Management

Transportation Demand Management (TDM) is the use of policies, infrastructure, services and marketing and educational programs to influence or encourage a behavioural shift in people with respect to how they travel. More specifically, TDM aims to reduce single occupancy vehicle trips and ultimately, the reliance on private automobiles by promoting alternative travel options. The transportation demand management requirements and recommendations are included below.

6.1 TDM OPPORTUNITIES

6.1.1 Public Transit

Local Transit

As noted in Section 2.3, the study area is currently served by Barrie Transit with 3 routes (Route 8A-SB, Route 8B-NB, and Route 12) passing by the subject site. The subject site is located:

- less than 300 metres from Barrie South GO, a transit station operated by GO Transit which provides connections to regional GO train and GO bus services; and
- approximately 4 km east of Park Place, a major commercial centre and transit hub connecting with many other Barrie Transit routes.

As noted in Section 3.3, further improvements are planned for the local transit network in the near future, which will further improve service levels and access throughout the City and within the study area.

Regional Transit

Regional transit options are available within the City, provided by GO Transit (as detailed in Section 2.3) and are all accessible via the Barrie South GO station. As detailed in Section 3.3, improvements are planned for GO services in Barrie, which will see significant increases in train services to and from the GTA.

6.1.2 Active Transportation

As noted in Section 2.2, the subject site is well served by the existing sidewalk/multi-use path system present along Maplevue Drive and Yonge Street (illustrated in Figure 3). As detailed in Section 3.2, dedicated cycling facilities are planned along Yonge Street, Country Lane, and Goodwin Drive, though a timeline is not specified.

With respect to the existing and proposed active transportation infrastructure, the site is considered to be well connected to the local transportation network.



6.2 TDM PROGRAM

A TDM program has been developed which provides a framework for implementation of specific TDM measures. The details of such are provided below.

6.2.1 Marketing & Education

A site-specific TDM marketing and education package will be prepared and distributed to all new residents and employees of the development. The TDM package should include the following information:

- introduction to TDM objectives, goals and benefits;
- maps of cycling routes/sidewalk network in the City of Barrie;
- bicycle safety information;
- transit schedules for local services (i.e. Barrie Transit, GO Transit); and
- carpool/rideshare information and registration forms.

6.2.2 Transit Initiatives

Encouraging the use of the available transit services serving the site is crucial to the overall success of the TDM program. In order to increase the likelihood that a commuter will try transit, it is important to remove or lessen the barriers or hurdles that currently prevent commuters from making the switch. It is recommended that prepaid Barrie Transit ride cards be available for new residents of the site to use on local transit services. The intent of the prepaid card is to provide a financial incentive to encourage commuters to try public transit, with the ultimate goal of a more permanent shift to transit use by commuters.

In addition to the noted transit incentives, real-time transit display boards may be provided in the lobby area as a means of providing continuous transit information to residents and visitors.

6.2.3 Other Support Measures

In addition to the above, other measures to be implemented in support of the TDM plan include:

- provision of long and short-term bicycle parking; and
- designated car-share spaces (predicated on attracting a car share provider to the area).

6.3 TDM SUMMARY

The TDM plan for the proposed development includes a marketing and education package that is distributed to new residents and employees of the development on an ongoing basis. The



package may include transit passes, cycling maps, transit maps and schedules, safety tips, and other information regarding programs supporting alternative modes of transportation.



7 Summary

This study has addressed the transportation impacts associated with the proposed long-term care and senior's residential development to be located at 800 Yonge Street in the City of Barrie.

Proposed Development

The proposed development consists of a 192-bed long-term care facility, 485 retirement suites, and a total of 480 senior's apartments. Upon completion, the development is expected to generate a total of 210 trips during the weekday AM peak hour and 263 trips during the weekday PM peak hour.

Transportation Impacts

In assessing the impact of the proposed development on the study area road system, the key intersections were analyzed under existing (2024) and future (2027, 2031, 2036 and 2041) horizon periods.

Results of the operational analyses indicate that the intersections currently provide good overall operations (LOS C or better) with critical movements providing acceptable operations (LOS D or better) with low to average delays.

Under future background conditions, most intersections are expected to continue to provide good overall operations (LOS C or better) with critical movements providing acceptable operations (LOS D or better) with low to average delays. The intersection of Mapleview Drive with Yonge Street is expected to provide acceptable overall operations (LOS D or better) with critical movements expected to provide acceptable operations (LOS E or better) with low to moderate delays through the 2041 horizon. This intersection will, however, require the addition of dedicated right turn lanes on all approaches by the 2036 horizon to ensure acceptable performance is maintained on each movement. This intersection was also noted to operate slightly over capacity during the 2041 weekday PM peak hour, however, such is not considered problematic.

Under future total conditions, operations of each study area intersection were found to be comparable to those realized under background conditions at each horizon. Each intersection is expected to provide acceptable overall operations (LOS D or better) with critical movements expected to provide acceptable operations (LOS E or better) with low to moderate delays. As realized under background conditions, select movements at the intersection of Mapleview Drive with Yonge Street are anticipated to operate at LOS F and/or at capacity by the 2041 horizon, however, such are not considered problematic.



Overall, the proposed development was not found to have a significant impact on the adjacent road network.

Access Review

The proposed site access points were reviewed in context of City standards with respect to location, geometry, and available sight distance. Based on this review, each access point was found to be compliant with respect to access separation, corner clearance, setbacks from property lines and geometry.

The sight lines at each access were found to be sufficient for the design speed of the road each is located on.

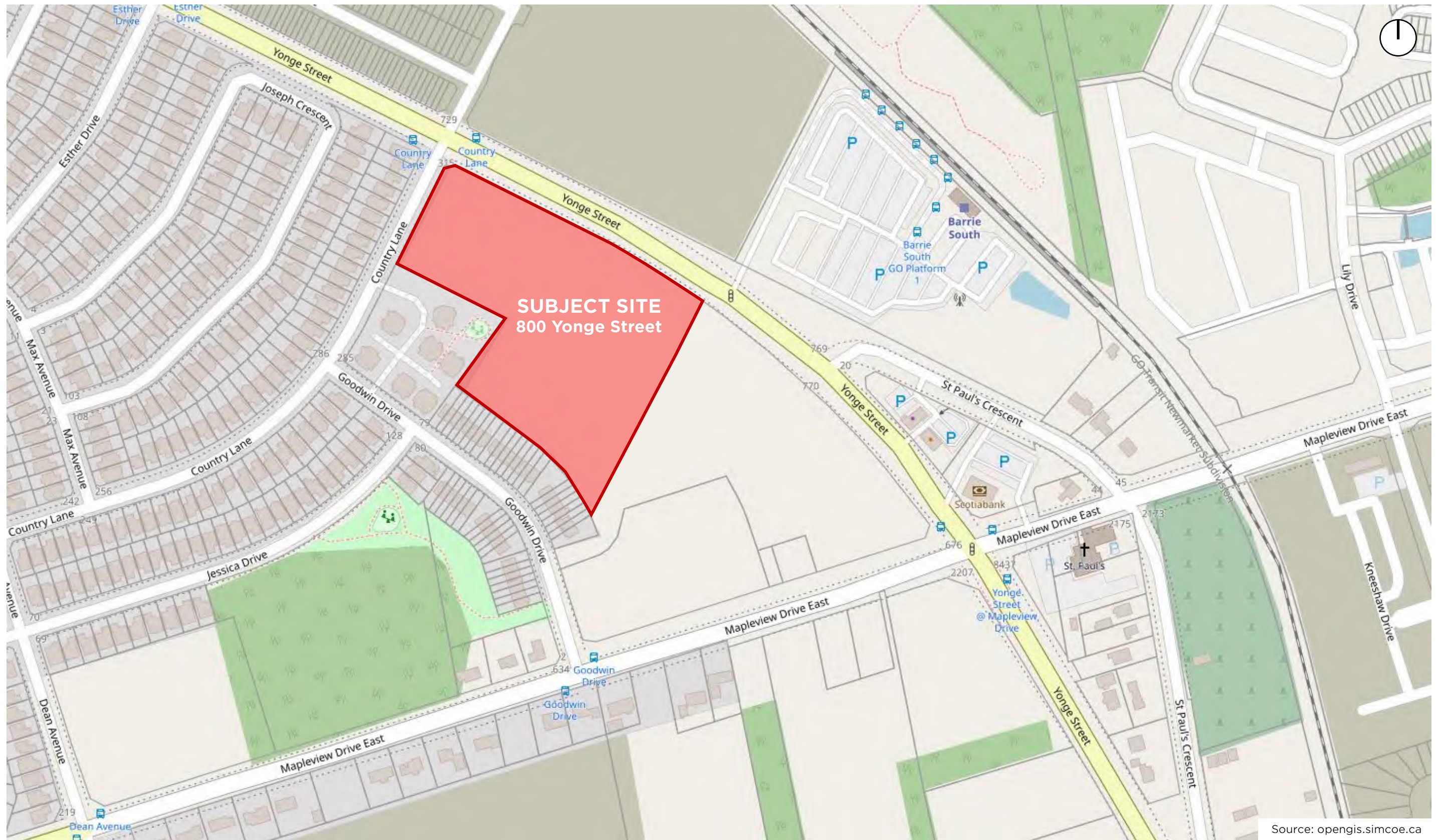
Turn Lane Requirements

The need for exclusive turn lanes to serve site access points on Country Lane and Yonge Street were reviewed in context of MTO warrants for auxiliary turn lanes at unsignalized intersections. Based on this review, turn lanes are not warranted at either access.

Transportation Demand Management

Potential transportation demand management (TDM) opportunities were identified and a framework for implementation of a TDM program was developed for the subject site.





Source: opengis.simcoe.ca

THE VILLAGE OF INNIS LANDING - TRANSPORTATION IMPACT STUDY

Figure 1: Site Location

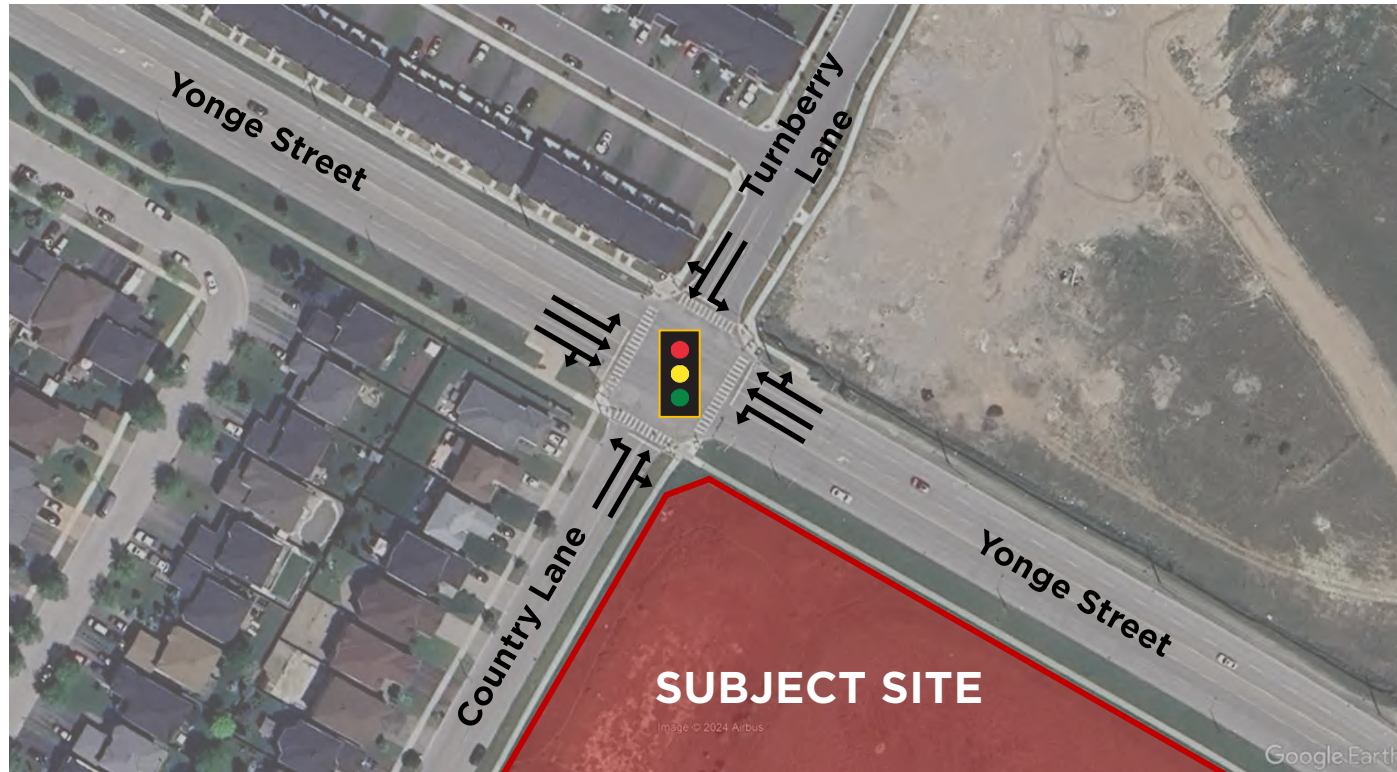




THE VILLAGE OF INNIS LANDING - TRANSPORTATION IMPACT STUDY

Figure 2A: Road Network





Intersection of Yonge Street & Country Lane/Turnberry Lane



Intersection of Yonge Street & Barrie South GO access



Intersection of Mapleview Drive East & Goodwin Drive



Intersection of Yonge Street & Mapleview Drive East

THE VILLAGE OF INNIS LANDING - TRANSPORTATION IMPACT STUDY

Figure 2B: Road Network





THE VILLAGE OF INNIS LANDING - TRANSPORTATION IMPACT STUDY

Figure 3: Active Transportation Network



Barrie Transit Network Map

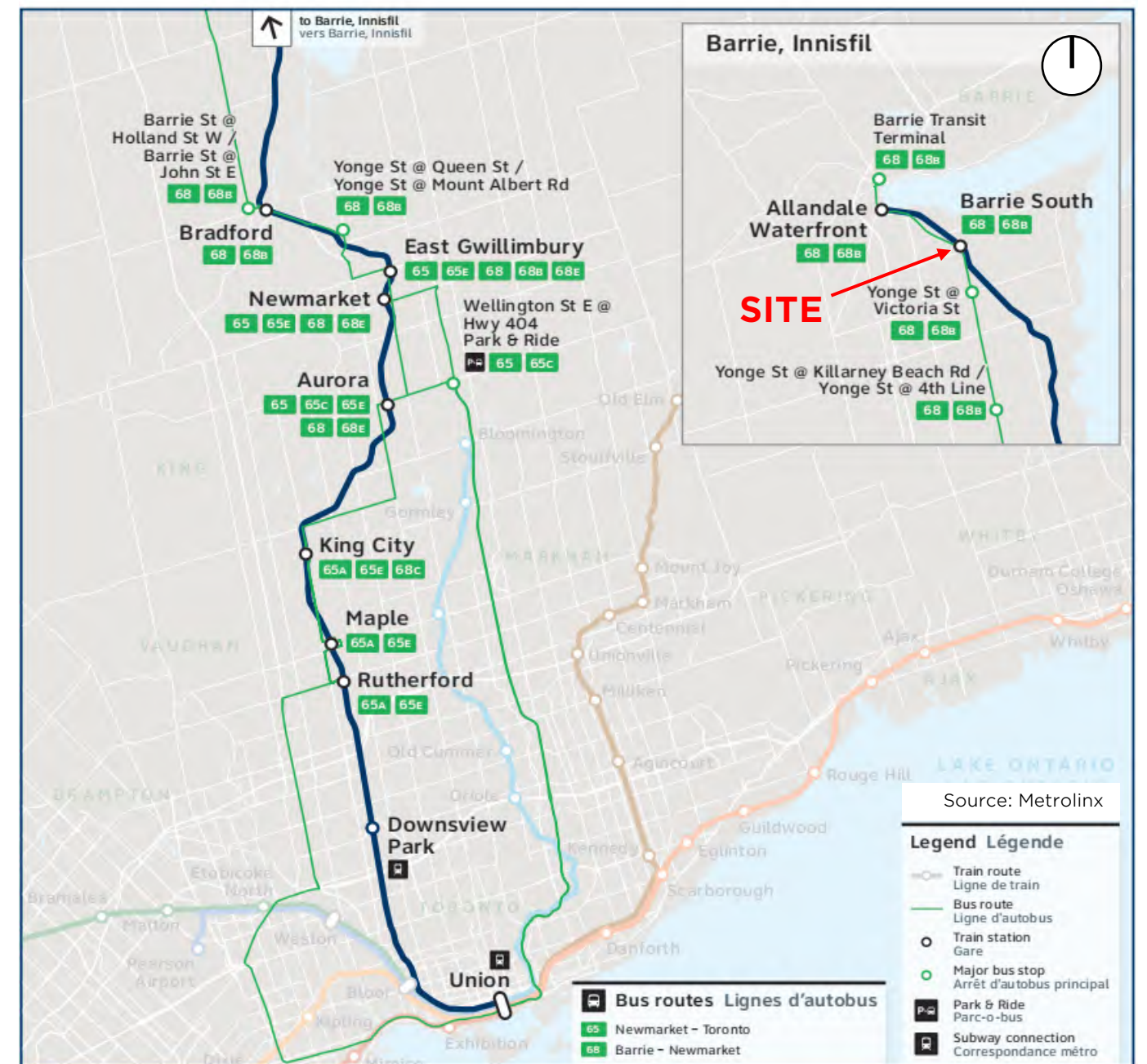


System Map - Barrie Transit

63-65-68

Route number
Nombre d'itinéraire

Barrie

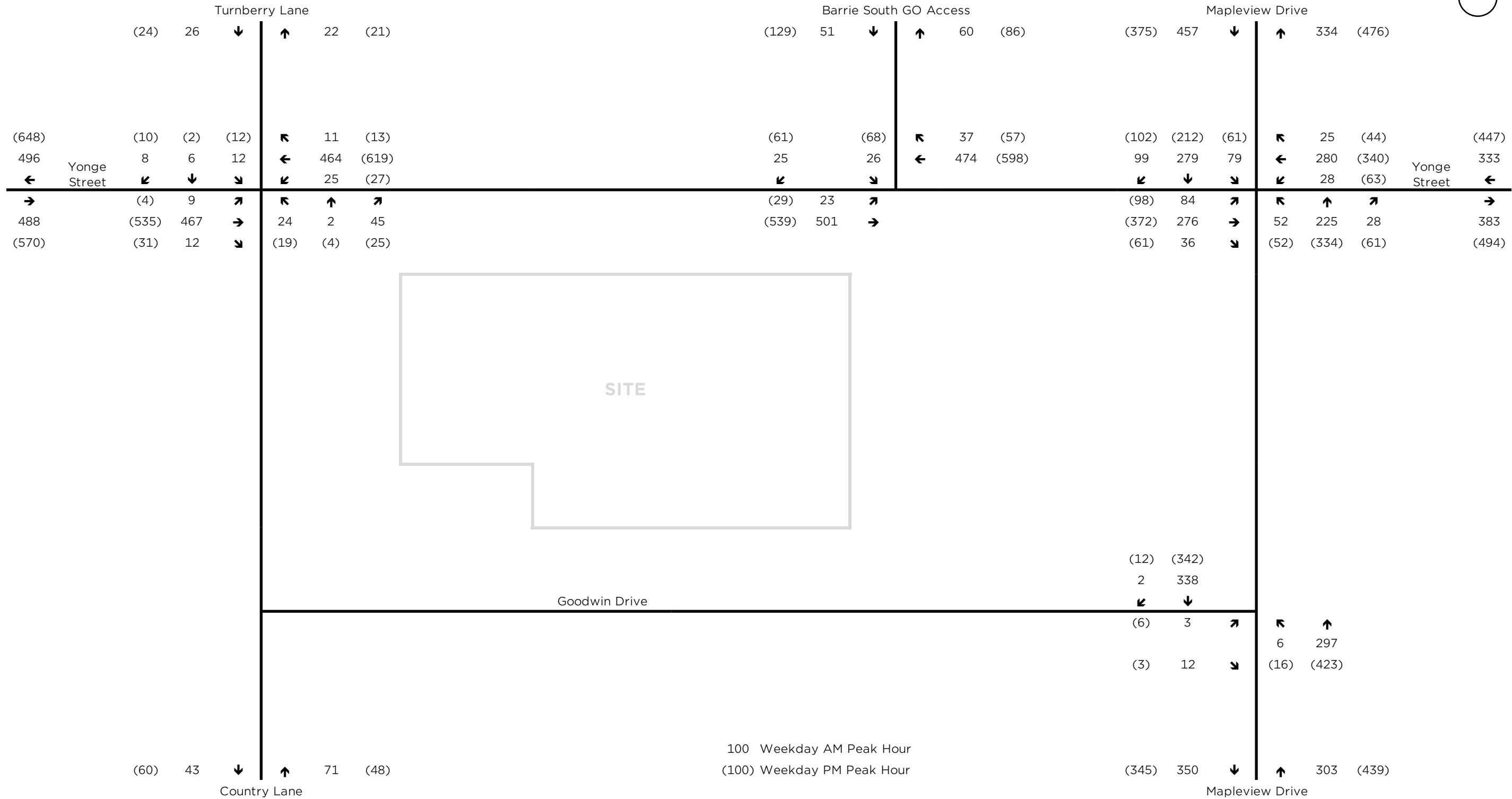


System Map - GO Transit (Barrie Service)

THE VILLAGE OF INNIS LANDING - TRANSPORTATION IMPACT STUDY

Figure 4: Transit Network - Existing

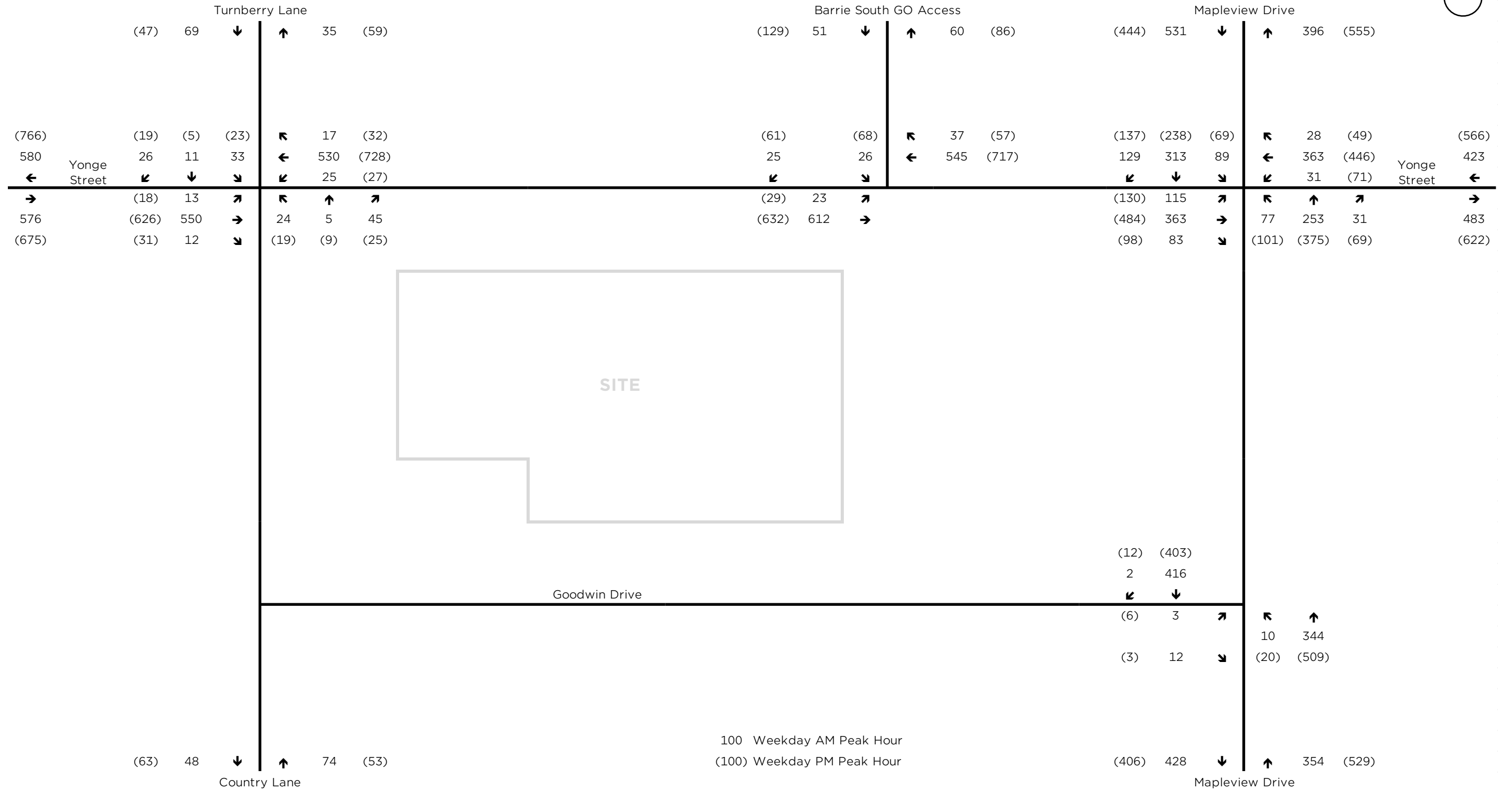




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Figure 5: Traffic Volumes - 2022 Counts



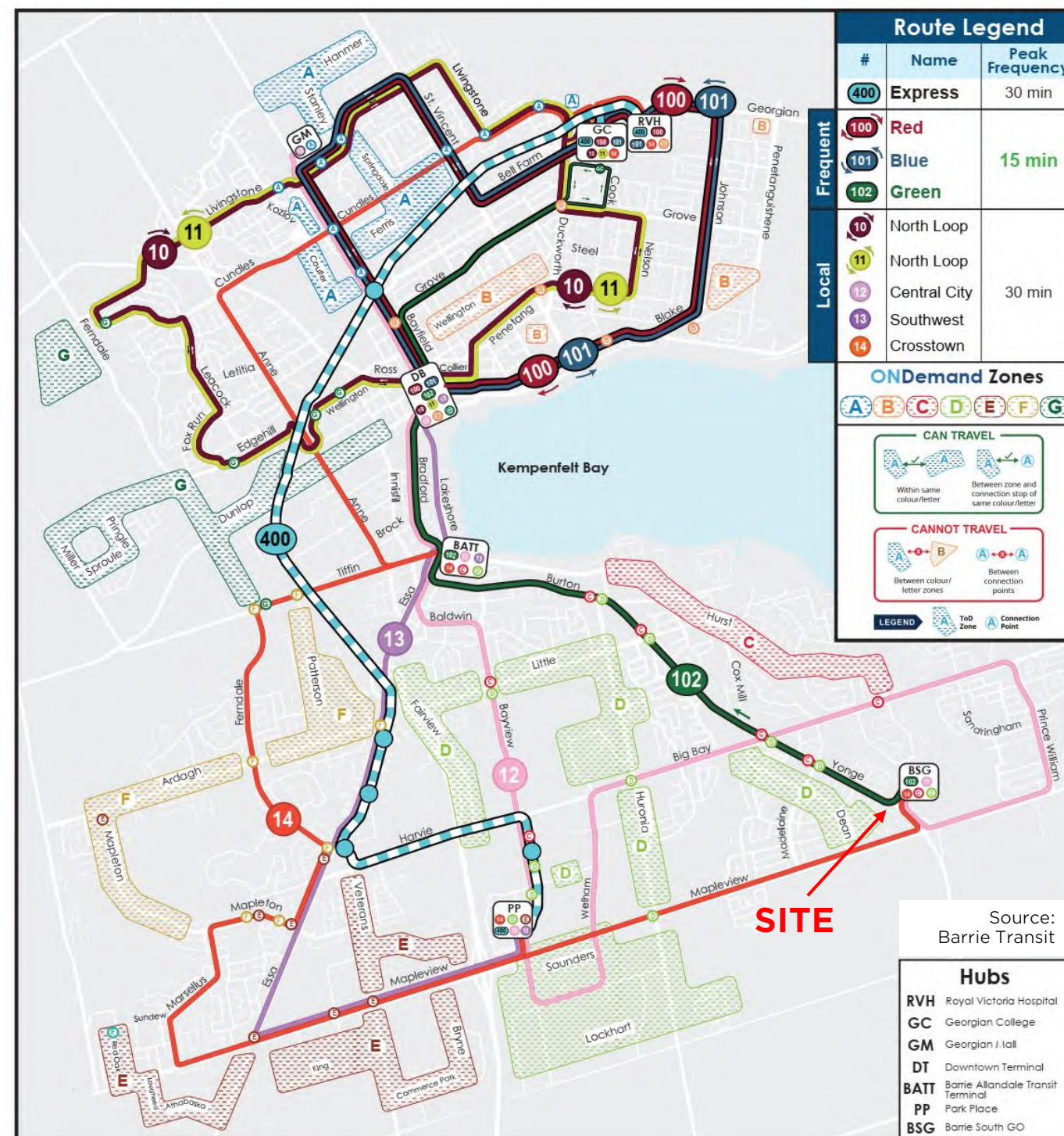


THE VILLAGE OF INNIS LANDING - TRANSPORTATION IMPACT STUDY

Figure 6: Traffic Volumes - 2024



2025 Phase 2 Transit Network



Barrie Transit - 2025 Network

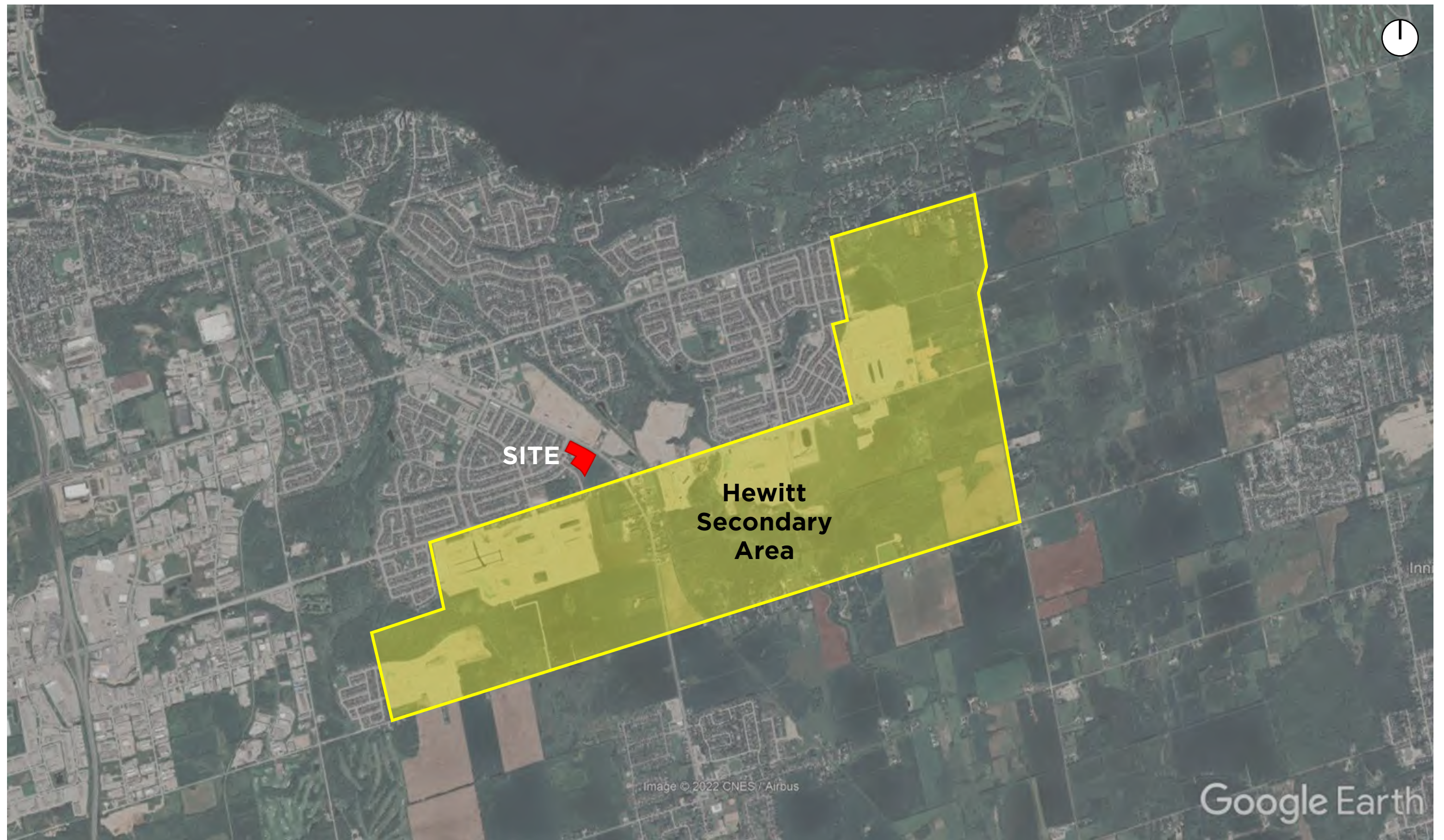


Barrie Transit - 2031 Conceptual Network

THE VILLAGE OF INNIS LANDING - TRANSPORTATION IMPACT STUDY

Figure 7: Transit Network - Future

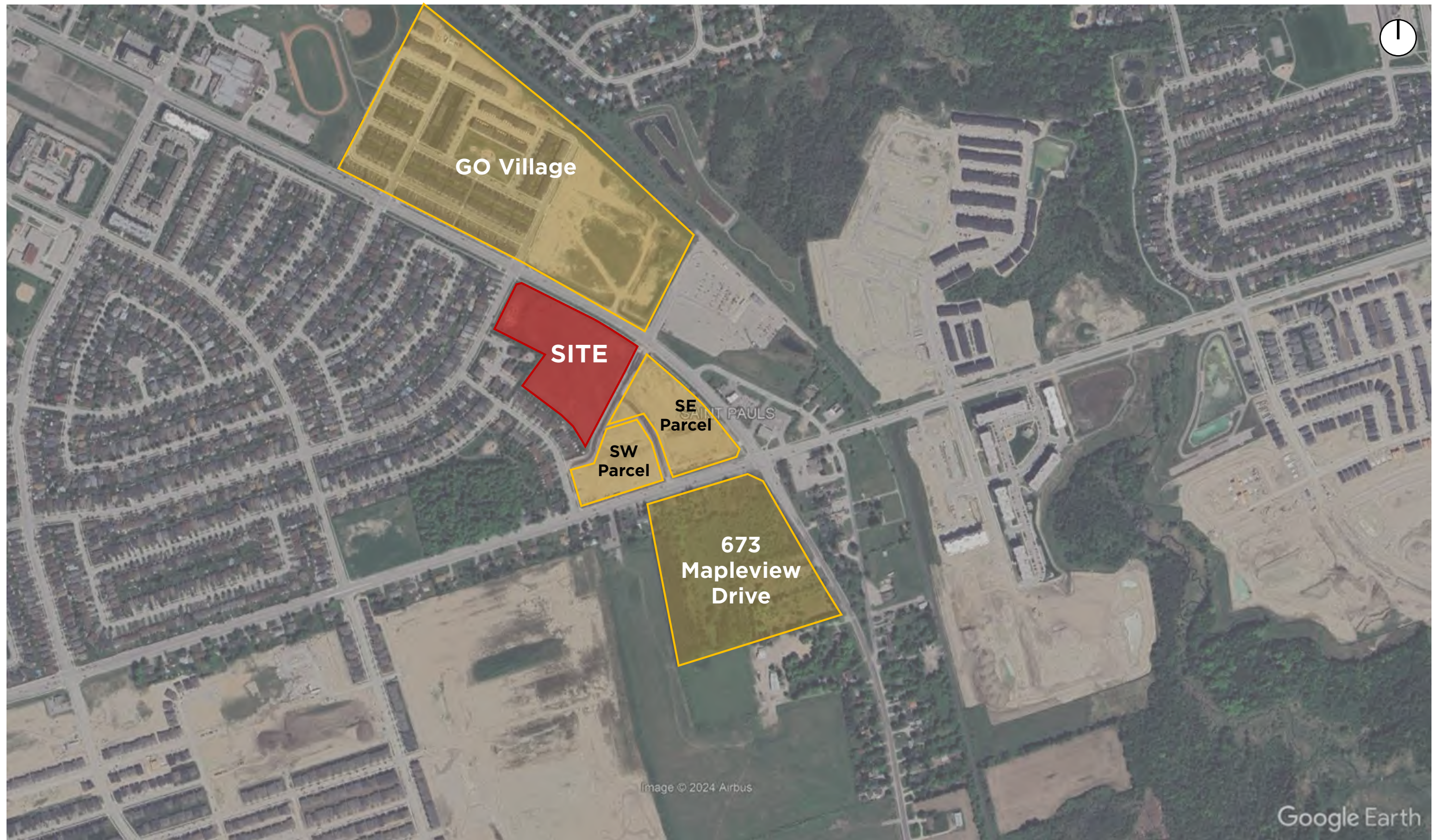




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Figure 8: Hewitt Secondary Area

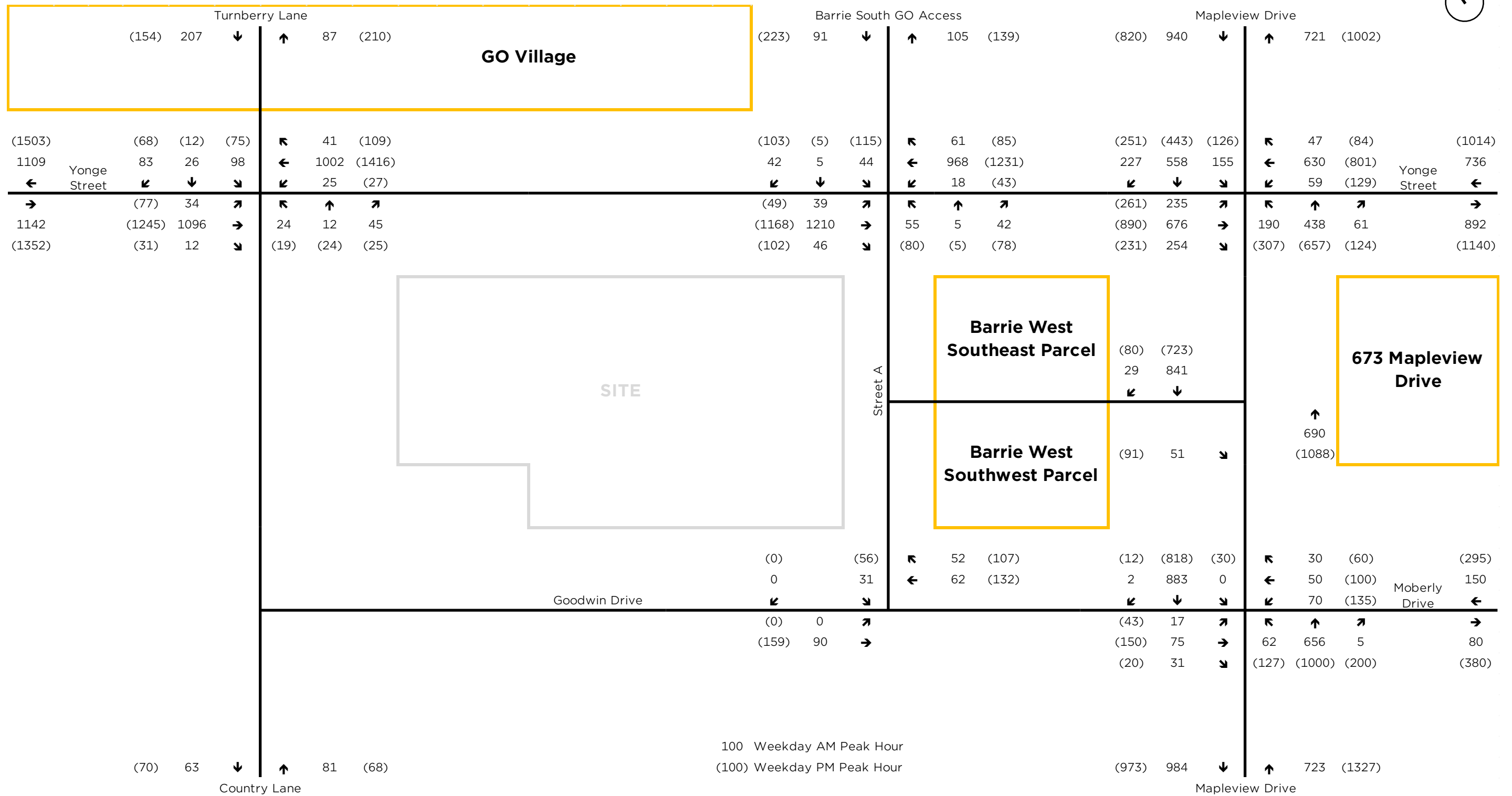




THE VILLAGE OF INNIS LANDING - TRANSPORTATION IMPACT STUDY

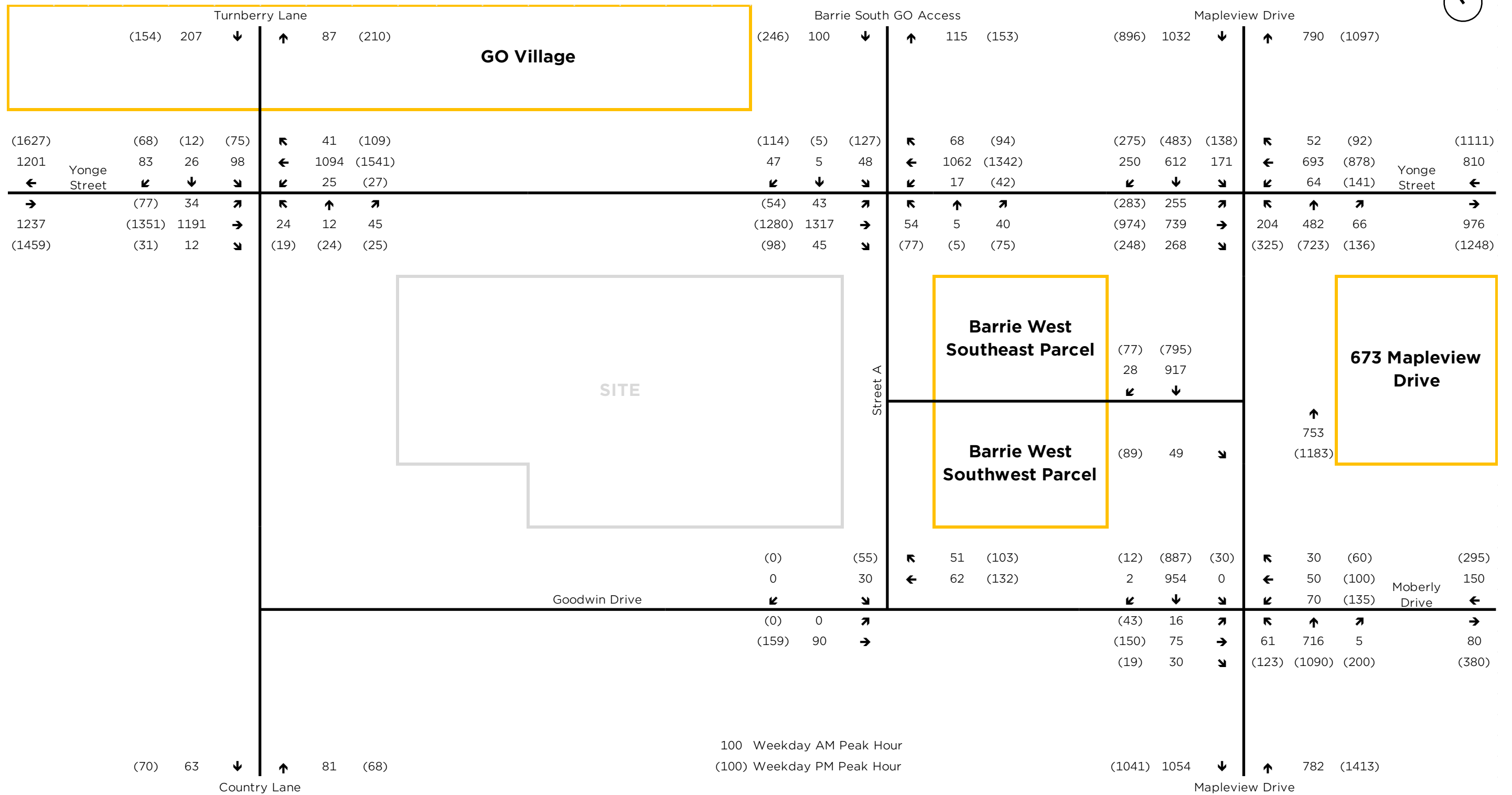
Figure 9: Background Development Locations





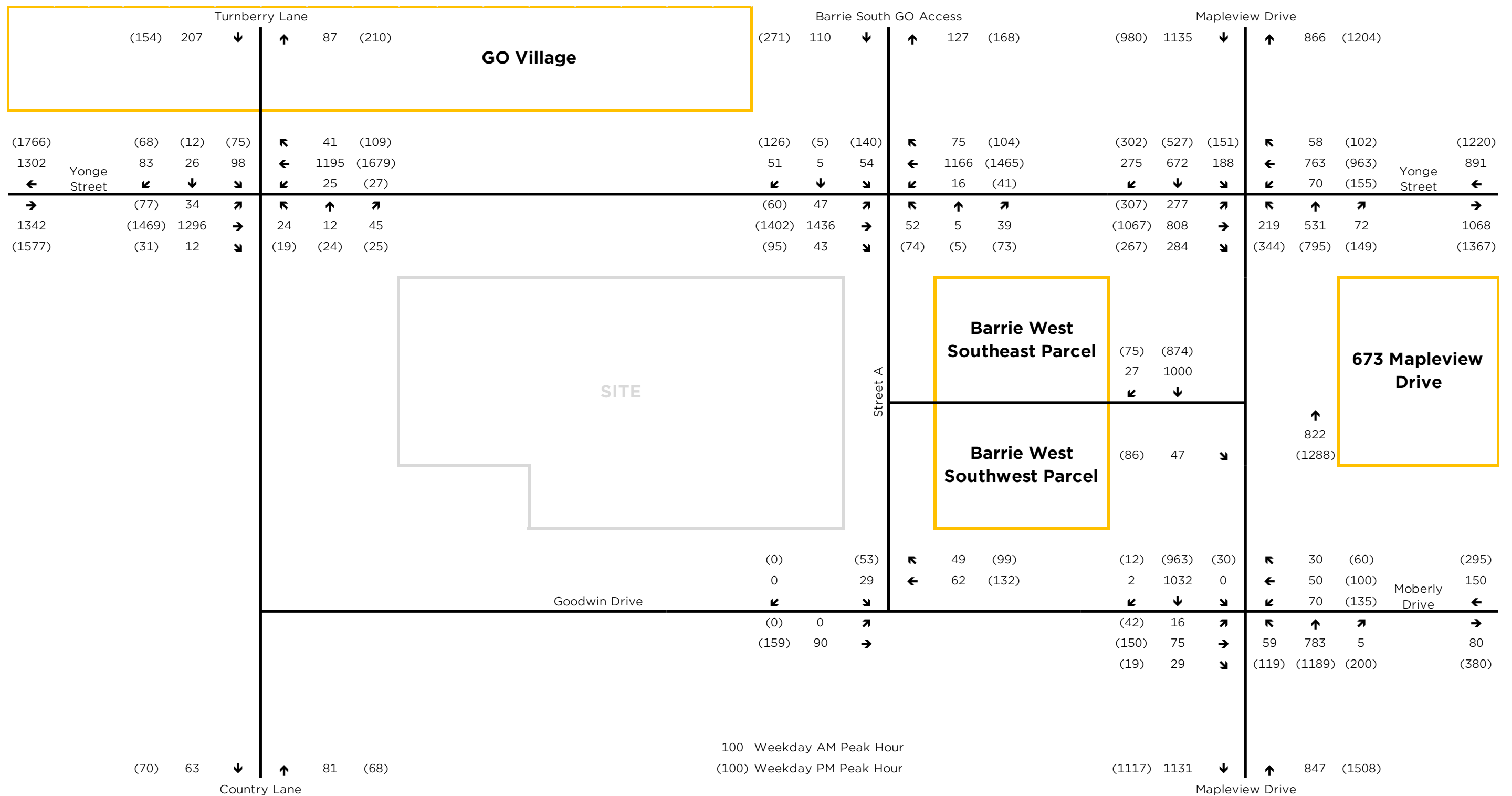
THE VILLAGE OF INNIS LANDING - TRANSPORTATION IMPACT STUDY
Figure 12: Traffic Volumes – 2031 Background





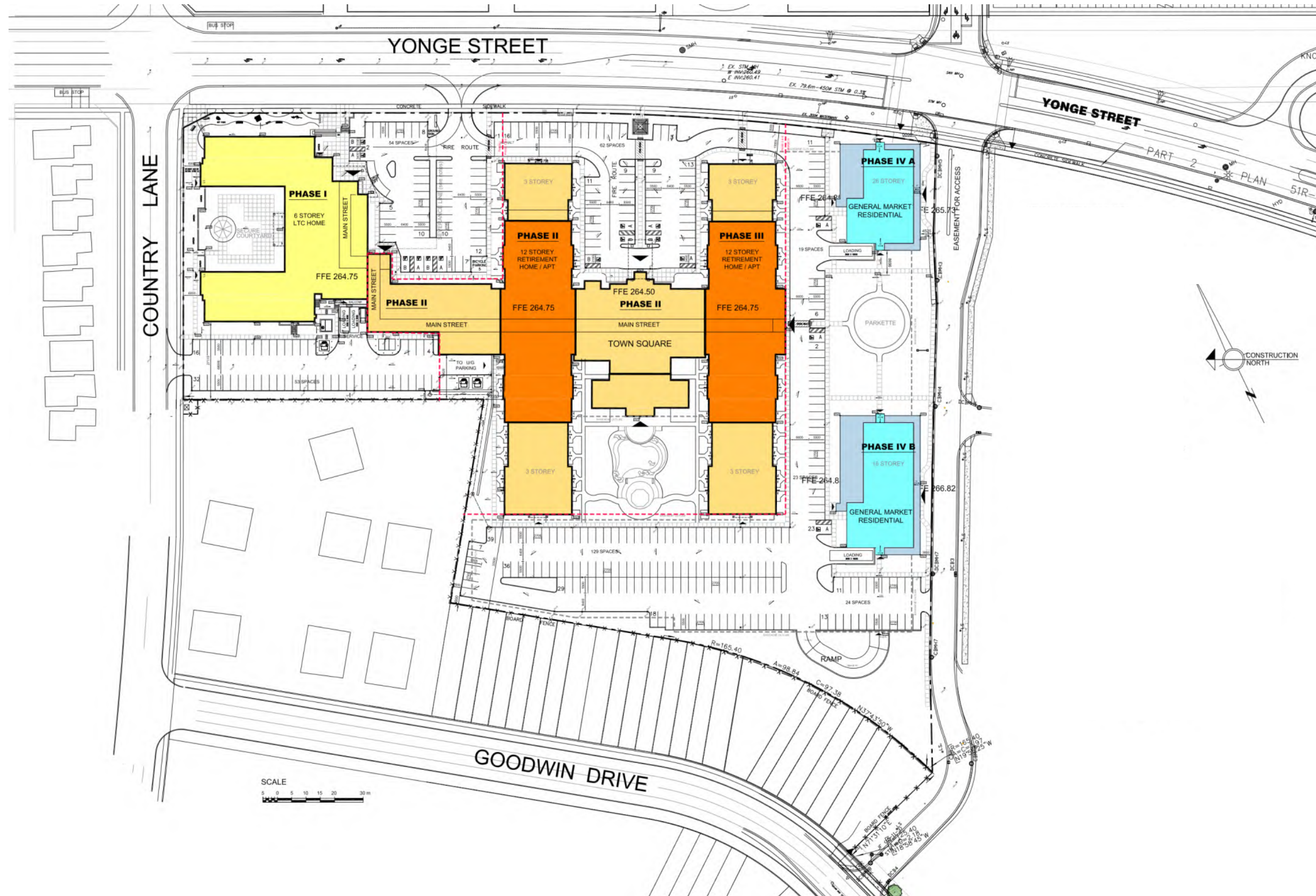
THE VILLAGE OF INNIS LANDING - TRANSPORTATION IMPACT STUDY
Figure 13: Traffic Volumes – 2036 Background





THE VILLAGE OF INNIS LANDING - TRANSPORTATION IMPACT STUDY
Figure 14: Traffic Volumes - 2041 Background

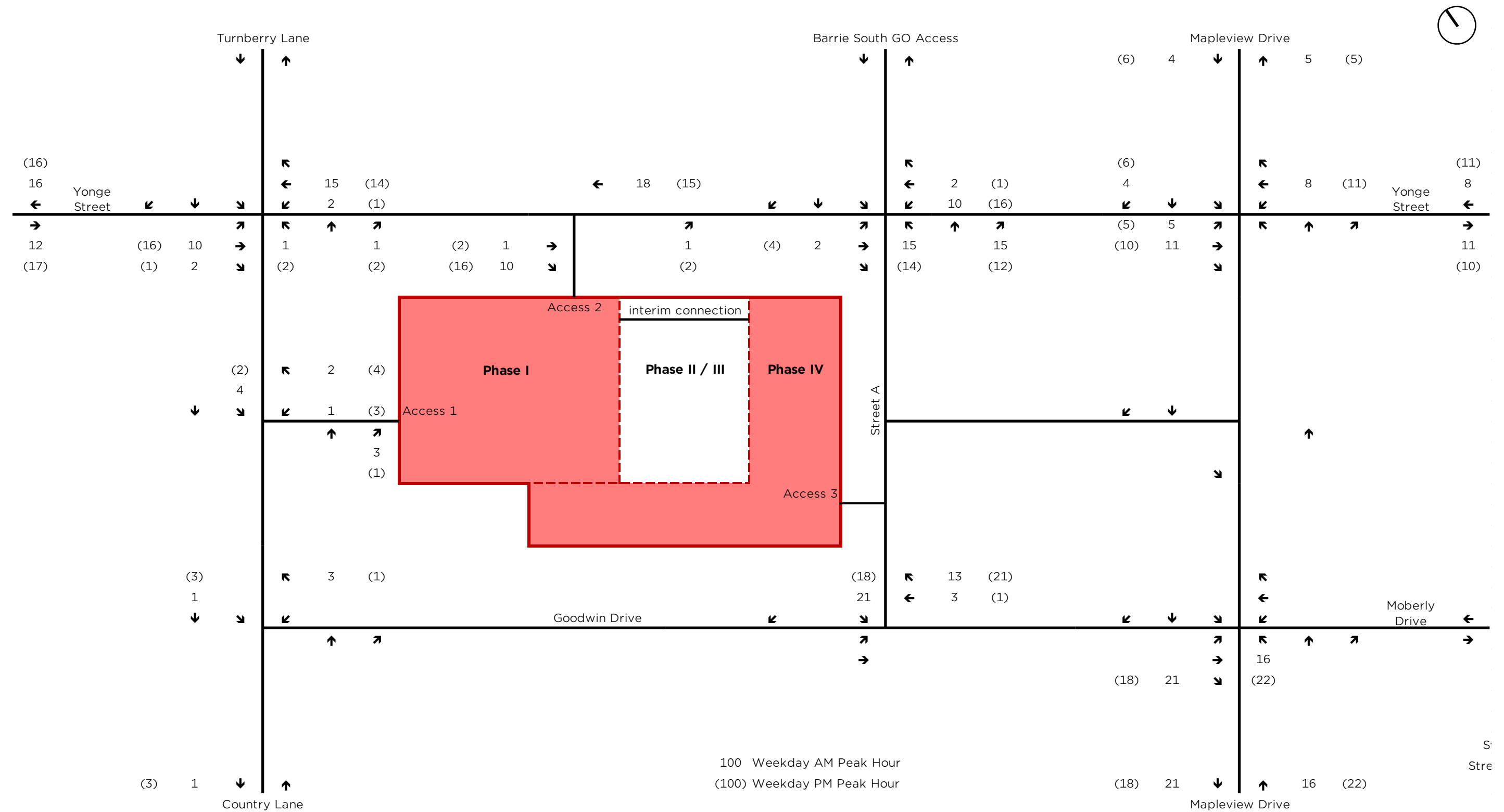




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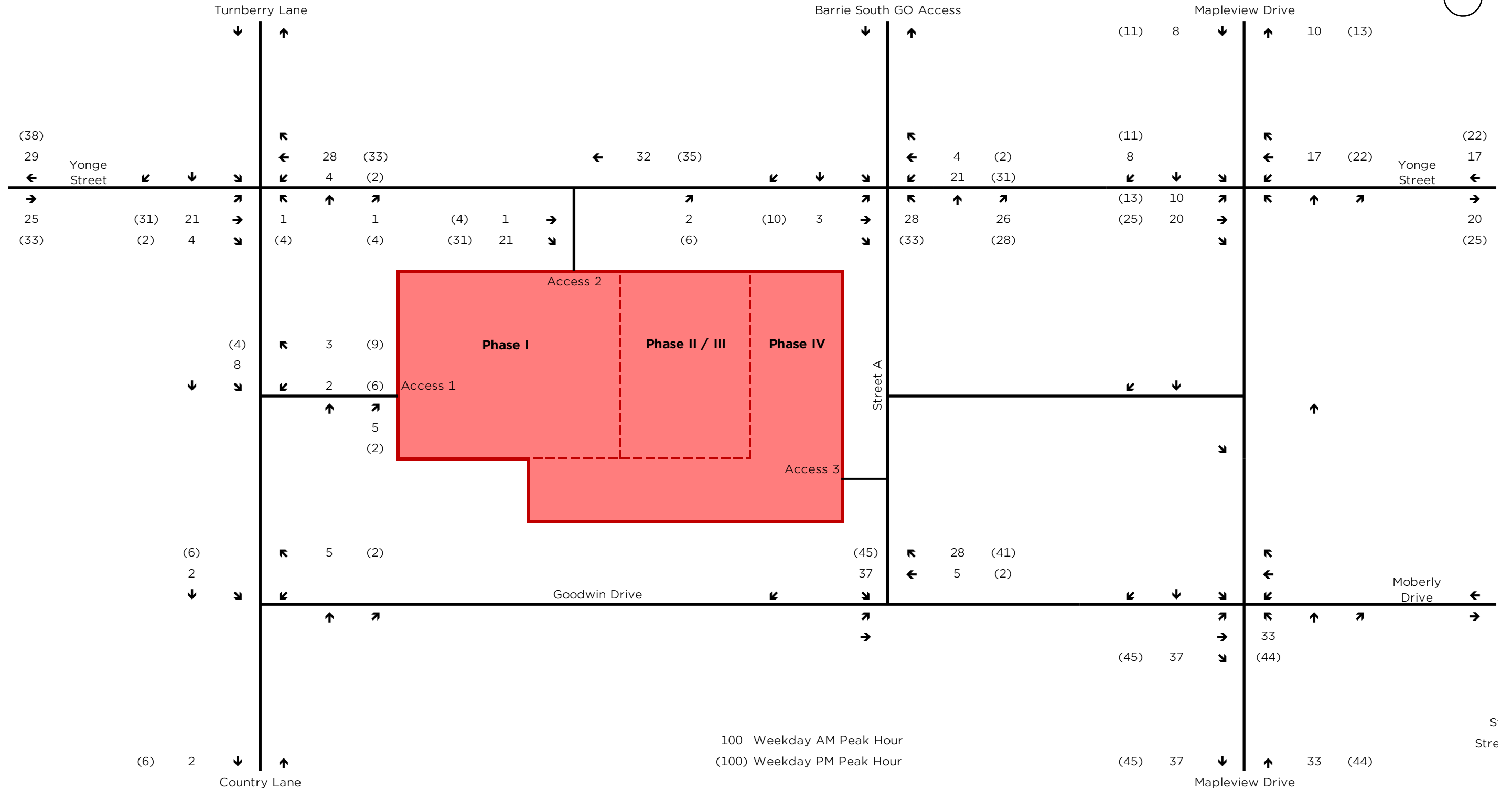
Figure 15: Site Plan





THE VILLAGE OF INNIS LANDING - TRANSPORTATION IMPACT STUDY
 Figure 17: Site-Generated Traffic - 2031

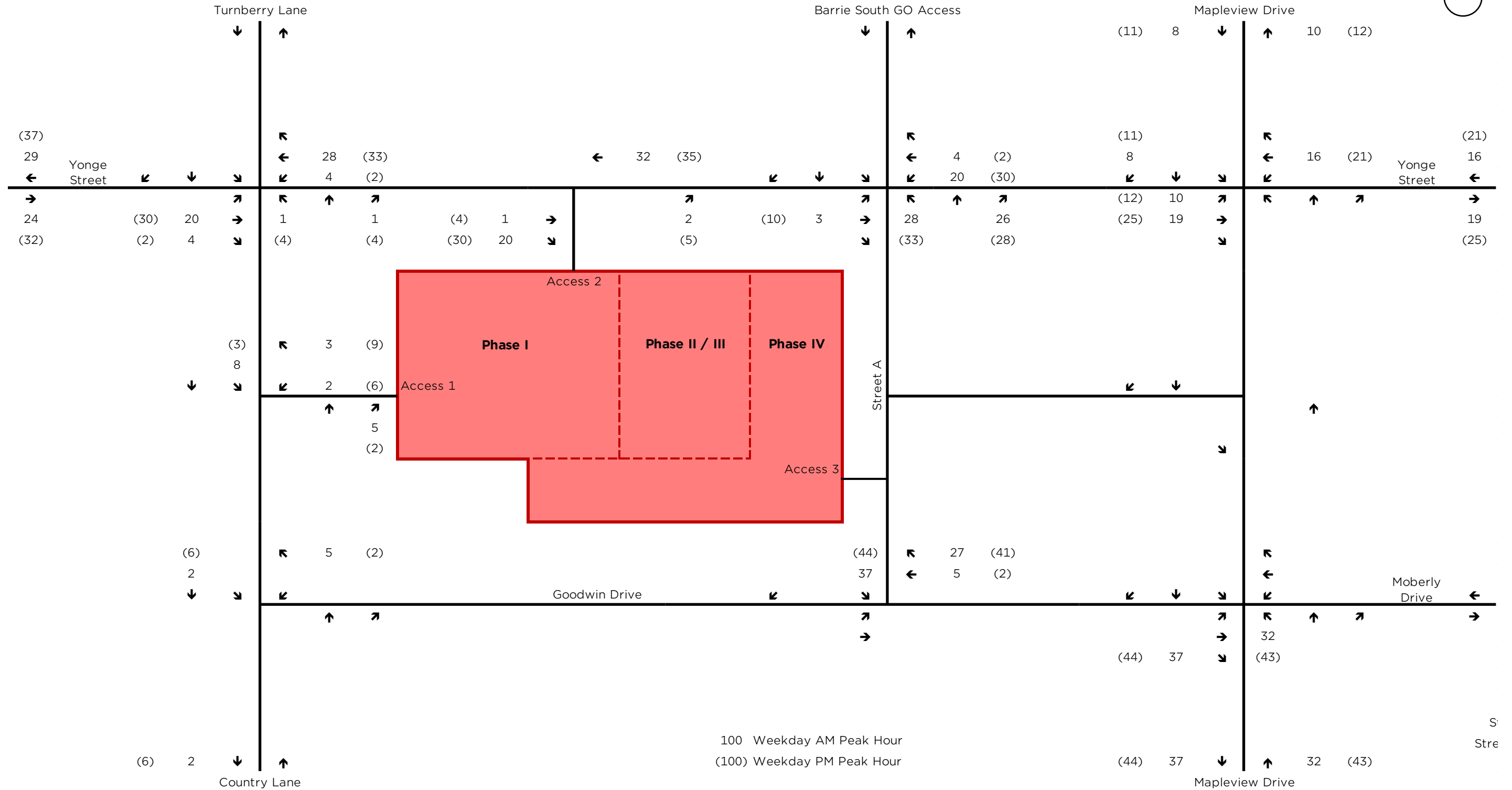




THE VILLAGE OF INNIS LANDING - TRANSPORTATION IMPACT STUDY

Figure 18: Site-Generated Traffic - 2036

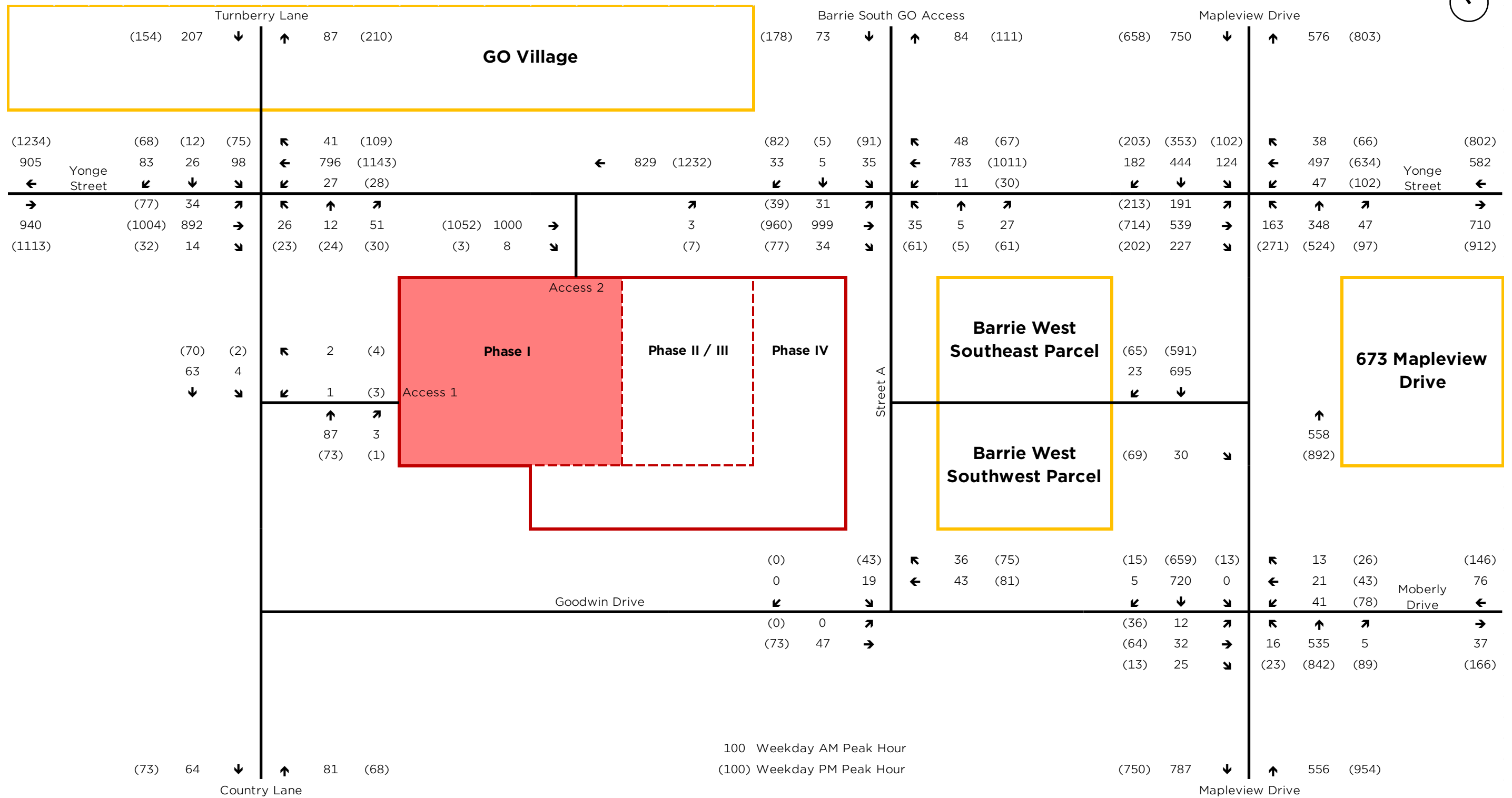




THE VILLAGE OF INNIS LANDING - TRANSPORTATION IMPACT STUDY

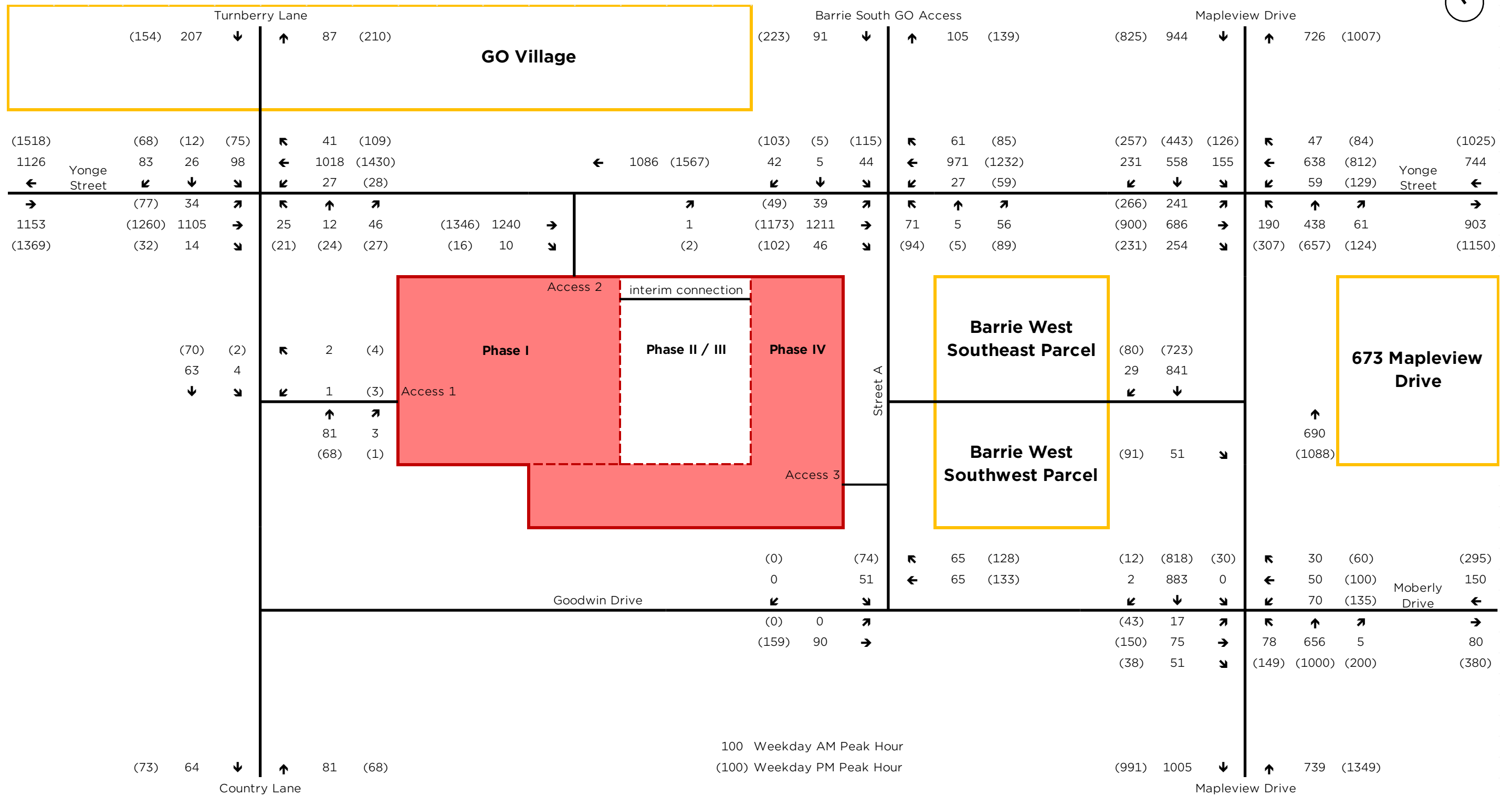
Figure 19: Site-Generated Traffic - 2041





THE VILLAGE OF INNIS LANDING - TRANSPORTATION IMPACT STUDY
Figure 20: Traffic Volumes - 2027 Total

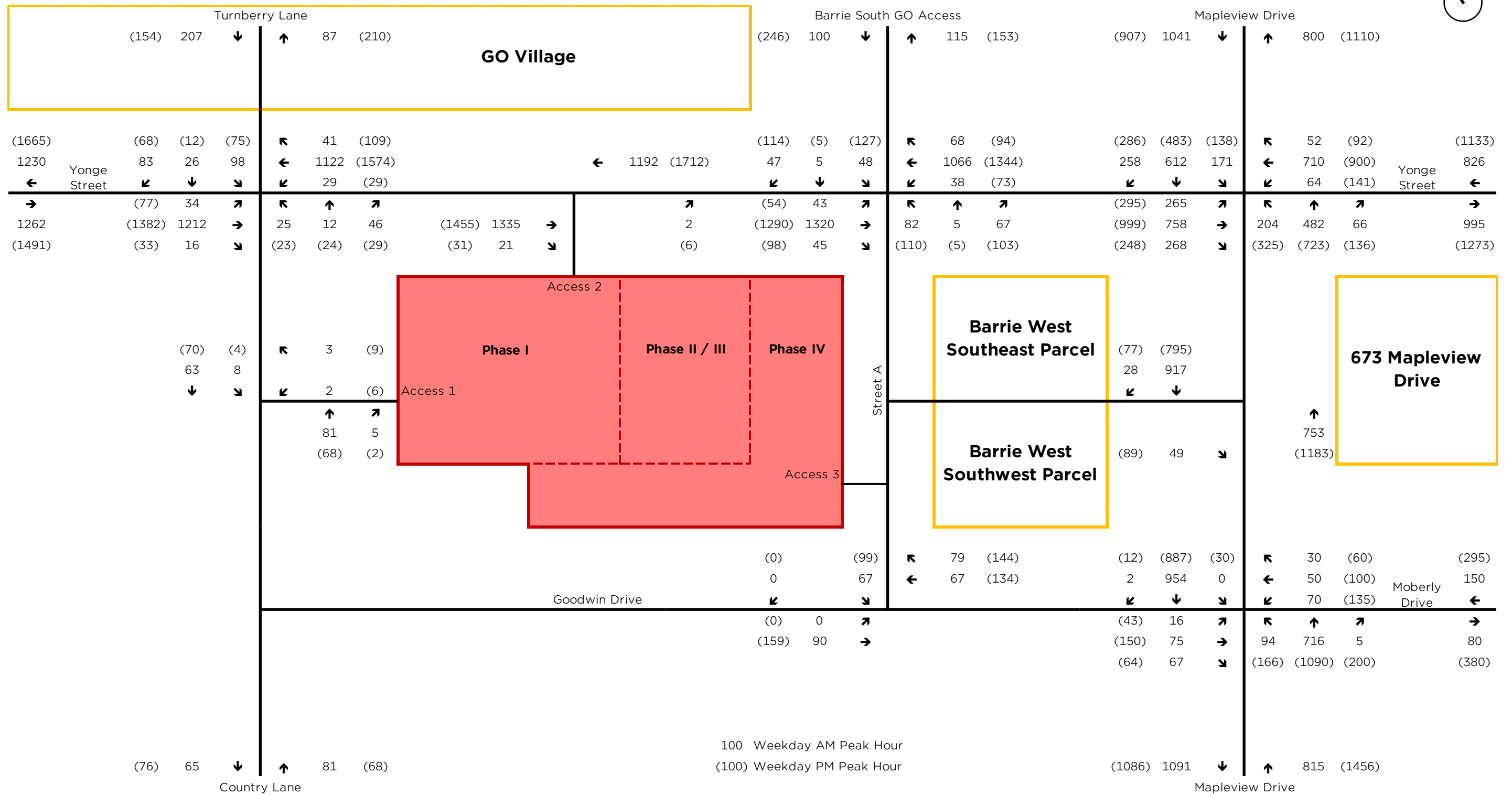




THE VILLAGE OF INNIS LANDING - TRANSPORTATION IMPACT STUDY

Figure 21: Traffic Volumes - 2031 Total

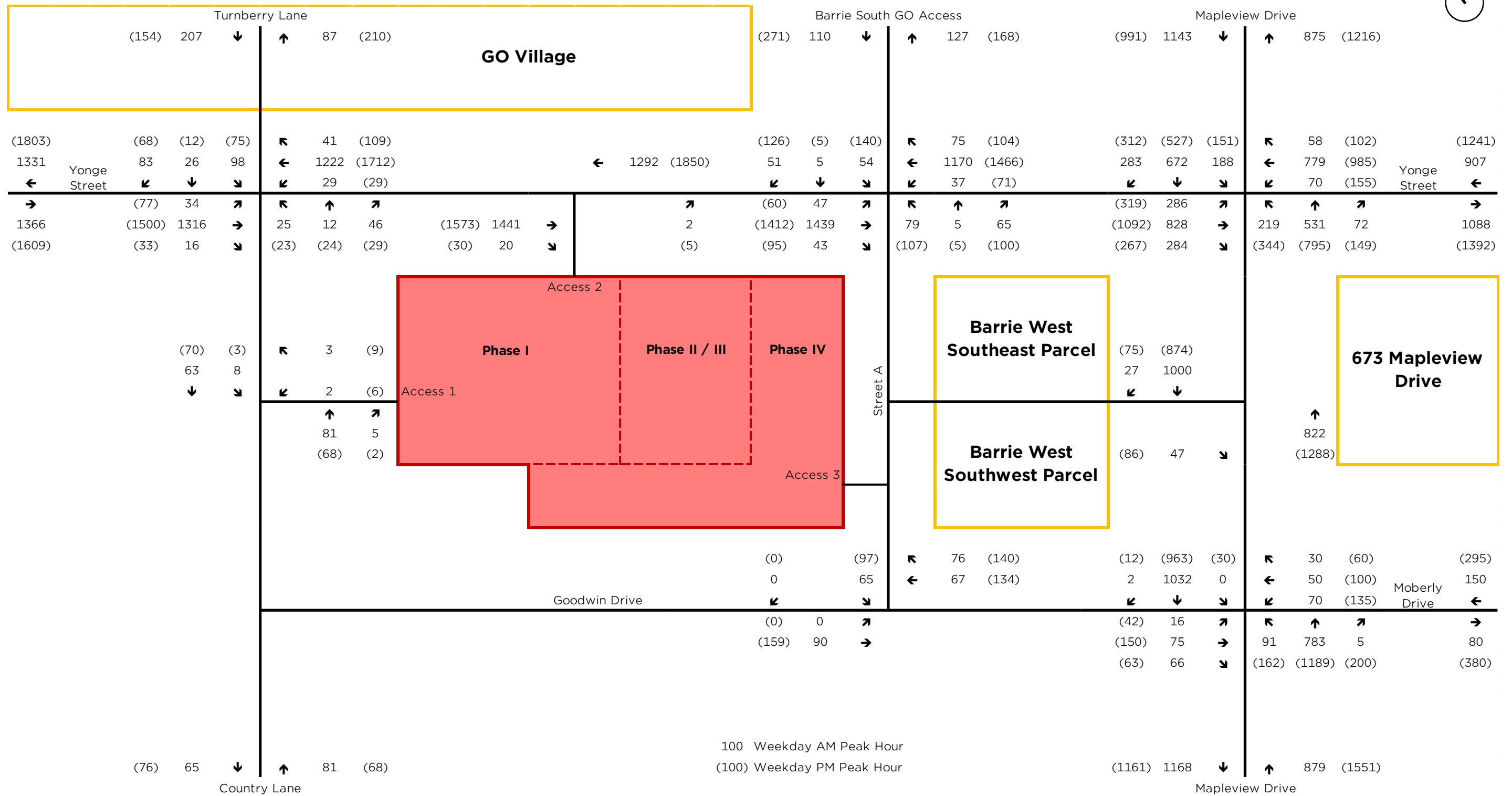




THE VILLAGE OF INNIS LANDING - TRANSPORTATION IMPACT STUDY

Figure 22: Traffic Volumes - 2036 Total





THE VILLAGE OF INNIS LANDING - TRANSPORTATION IMPACT STUDY
Figure 23: Traffic Volumes - 2041 Total



Appendix A: Study Terms of Reference

From: [Justin MacDonald](#)
To: [Matthew Buttrum](#)
Cc: [David Perks](#)
Subject: RE: 800 Yonge Street - Terms of Reference
Sent: 1/16/2024 9:53:30 AM

CAUTION: This email originated from outside of Tatham Engineering or Envision-Tatham. Do not click on links or open attachments unless you know the sender and have verified the sender's email address and know the content is safe.

Good morning, Matthew,

I have highlighted my comments below.

Justin MacDonald, C.E.T., PTP
Project Delivery – Transportation Planning, Development Services
The City of Barrie
Mobile 705-734-8020
Please consider the environment before printing this email.

From: Matthew Buttrum <mbuttrum@tathameng.com>
Sent: Thursday, January 11, 2024 3:29 PM
To: Justin MacDonald <Justin.MacDonald@barrie.ca>
Cc: David Perks <dperks@tathameng.com>
Subject: 800 Yonge Street - Terms of Reference

Hi Justin,

We (Tatham Engineering Limited) have been retained to prepare a traffic impact study in support of a proposed long-term care/seniors residential development to be located at 800 Yonge Street. We have prepared this Terms of Reference for your review prior to commencement of the study. As you may recall, we have completed two other traffic studies in support of other developments to be located adjacent to that proposed, thus are quite familiar with the development site and surrounding area.

Development Details

As noted, the development site is to be located at 800 Yonge Street, in the northern portion of the property. As per our most recent correspondence with the client, the development will consist of a 192-bed long-term care facility, 605 senior's apartments/suites, and 360 market rental apartment units. This is estimated to generate approximately 235 trips during the weekday AM peak and 290 trips during the weekday PM peak.

Terms of Reference

1. Study area to consist of the following intersections:
 - a. Yonge Street & Country Lane/Turnberry Lane
 - b. Yonge Street & Barrie South GO access
 - c. Yonge Street & Mapleview Drive
 - d. Mapleview Drive & Goodwin Drive
 - e. All site accesses (previous concepts identified a RIRO onto Yonge Street and a full movement access onto Country Lane).
2. Study horizons: 2024 (existing), full build-out, and 5 and 10 years beyond build-out. The exact future horizons will be determined pending further discussion with the client to establish anticipated construction timelines. One or more interim horizons for partial build-out of the site may also be considered given the phased nature of the development.
3. Traffic volumes will be established based on counts completed at each of the proposed study intersections. We have traffic data available for each noted intersection from 2022, however will complete new 2024 counts at the City's discretion.
 - a. Obtaining new counts in 2024 may be challenging due to the commencement of the MVD ROW expansion this spring and travel patterns for winter counts may be skewed due to weather events. Provide commentary regarding why updated counts were reviewed but determined problematic.
4. Establish future traffic volumes through application of general background growth and through consideration of development-specific traffic volumes.
 - a. With respect to growth, our prior work in the area revealed that the City's EMME model forecasts growth in the order of 6 to 7% per annum on Yonge Street and Mapleview Drive through 2031. Could you please confirm if this is an appropriate rate to apply to those roads?
 - i. Yes, please use 6% per annum until 2031 horizon and 2% per annum post 2031. This accounts for the anticipated growth within Phase of the Hewitt's Secondary Plan Area.
 - b. We anticipate that we will need to consider the nearby developments at GO Village, 673 Mapleview Drive, and the two developments adjacent to our site (Metro store + other residential development). Could you please confirm if this is appropriate?
 - i. I am supportive of this approach. The balance of background development should be accounted for within the 6% corridor growth rate.
5. Provide details of the proposed development and estimate trip generation based on trip rates contained within the *ITE Trip Generation Manual, 11th Edition*. Trips will be distributed based on the location of the site within the City and available travel data. Mode share adjustments in line with City targets will be considered at each future horizon.
6. Assess operations of the study area intersections for the weekday AM and PM peak periods using Synchro software. Operations will be assessed under existing conditions and at future both with and without the subject development. Any improvements required to accommodate the existing or future conditions will be identified.
7. Review available sight distance at each proposed access point to an external road.
8. Provide commentary on existing and proposed active transportation infrastructure and transit services in the area.
 - a. Please refer to Sections 8-10 of the Transportation Impact Study Guidelines for specific requirements.
9. Review and provide commentary on the internal circulation of vehicle and pedestrian traffic.
10. Provide discussion on Transportation Demand Management opportunities/measures for the proposed development.
11. Document the above into a Traffic Impact Study report for submission to the City for review and approval.
12. If applicable, provide justification for any proposed deviations from the minimum parking requirements.

Please review the above Terms of Reference and provide any necessary feedback. I look forward to hearing back from you.

Regards,

Matthew Buttrum EIT
Engineering Intern



mbuttrum@tathameng.com T 705-733-9037 x2222
41 King Street, Unit 4, Barrie, Ontario L4N 6B5

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Appendix B: Traffic Data



Turning Movement Count (5 . MAPLEVIEW DR E & GOODWIN DR)

Start Time	N Approach GOODWIN DR						E Approach MAPLEVIEW DR E						S Approach GOODWIN DR						W Approach MAPLEVIEW DR E						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total			
07:30:00	4	0	2	0	1	6	1	79	0	0	0	80	0	0	0	0	0	0	0	67	0	0	0	67	153		
07:45:00	4	0	2	0	3	6	0	93	0	0	1	93	0	0	0	0	0	0	0	74	0	0	0	74	173		
08:00:00	2	0	0	0	0	2	1	71	0	0	0	72	0	0	0	0	0	0	0	69	1	0	0	70	144		
08:15:00	3	0	0	0	0	3	1	71	0	0	0	72	1	0	0	0	1	1	0	79	4	0	0	83	159	629	
08:30:00	3	0	1	0	0	4	0	103	0	0	0	103	0	0	0	0	0	0	0	75	1	0	0	76	183	659	
08:45:00	7	0	2	0	0	9	0	84	0	0	0	84	0	0	0	0	0	0	0	62	2	0	0	64	157	643	
09:00:00	3	0	3	0	0	6	0	68	0	0	0	68	0	0	0	0	0	0	0	57	1	0	0	58	132	631	
09:15:00	0	0	0	0	0	0	1	65	0	0	0	66	0	0	0	0	0	0	0	49	0	0	0	49	115	587	
BREAK																											
16:00:00	4	0	2	0	0	6	3	83	0	0	0	86	0	0	0	0	1	0	1	89	5	0	0	95	187		
16:15:00	0	0	2	0	1	2	2	116	0	0	1	118	0	0	0	0	0	0	0	94	3	0	0	97	217		
16:30:00	0	0	0	0	0	0	3	82	0	0	1	85	0	0	0	0	0	0	0	106	5	0	0	111	196		
16:45:00	1	0	1	0	0	2	3	67	0	0	0	70	0	0	0	0	0	0	0	99	8	0	0	107	179	779	
17:00:00	2	0	3	0	0	5	4	77	0	0	0	81	0	0	0	0	0	0	0	124	0	0	0	124	210	802	
17:15:00	1	0	0	0	0	1	4	94	0	0	0	98	0	0	0	0	0	0	0	109	2	0	0	111	210	795	
17:30:00	0	0	1	0	0	1	2	77	0	0	0	79	1	0	0	0	0	1	0	108	3	0	0	111	192	791	
17:45:00	0	0	0	0	1	0	1	78	1	0	1	80	0	0	0	0	0	0	0	92	1	0	0	93	173	785	
Grand Total	34	0	19	0	6	53	26	1308	1	0	4	1335	2	0	0	0	2	2	1	1353	36	0	0	1390	2780	-	
Approach%	64.2%	0%	35.8%	0%		-	1.9%	98%	0.1%	0%		-	100%	0%	0%	0%		-	0.1%	97.3%	2.6%	0%		-	-	-	
Totals %	1.2%	0%	0.7%	0%		1.9%	0.9%	47.1%	0%	0%		48%	0.1%	0%	0%	0%		0.1%	0%	48.7%	1.3%	0%		50%	-	-	
Heavy	3	0	1	0		-	0	43	0	0		-	0	0	0	0		-	0	49	0	0		-	-	-	
Heavy %	8.8%	0%	5.3%	0%		-	0%	3.3%	0%	0%		-	0%	0%	0%	0%		-	0%	3.6%	0%	0%		-	-	-	
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	



Peak Hour: 07:45 AM - 08:45 AM Weather: Overcast Clouds (-0.04 °C)

Start Time	N Approach GOODWIN DR						E Approach MAPLEVIEW DR E						S Approach GOODWIN DR						W Approach MAPLEVIEW DR E						Int. Total (15 min)	
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total		
07:45:00	4	0	2	0	3	6	0	93	0	0	1	93	0	0	0	0	0	0	0	74	0	0	0	74	173	
08:00:00	2	0	0	0	0	2	1	71	0	0	0	72	0	0	0	0	0	0	0	69	1	0	0	70	144	
08:15:00	3	0	0	0	0	3	1	71	0	0	0	72	1	0	0	0	1	1	0	79	4	0	0	83	159	
08:30:00	3	0	1	0	0	4	0	103	0	0	0	103	0	0	0	0	0	0	0	75	1	0	0	76	183	
Grand Total	12	0	3	0	3	15	2	338	0	0	1	340	1	0	0	0	1	1	0	297	6	0	0	303	659	
Approach%	80%	0%	20%	0%		-	0.6%	99.4%	0%	0%		-	100%	0%	0%	0%		-	0%	98%	2%	0%		-	-	
Totals %	1.8%	0%	0.5%	0%		2.3%	0.3%	51.3%	0%	0%		51.6%	0.2%	0%	0%	0%		0.2%	0%	45.1%	0.9%	0%		46%	-	
PHF	0.75	0	0.38	0		0.63	0.5	0.82	0	0		0.83	0.25	0	0	0		0.25	0	0.94	0.38	0		0.91	-	
Heavy	2	0	0	0		2	0	8	0	0		8	0	0	0	0		0	0	21	0	0		21	-	
Heavy %	16.7%	0%	0%	0%		13.3%	0%	2.4%	0%	0%		2.4%	0%	0%	0%	0%		0%	0%	7.1%	0%	0%		6.9%	-	
Lights	10	0	3	0		13	2	330	0	0		332	1	0	0	0		1	0	276	6	0		282	-	
Lights %	83.3%	0%	100%	0%		86.7%	100%	97.6%	0%	0%		97.6%	100%	0%	0%	0%		100%	0%	92.9%	100%	0%		93.1%	-	
Single-Unit Trucks	2	0	0	0		2	0	6	0	0		6	0	0	0	0		0	0	14	0	0		14	-	
Single-Unit Trucks %	16.7%	0%	0%	0%		13.3%	0%	1.8%	0%	0%		1.8%	0%	0%	0%	0%		0%	0%	4.7%	0%	0%		4.6%	-	
Buses	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	0	1	0	0		1	-	
Buses %	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.3%	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.3%	-	
Articulated Trucks	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	0	6	0	0		6	-	
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.3%	0%	0%	0%	0%		0%	0%	2%	0%	0%		2%	-	
Pedestrians	-	-	-	-	3	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-
Pedestrians%	-	-	-	-	60%	-	-	-	-	20%	-	-	-	-	-	20%	-	-	-	-	-	0%	-	-	-	-



Peak Hour: 04:15 PM - 05:15 PM Weather: Overcast Clouds (0.34 °C)

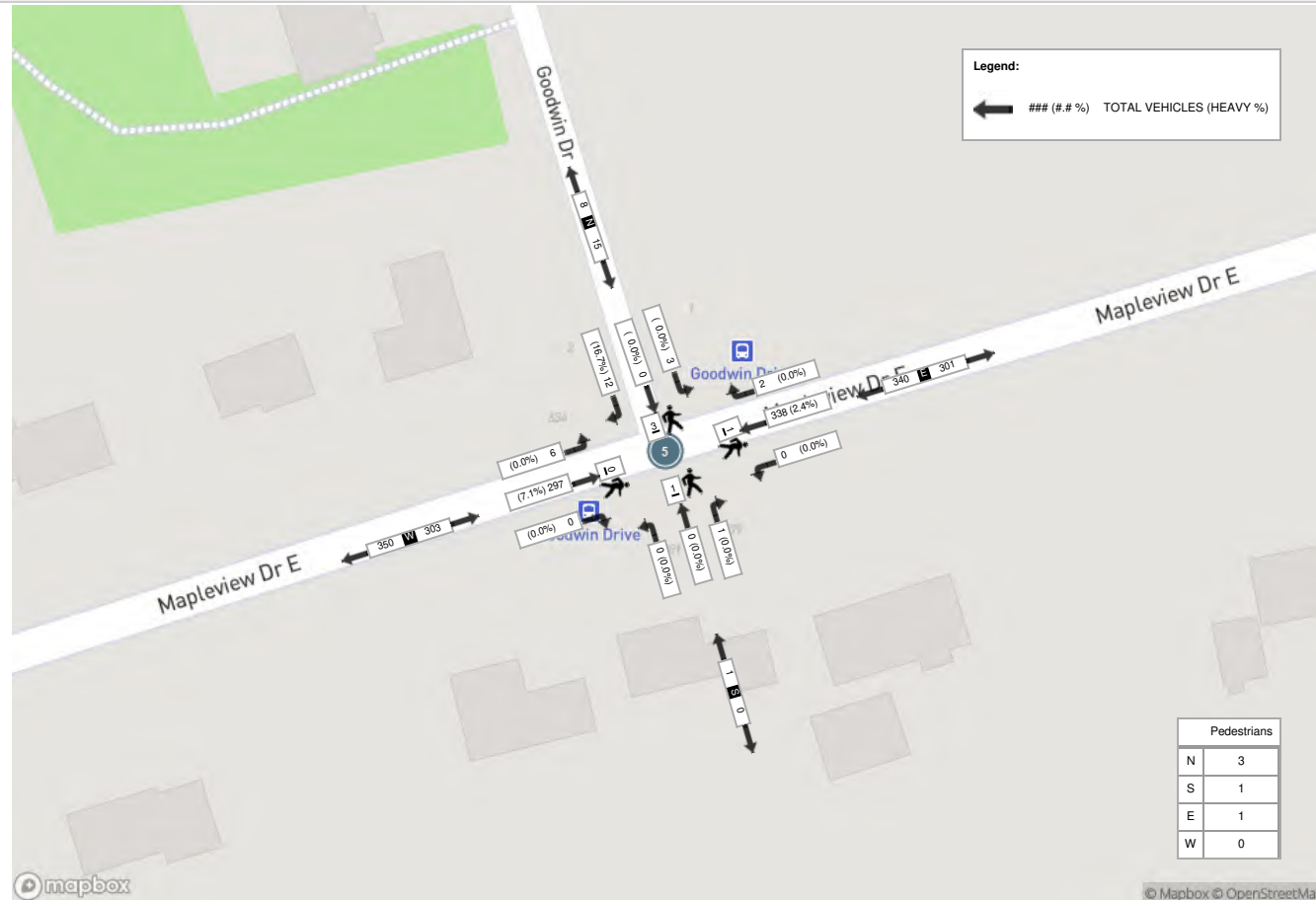
Start Time	N Approach GOODWIN DR						E Approach MAPLEVIEW DR E						S Approach GOODWIN DR						W Approach MAPLEVIEW DR E						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:15:00	0	0	2	0	1	2	2	116	0	0	1	118	0	0	0	0	0	0	0	94	3	0	0	97	217
16:30:00	0	0	0	0	0	0	3	82	0	0	1	85	0	0	0	0	0	0	0	106	5	0	0	111	196
16:45:00	1	0	1	0	0	2	3	67	0	0	0	70	0	0	0	0	0	0	0	99	8	0	0	107	179
17:00:00	2	0	3	0	0	5	4	77	0	0	0	81	0	0	0	0	0	0	0	124	0	0	0	124	210
Grand Total	3	0	6	0	1	9	12	342	0	0	2	354	0	0	0	0	0	0	0	423	16	0	0	439	802
Approach%	33.3%	0%	66.7%	0%		-	3.4%	96.6%	0%	0%		-	0%	0%	0%	0%		-	0%	96.4%	3.6%	0%		-	-
Totals %	0.4%	0%	0.7%	0%		1.1%	1.5%	42.6%	0%	0%		44.1%	0%	0%	0%	0%		0%	0%	52.7%	2%	0%		54.7%	-
PHF	0.38	0	0.5	0		0.45	0.75	0.74	0	0		0.75	0	0	0	0		0	0	0.85	0.5	0		0.89	-
Heavy	0	0	0	0		0	0	13	0	0		13	0	0	0	0		0	0	3	0	0		3	-
Heavy %	0%	0%	0%	0%		0%	0%	3.8%	0%	0%		3.7%	0%	0%	0%	0%		0%	0%	0.7%	0%	0%		0.7%	-
Lights	3	0	6	0		9	12	329	0	0		341	0	0	0	0		0	0	420	16	0		436	-
Lights %	100%	0%	100%	0%		100%	100%	96.2%	0%	0%		96.3%	0%	0%	0%	0%		0%	0%	99.3%	100%	0%		99.3%	-
Single-Unit Trucks	0	0	0	0		0	0	6	0	0		6	0	0	0	0		0	0	1	0	0		1	-
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	1.8%	0%	0%		1.7%	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.2%	-
Buses	0	0	0	0		0	0	5	0	0		5	0	0	0	0		0	0	0	0	0		0	-
Buses %	0%	0%	0%	0%		0%	0%	1.5%	0%	0%		1.4%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Articulated Trucks	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	0	2	0	0		2	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.6%	0%	0%		0.6%	0%	0%	0%	0%		0%	0%	0.5%	0%	0%		0.5%	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	0	-	-	-	-	-	0	-	-	-
Pedestrians%	-	-	-	-	33.3%	-	-	-	-	-	66.7%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-



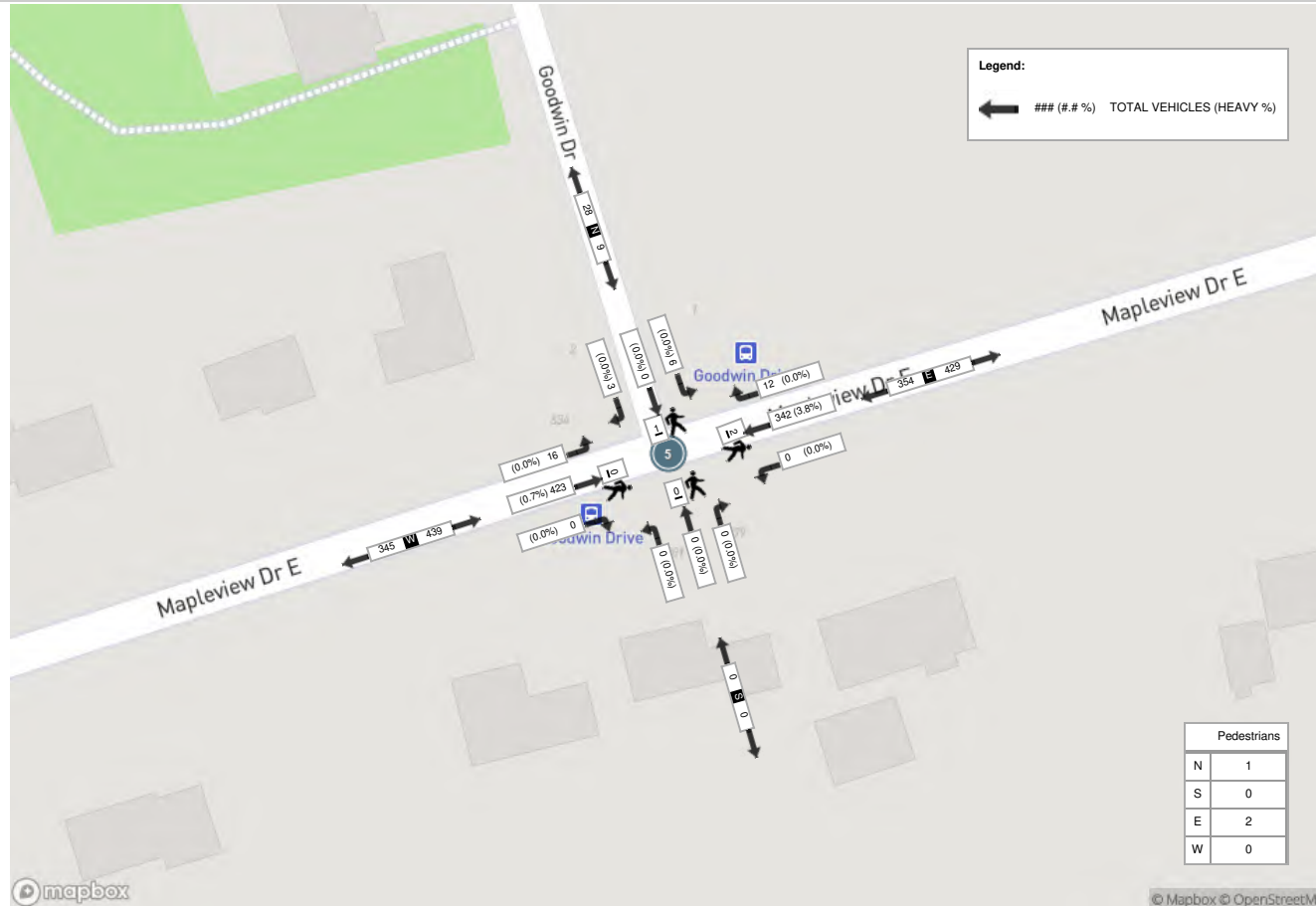
Turning Movement Count
Location Name: MAPLEVIEW DR E & GOODWIN DR
Date: Thu, Feb 10, 2022 Deployment Lead: Peter Ilias

BA Group
300 45 ST. CLAIR AVE W
TORONTO ONTARIO, M4V 1K9
CANADA

Peak Hour: 07:45 AM - 08:45 AM Weather: Overcast Clouds (-0.04 °C)



Peak Hour: 04:15 PM - 05:15 PM Weather: Overcast Clouds (0.34 °C)





Turning Movement Count (1 . MAPLEVIEW DR E & YONGE ST)

Start Time	N Approach YONGE ST						E Approach MAPLEVIEW DR						S Approach YONGE ST						W Approach MAPLEVIEW DR						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total			
07:30:00	10	67	13	0	0	90	18	63	17	0	0	98	6	69	9	0	0	84	9	46	6	0	0	61	333		
07:45:00	9	73	23	0	0	105	27	75	26	0	0	128	6	77	6	0	0	89	6	58	16	0	0	80	402		
08:00:00	5	76	20	0	0	101	29	69	18	0	0	116	8	72	4	0	0	84	8	52	9	0	0	69	370		
08:15:00	8	65	19	0	1	92	20	55	17	0	0	92	7	69	7	0	1	83	10	55	13	0	0	78	345	1450	
08:30:00	14	62	22	0	0	98	23	80	18	0	0	121	4	62	11	0	0	77	4	60	14	0	0	78	374	1491	
08:45:00	13	61	12	0	0	86	15	59	13	0	0	87	4	54	9	0	0	67	13	42	15	0	0	70	310	1399	
09:00:00	6	53	16	0	0	75	19	55	10	0	0	84	7	59	8	0	0	74	7	50	2	0	0	59	292	1321	
09:15:00	10	37	11	0	0	58	14	43	11	0	0	68	4	59	13	0	0	76	9	33	8	0	0	50	252	1228	
BREAK																											
16:00:00	8	74	22	0	0	104	10	62	21	0	0	93	17	96	22	0	0	135	11	75	9	0	0	95	427		
16:15:00	11	93	17	0	0	121	19	76	16	0	0	111	7	89	24	0	0	120	15	64	16	0	0	95	447		
16:30:00	14	102	20	0	0	136	31	53	9	0	0	93	12	85	22	0	0	119	9	82	9	0	0	100	448		
16:45:00	9	83	22	0	0	114	20	42	25	0	0	87	18	102	12	0	0	132	20	76	16	0	0	112	445	1767	
17:00:00	10	75	23	0	0	108	22	58	14	0	0	94	8	76	18	0	0	102	16	92	13	0	0	121	425	1765	
17:15:00	28	112	33	0	1	173	29	59	13	0	0	101	6	77	11	0	0	94	16	84	14	0	0	114	482	1800	
17:30:00	6	58	16	0	0	80	20	48	9	0	0	77	8	70	20	0	0	98	12	77	12	0	0	101	356	1708	
17:45:00	7	58	11	0	0	76	10	58	8	0	0	76	5	73	15	0	0	93	12	71	15	0	0	98	343	1606	
Grand Total	168	1149	300	0	2	1617	326	955	245	0	0	1526	127	1189	211	0	1	1527	177	1017	187	0	0	1381	6051	-	
Approach%	10.4%	71.1%	18.6%	0%	-	-	21.4%	62.6%	16.1%	0%	-	-	8.3%	77.9%	13.8%	0%	-	-	12.8%	73.6%	13.5%	0%	-	-	-	-	
Totals %	2.8%	19%	5%	0%	-	26.7%	5.4%	15.8%	4%	0%	-	25.2%	2.1%	19.6%	3.5%	0%	-	25.2%	2.9%	16.8%	3.1%	0%	-	22.8%	-	-	
Heavy	7	27	10	0	-	-	17	30	17	0	-	-	8	35	6	0	-	-	7	35	9	0	-	-	-	-	
Heavy %	4.2%	2.3%	3.3%	0%	-	-	5.2%	3.1%	6.9%	0%	-	-	6.3%	2.9%	2.8%	0%	-	-	4%	3.4%	4.8%	0%	-	-	-	-	
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Peak Hour: 07:45 AM - 08:45 AM Weather: Overcast Clouds (-0.04 °C)

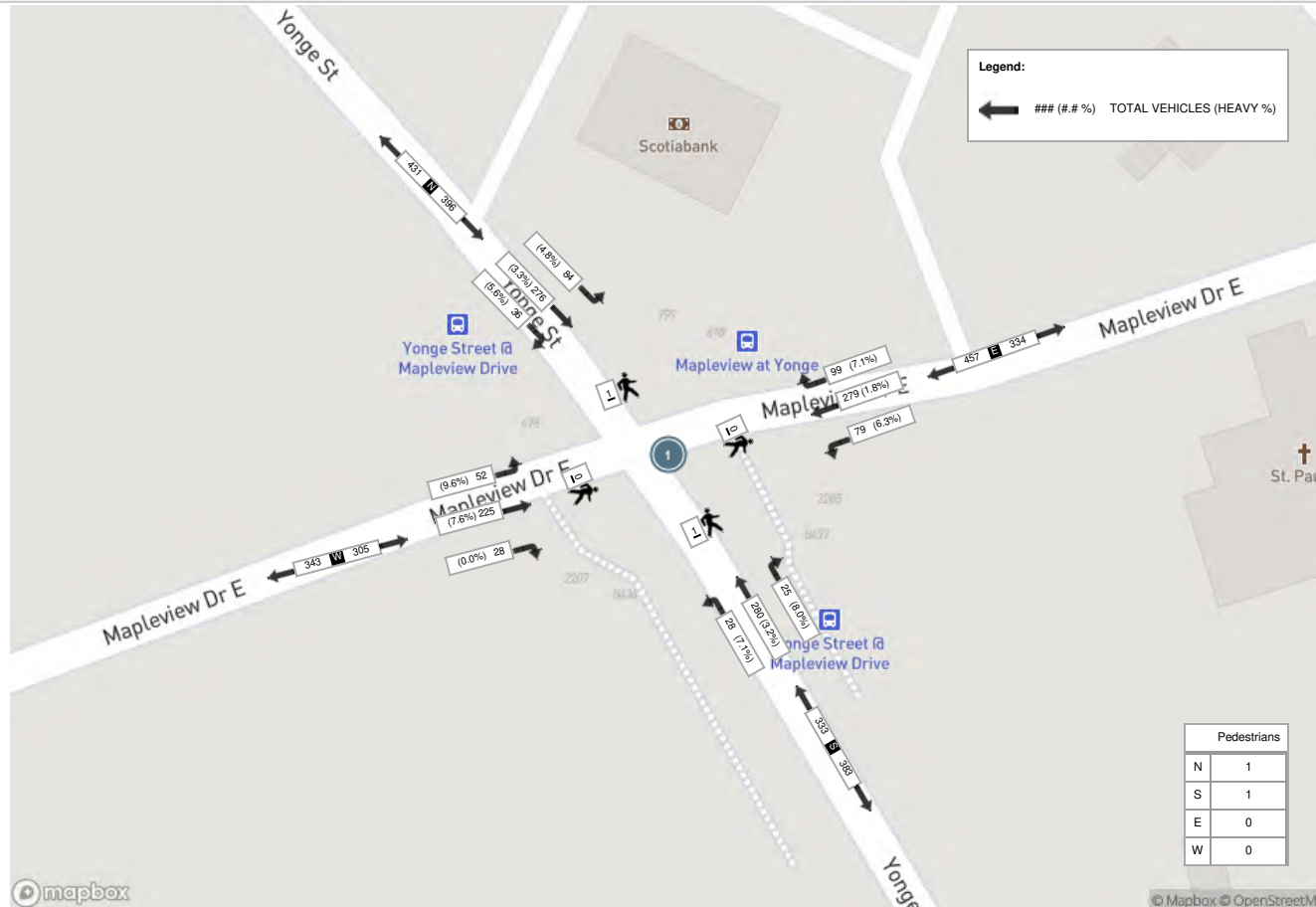
Start Time	N Approach YONGE ST						E Approach MAPLEVIEW DR						S Approach YONGE ST						W Approach MAPLEVIEW DR						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
07:45:00	9	73	23	0	0	105	27	75	26	0	0	128	6	77	6	0	0	89	6	58	16	0	0	80	402
08:00:00	5	76	20	0	0	101	29	69	18	0	0	116	8	72	4	0	0	84	8	52	9	0	0	69	370
08:15:00	8	65	19	0	1	92	20	55	17	0	0	92	7	69	7	0	1	83	10	55	13	0	0	78	345
08:30:00	14	62	22	0	0	98	23	80	18	0	0	121	4	62	11	0	0	77	4	60	14	0	0	78	374
Grand Total	36	276	84	0	1	396	99	279	79	0	0	457	25	280	28	0	1	333	28	225	52	0	0	305	1491
Approach%	9.1%	69.7%	21.2%	0%		-	21.7%	61.1%	17.3%	0%		-	7.5%	84.1%	8.4%	0%		-	9.2%	73.8%	17%	0%		-	-
Totals %	2.4%	18.5%	5.6%	0%		26.6%	6.6%	18.7%	5.3%	0%		30.7%	1.7%	18.8%	1.9%	0%		22.3%	1.9%	15.1%	3.5%	0%		20.5%	-
PHF	0.64	0.91	0.91	0		0.94	0.85	0.87	0.76	0		0.89	0.78	0.91	0.64	0		0.94	0.7	0.94	0.81	0		0.95	-
Heavy	2	9	4	0		15	7	5	5	0		17	2	9	2	0		13	0	17	5	0		22	-
Heavy %	5.6%	3.3%	4.8%	0%		3.8%	7.1%	1.8%	6.3%	0%		3.7%	8%	3.2%	7.1%	0%		3.9%	0%	7.6%	9.6%	0%		7.2%	-
Lights	34	267	80	0		381	92	274	74	0		440	23	271	26	0		320	28	208	47	0		283	-
Lights %	94.4%	96.7%	95.2%	0%		96.2%	92.9%	98.2%	93.7%	0%		96.3%	92%	96.8%	92.9%	0%		96.1%	100%	92.4%	90.4%	0%		92.8%	-
Single-Unit Trucks	2	6	0	0		8	2	3	5	0		10	2	4	1	0		7	0	13	2	0		15	-
Single-Unit Trucks %	5.6%	2.2%	0%	0%		2%	2%	1.1%	6.3%	0%		2.2%	8%	1.4%	3.6%	0%		2.1%	0%	5.8%	3.8%	0%		4.9%	-
Buses	0	3	4	0		7	5	1	0	0		6	0	2	0	0		2	0	1	0	0		1	-
Buses %	0%	1.1%	4.8%	0%		1.8%	5.1%	0.4%	0%	0%		1.3%	0%	0.7%	0%	0%		0.6%	0%	0.4%	0%	0%		0.3%	-
Articulated Trucks	0	0	0	0		0	0	1	0	0		1	0	3	1	0		4	0	3	3	0		6	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.4%	0%	0%		0.2%	0%	1.1%	3.6%	0%		1.2%	0%	1.3%	5.8%	0%		2%	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	50%	-	-	-	-	-	0%	-	-	-	-	-	50%	-	-	-	-	-	0%	-	-



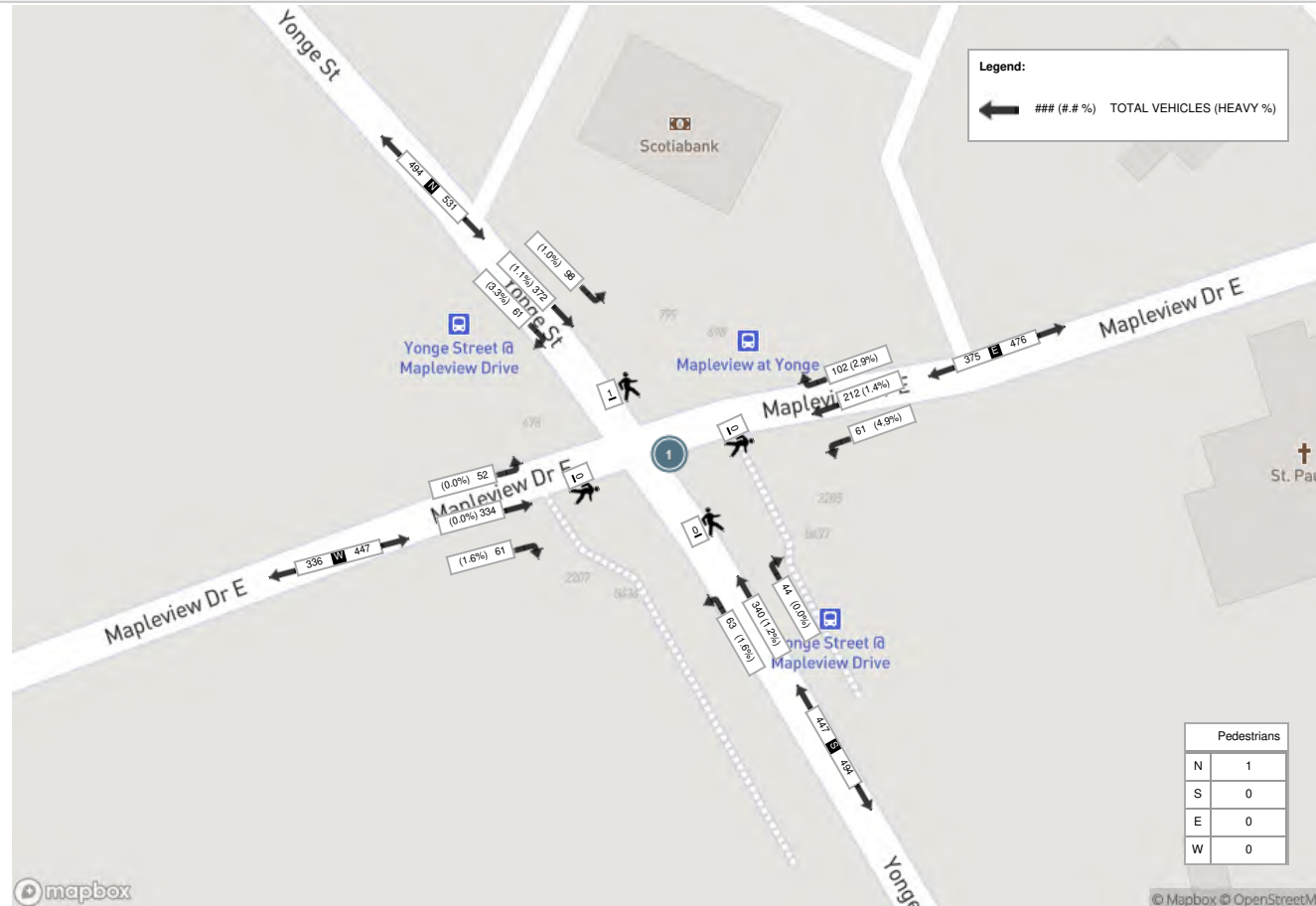
Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (0.34 °C)

Start Time	N Approach YONGE ST						E Approach MAPLEVIEW DR						S Approach YONGE ST						W Approach MAPLEVIEW DR						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:30:00	14	102	20	0	0	136	31	53	9	0	0	93	12	85	22	0	0	119	9	82	9	0	0	100	448
16:45:00	9	83	22	0	0	114	20	42	25	0	0	87	18	102	12	0	0	132	20	76	16	0	0	112	445
17:00:00	10	75	23	0	0	108	22	58	14	0	0	94	8	76	18	0	0	102	16	92	13	0	0	121	425
17:15:00	28	112	33	0	1	173	29	59	13	0	0	101	6	77	11	0	0	94	16	84	14	0	0	114	482
Grand Total	61	372	98	0	1	531	102	212	61	0	0	375	44	340	63	0	0	447	61	334	52	0	0	447	1800
Approach%	11.5%	70.1%	18.5%	0%		-	27.2%	56.5%	16.3%	0%		-	9.8%	76.1%	14.1%	0%		-	13.6%	74.7%	11.6%	0%		-	-
Totals %	3.4%	20.7%	5.4%	0%		29.5%	5.7%	11.8%	3.4%	0%		20.8%	2.4%	18.9%	3.5%	0%		24.8%	3.4%	18.6%	2.9%	0%		24.8%	-
PHF	0.54	0.83	0.74	0		0.77	0.82	0.9	0.61	0		0.93	0.61	0.83	0.72	0		0.85	0.76	0.91	0.81	0		0.92	-
Heavy	2	4	1	0		7	3	3	3	0		9	0	4	1	0		5	1	0	0	0		1	-
Heavy %	3.3%	1.1%	1%	0%		1.3%	2.9%	1.4%	4.9%	0%		2.4%	0%	1.2%	1.6%	0%		1.1%	1.6%	0%	0%	0%		0.2%	-
Lights	59	368	97	0		524	99	209	58	0		366	44	336	62	0		442	60	334	52	0		446	-
Lights %	96.7%	98.9%	99%	0%		98.7%	97.1%	98.6%	95.1%	0%		97.6%	100%	98.8%	98.4%	0%		98.9%	98.4%	100%	100%	0%		99.8%	-
Single-Unit Trucks	1	2	0	0		3	0	2	3	0		5	0	2	1	0		3	0	0	0	0		0	-
Single-Unit Trucks %	1.6%	0.5%	0%	0%		0.6%	0%	0.9%	4.9%	0%		1.3%	0%	0.6%	1.6%	0%		0.7%	0%	0%	0%	0%		0%	-
Buses	0	1	1	0		2	3	0	0	0		3	0	2	0	0		2	0	0	0	0		0	-
Buses %	0%	0.3%	1%	0%		0.4%	2.9%	0%	0%	0%		0.8%	0%	0.6%	0%	0%		0.4%	0%	0%	0%	0%		0%	-
Articulated Trucks	1	1	0	0		2	0	1	0	0		1	0	0	0	0		0	1	0	0	0		1	-
Articulated Trucks %	1.6%	0.3%	0%	0%		0.4%	0%	0.5%	0%	0%		0.3%	0%	0%	0%	0%		0%	1.6%	0%	0%	0%		0.2%	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	100%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-

Peak Hour: 07:45 AM - 08:45 AM Weather: Overcast Clouds (-0.04 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast Clouds (0.34 °C)





Turning Movement Count (1 . YONGE ST & COUNTRY LN)

Start Time	N Approach YONGE ST						E Approach TURNBERRY LN						S Approach YONGE ST						W Approach COUNTRY LN						Int. Total (15 min)	Int. Total (1 hr)
	Right N-W	Thru N-S	Left N-E	UTurn N-N	Peds N:	Approach Total	Right E-N	Thru E-W	Left E-S	UTurn E-E	Peds E:	Approach Total	Right S-E	Thru S-N	Left S-W	UTurn S-S	Peds S:	Approach Total	Right W-S	Thru W-E	Left W-N	UTurn W-W	Peds W:	Approach Total		
06:00:00	2	49	0	0	0	51	1	0	1	0	0	2	1	29	1	0	0	31	4	0	1	0	0	5	89	
06:15:00	0	77	0	0	0	77	0	0	2	0	1	2	0	36	4	0	0	40	12	0	0	0	1	12	131	
06:30:00	1	47	1	0	0	49	2	1	1	0	0	4	3	31	2	0	0	36	5	0	1	0	1	6	95	
06:45:00	0	85	2	0	0	87	1	1	1	0	1	3	2	61	2	0	0	65	15	1	3	0	1	19	174	489
07:00:00	2	100	1	0	0	103	3	1	3	0	1	7	3	60	4	0	0	67	12	0	2	0	3	14	191	591
07:15:00	1	58	1	0	0	60	1	1	1	0	0	3	7	62	6	0	1	75	8	1	2	0	0	11	149	609
07:30:00	1	104	3	0	0	108	3	2	3	0	0	8	1	111	2	0	0	114	13	0	9	0	2	22	252	766
07:45:00	5	154	5	0	0	164	1	1	4	0	1	6	3	156	6	0	1	165	11	0	3	0	2	14	349	941
08:00:00	4	108	1	0	0	113	2	2	3	0	3	7	5	89	10	0	0	104	12	1	5	0	0	18	242	992
08:15:00	2	101	0	0	0	103	2	1	2	0	0	5	2	108	7	0	0	117	9	1	7	0	3	17	242	1085
08:30:00	2	102	0	0	1	104	1	0	2	0	0	3	2	108	3	0	0	113	9	0	9	0	3	18	238	1071
08:45:00	10	87	1	0	0	98	1	1	2	0	0	4	6	79	8	0	0	93	6	0	8	0	3	14	209	931
BREAK																										
16:00:00	7	109	2	1	3	119	4	0	4	0	4	8	3	128	6	0	0	137	6	1	1	0	0	8	272	
16:15:00	9	118	0	0	3	127	5	0	2	0	3	7	5	149	10	0	0	164	5	0	3	0	4	8	306	
16:30:00	13	116	0	0	0	129	1	0	1	0	0	2	8	163	6	0	3	177	6	0	4	0	2	10	318	
16:45:00	13	126	0	0	0	139	5	0	4	0	0	9	4	157	4	0	0	165	9	3	9	0	1	21	334	1230
17:00:00	6	113	1	0	0	120	3	2	3	0	0	8	4	177	5	0	0	186	6	0	5	0	3	11	325	1283
17:15:00	4	163	2	0	0	169	1	0	0	0	4	1	2	126	5	0	0	133	5	1	1	0	3	7	310	1287
17:30:00	8	133	1	0	1	142	1	0	5	0	3	6	3	159	13	0	1	175	5	0	4	0	1	9	332	1301
17:45:00	3	112	2	0	0	117	1	0	1	0	0	2	3	92	9	0	0	104	5	1	4	0	2	10	233	1200
18:00:00	8	105	0	0	0	113	1	1	4	0	2	6	2	144	8	0	2	154	8	2	2	0	0	12	285	1160
18:15:00	8	97	1	0	1	106	2	1	2	0	0	5	4	118	12	0	0	134	5	0	1	0	3	6	251	1101
18:30:00	4	100	1	0	1	105	0	0	1	0	1	1	1	136	9	0	0	146	6	3	7	0	2	16	268	1037
18:45:00	9	81	1	0	0	91	3	2	2	0	2	7	0	130	11	0	0	141	4	0	4	0	3	8	247	1051
Grand Total	122	2445	26	1	10	2594	45	17	54	0	26	116	74	2609	153	0	8	2836	186	15	95	0	43	296	5842	-
Approach%	4.7%	94.3%	1%	0%		-	38.8%	14.7%	46.6%	0%		-	2.6%	92%	5.4%	0%		-	62.8%	5.1%	32.1%	0%		-	-	-
Totals %	2.1%	41.9%	0.4%	0%		44.4%	0.8%	0.3%	0.9%	0%		2%	1.3%	44.7%	2.6%	0%		48.5%	3.2%	0.3%	1.6%	0%		5.1%	-	-
Heavy	5	56	0	0		-	1	0	6	0		-	6	69	25	0		-	22	1	1	0		-	-	-
Heavy %	4.1%	2.3%	0%	0%		-	2.2%	0%	11.1%	0%		-	8.1%	2.6%	16.3%	0%		-	11.8%	6.7%	1.1%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-



Peak Hour: 07:30 AM - 08:30 AM Weather: Broken Clouds (7.34 °C)

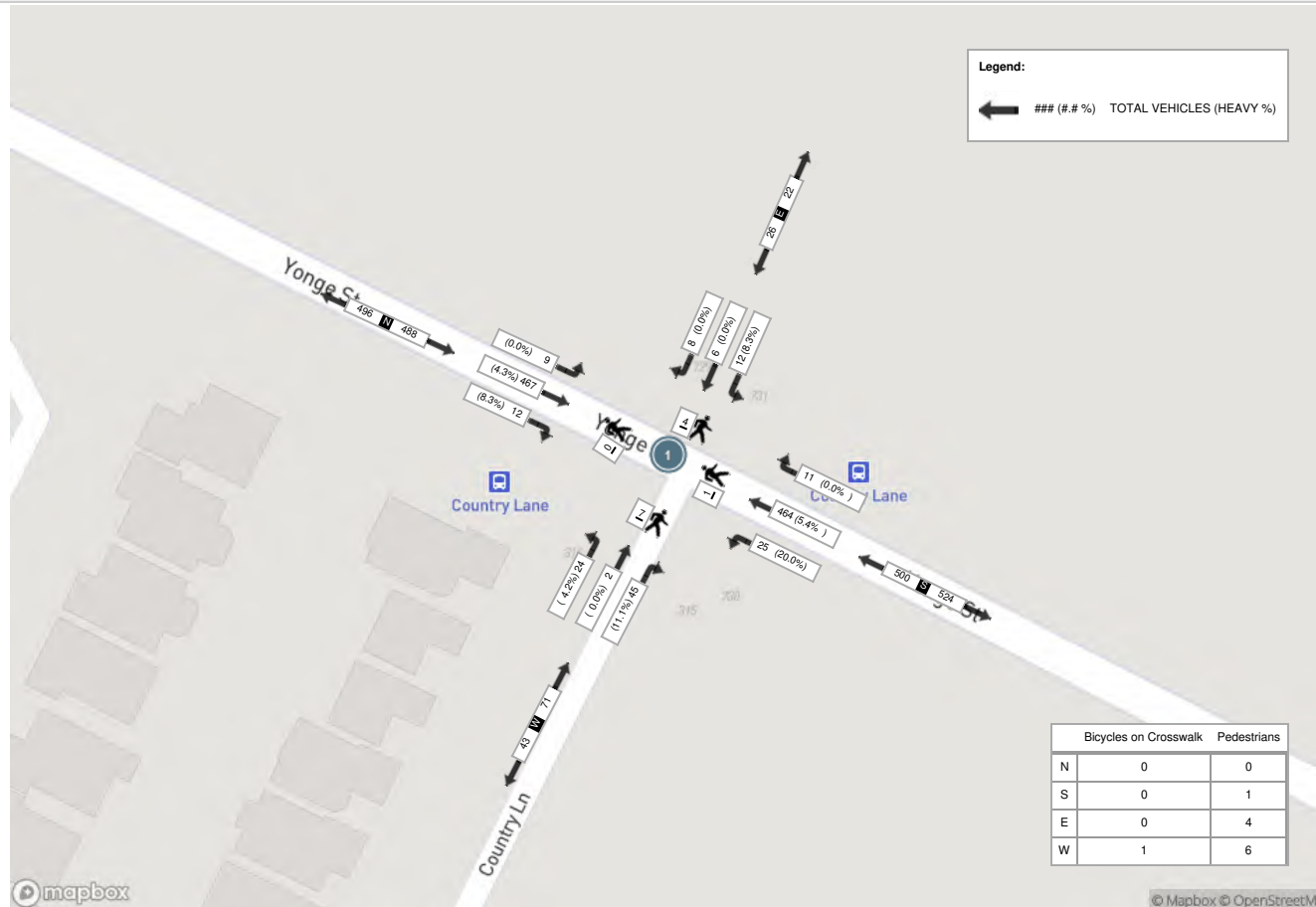
Start Time	N Approach YONGE ST						E Approach TURNBERRY LN						S Approach YONGE ST						W Approach COUNTRY LN						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
07:30:00	1	104	3	0	0	108	3	2	3	0	0	8	1	111	2	0	0	114	13	0	9	0	2	22	252
07:45:00	5	154	5	0	0	164	1	1	4	0	1	6	3	156	6	0	1	165	11	0	3	0	2	14	349
08:00:00	4	108	1	0	0	113	2	2	3	0	3	7	5	89	10	0	0	104	12	1	5	0	0	18	242
08:15:00	2	101	0	0	0	103	2	1	2	0	0	5	2	108	7	0	0	117	9	1	7	0	3	17	242
Grand Total	12	467	9	0	0	488	8	6	12	0	4	26	11	464	25	0	1	500	45	2	24	0	7	71	1085
Approach%	2.5%	95.7%	1.8%	0%		-	30.8%	23.1%	46.2%	0%		-	2.2%	92.8%	5%	0%		-	63.4%	2.8%	33.8%	0%		-	-
Totals %	1.1%	43%	0.8%	0%		45%	0.7%	0.6%	1.1%	0%		2.4%	1%	42.8%	2.3%	0%		46.1%	4.1%	0.2%	2.2%	0%		6.5%	-
PHF	0.6	0.76	0.45	0		0.74	0.67	0.75	0.75	0		0.81	0.55	0.74	0.63	0		0.76	0.87	0.5	0.67	0		0.81	-
Heavy	1	20	0	0		21	0	0	1	0		1	0	25	5	0		30	5	0	1	0		6	-
Heavy %	8.3%	4.3%	0%	0%		4.3%	0%	0%	8.3%	0%		3.8%	0%	5.4%	20%	0%		6%	11.1%	0%	4.2%	0%		8.5%	-
Lights	11	447	9	0		467	8	6	11	0		25	11	438	20	0		469	40	2	23	0		65	-
Lights %	91.7%	95.7%	100%	0%		95.7%	100%	100%	91.7%	0%		96.2%	100%	94.4%	80%	0%		93.8%	88.9%	100%	95.8%	0%		91.5%	-
Single-Unit Trucks	1	2	0	0		3	0	0	1	0		1	0	5	0	0		5	0	0	1	0		1	-
Single-Unit Trucks %	8.3%	0.4%	0%	0%		0.6%	0%	0%	8.3%	0%		3.8%	0%	1.1%	0%	0%		1%	0%	0%	4.2%	0%		1.4%	-
Buses	0	17	0	0		17	0	0	0	0		0	0	17	5	0		22	5	0	0	0		5	-
Buses %	0%	3.6%	0%	0%		3.5%	0%	0%	0%	0%		0%	0%	3.7%	20%	0%		4.4%	11.1%	0%	0%	0%		7%	-
Articulated Trucks	0	1	0	0		1	0	0	0	0		0	0	3	0	0		3	0	0	0	0		0	-
Articulated Trucks %	0%	0.2%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	0.6%	0%	0%		0.6%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.2%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	4	-	-	-	-	-	1	-	-	-	-	-	6	-	-
Pedestrians%	-	-	-	-	0%	-	-	-	-	-	33.3%	-	-	-	-	-	8.3%	-	-	-	-	-	50%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	8.3%	-	-



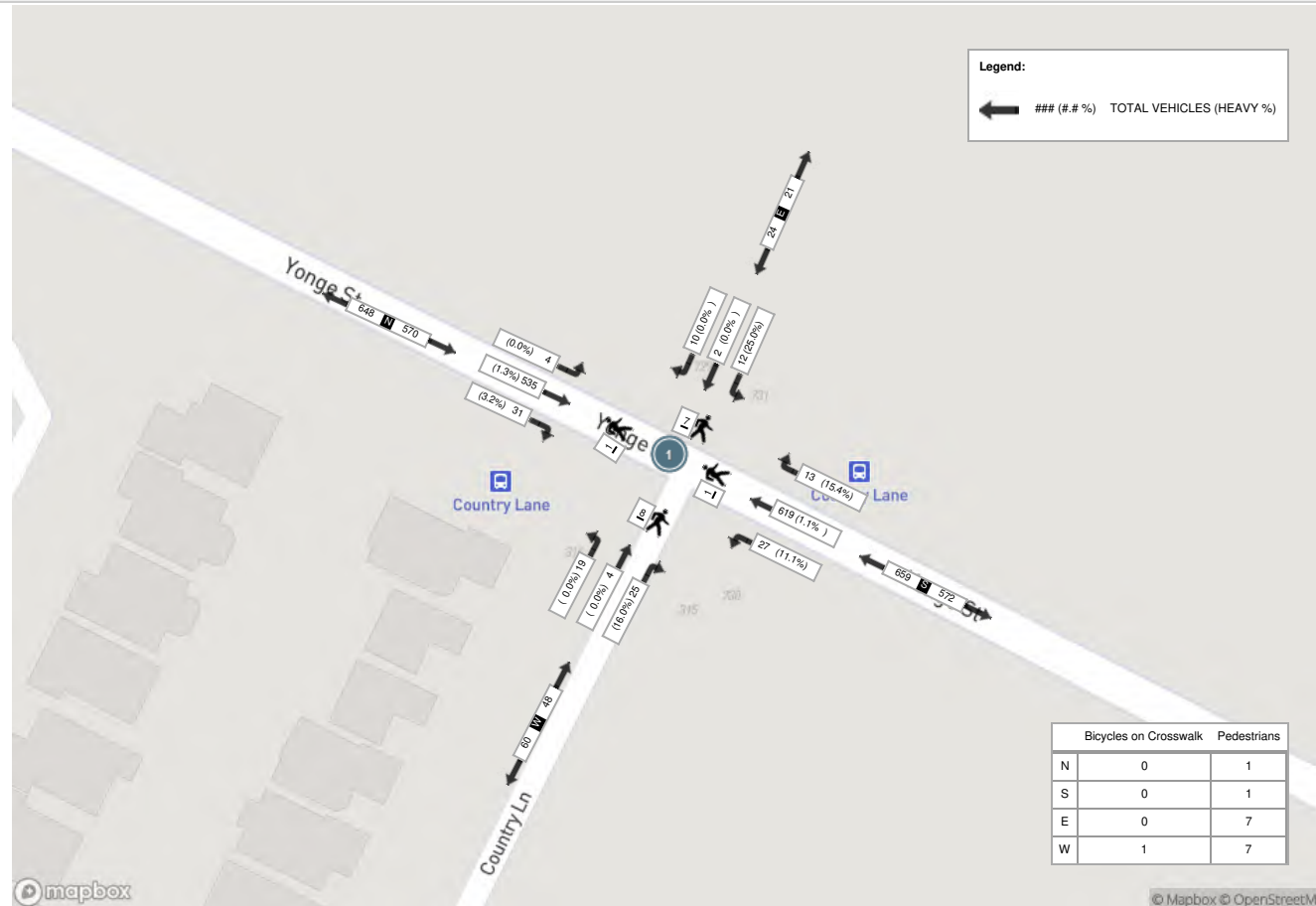
Peak Hour: 04:45 PM - 05:45 PM Weather: Clear Sky (14.83 °C)

Start Time	N Approach YONGE ST						E Approach TURNBERRY LN						S Approach YONGE ST						W Approach COUNTRY LN						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:45:00	13	126	0	0	0	139	5	0	4	0	0	9	4	157	4	0	0	165	9	3	9	0	1	21	334
17:00:00	6	113	1	0	0	120	3	2	3	0	0	8	4	177	5	0	0	186	6	0	5	0	3	11	325
17:15:00	4	163	2	0	0	169	1	0	0	0	4	1	2	126	5	0	0	133	5	1	1	0	3	7	310
17:30:00	8	133	1	0	1	142	1	0	5	0	3	6	3	159	13	0	1	175	5	0	4	0	1	9	332
Grand Total	31	535	4	0	1	570	10	2	12	0	7	24	13	619	27	0	1	659	25	4	19	0	8	48	1301
Approach%	5.4%	93.9%	0.7%	0%		-	41.7%	8.3%	50%	0%		-	2%	93.9%	4.1%	0%		-	52.1%	8.3%	39.6%	0%		-	-
Totals %	2.4%	41.1%	0.3%	0%		43.8%	0.8%	0.2%	0.9%	0%		1.8%	1%	47.6%	2.1%	0%		50.7%	1.9%	0.3%	1.5%	0%		3.7%	-
PHF	0.6	0.82	0.5	0		0.84	0.5	0.25	0.6	0		0.67	0.81	0.87	0.52	0		0.89	0.69	0.33	0.53	0		0.57	-
Heavy	1	7	0	0		8	0	0	3	0		3	2	7	3	0		12	4	0	0	0		4	-
Heavy %	3.2%	1.3%	0%	0%		1.4%	0%	0%	25%	0%		12.5%	15.4%	1.1%	11.1%	0%		1.8%	16%	0%	0%	0%		8.3%	-
Lights	30	528	4	0		562	10	2	9	0		21	11	612	24	0		647	20	4	19	0		43	-
Lights %	96.8%	98.7%	100%	0%		98.6%	100%	100%	75%	0%		87.5%	84.6%	98.9%	88.9%	0%		98.2%	80%	100%	100%	0%		89.6%	-
Single-Unit Trucks	0	5	0	0		5	0	0	3	0		3	2	3	0	0		5	0	0	0	0		0	-
Single-Unit Trucks %	0%	0.9%	0%	0%		0.9%	0%	0%	25%	0%		12.5%	15.4%	0.5%	0%	0%		0.8%	0%	0%	0%	0%		0%	-
Buses	1	2	0	0		3	0	0	0	0		0	0	4	3	0		7	4	0	0	0		4	-
Buses %	3.2%	0.4%	0%	0%		0.5%	0%	0%	0%	0%		0%	0%	0.6%	11.1%	0%		1.1%	16%	0%	0%	0%		8.3%	-
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	1	0	0	0		1	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	4%	0%	0%	0%		2.1%	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	7	-	-	-	-	-	1	-	-	-	-	-	7	-	-
Pedestrians%	-	-	-	-	5.9%	-	-	-	-	-	41.2%	-	-	-	-	-	5.9%	-	-	-	-	-	41.2%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	5.9%	-	-

Peak Hour: 07:30 AM - 08:30 AM Weather: Broken Clouds (7.34 °C)



Peak Hour: 04:45 PM - 05:45 PM Weather: Clear Sky (14.83 °C)





Turning Movement Count (2 . YONGE ST & BARRIE SOUTH GO ACCESS)

Start Time	N Approach YONGE ST					E Approach BARRIE SOUTH GO ACCESS					S Approach YONGE ST					Int. Total (15 min)	Int. Total (1 hr)
	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	UTurn S:S	Peds S:	Approach Total		
05:00:00	29	6	0	0	35	1	4	0	0	5	5	14	0	0	19	59	
05:15:00	34	17	0	0	51	5	2	0	0	7	16	7	0	0	23	81	
05:30:00	38	2	0	1	40	0	3	0	1	3	5	12	0	0	17	60	
05:45:00	38	17	0	0	55	5	5	0	0	10	17	24	0	1	41	106	306
06:00:00	51	2	0	0	53	1	5	0	0	6	11	31	0	1	42	101	348
06:15:00	65	28	0	1	93	8	7	0	0	15	31	30	0	3	61	169	436
06:30:00	47	3	0	0	50	4	5	0	0	9	3	32	0	0	35	94	470
06:45:00	88	16	0	0	104	10	3	0	1	13	22	58	0	1	80	197	561
07:00:00	87	24	0	0	111	11	23	0	2	34	55	57	0	3	112	257	717
07:15:00	71	3	0	0	74	11	14	0	0	25	5	64	0	0	69	168	716
07:30:00	110	5	0	1	115	3	6	0	2	9	5	111	0	0	116	240	862
07:45:00	158	4	0	0	162	5	6	0	2	11	8	163	0	0	171	344	1009
08:00:00	121	13	0	0	134	10	7	0	0	17	20	94	0	0	114	265	1017
08:15:00	106	3	0	0	109	9	9	0	1	18	5	103	0	0	108	235	1084
08:30:00	116	3	0	0	119	1	4	0	1	5	4	114	0	1	118	242	1086
08:45:00	86	8	0	1	94	6	2	0	0	8	9	93	0	0	102	204	946
BREAK																	
16:00:00	114	3	0	0	117	1	2	0	3	3	1	142	0	1	143	263	
16:15:00	112	5	0	0	117	4	5	0	3	9	6	164	0	2	170	296	
16:30:00	124	3	0	1	127	4	4	0	1	8	3	162	0	2	165	300	
16:45:00	132	3	0	1	135	5	5	0	0	10	13	168	0	0	181	326	1185
17:00:00	116	5	0	0	121	10	7	0	2	17	9	168	0	0	177	315	1237
17:15:00	152	15	0	2	167	17	22	0	2	39	21	129	0	0	150	356	1297
17:30:00	139	6	0	0	145	29	34	0	0	63	14	133	0	1	147	355	1352
17:45:00	114	5	0	0	119	9	4	0	0	13	7	106	0	0	113	245	1271
18:00:00	108	8	0	0	116	1	4	0	0	5	16	143	0	2	159	280	1236
18:15:00	100	3	0	0	103	31	33	0	0	64	6	114	0	1	120	287	1167
18:30:00	95	5	0	3	100	5	7	0	1	12	7	130	0	0	137	249	1061
18:45:00	89	5	0	0	94	32	27	0	1	59	6	112	0	1	118	271	1087
19:00:00	85	3	0	0	88	1	2	0	3	3	2	109	0	0	111	202	1009
19:15:00	94	9	0	0	103	10	9	0	3	19	14	75	0	2	89	211	933
19:30:00	73	5	0	0	78	22	28	0	0	50	5	74	0	0	79	207	891
19:45:00	66	4	0	1	70	4	11	0	2	15	4	65	0	0	69	154	774



Grand Total	2958	241	0	12	3199	275	309	0	31	584	355	3001	0	22	3356	7139	-
Approach%	92.5%	7.5%	0%		-	47.1%	52.9%	0%		-	10.6%	89.4%	0%		-	-	-
Totals %	41.4%	3.4%	0%		44.8%	3.9%	4.3%	0%		8.2%	5%	42%	0%		47%	-	-
Heavy	49	48	0		-	46	22	0		-	19	68	0		-	-	-
Heavy %	1.7%	19.9%	0%		-	16.7%	7.1%	0%		-	5.4%	2.3%	0%		-	-	-
Bicycles	-	-	-		-	-	-	-		-	-	-	-		-	-	-
Bicycle %	-	-	-		-	-	-	-		-	-	-	-		-	-	-



Peak Hour: 07:45 AM - 08:45 AM Weather: Broken Clouds (7.62 °C)

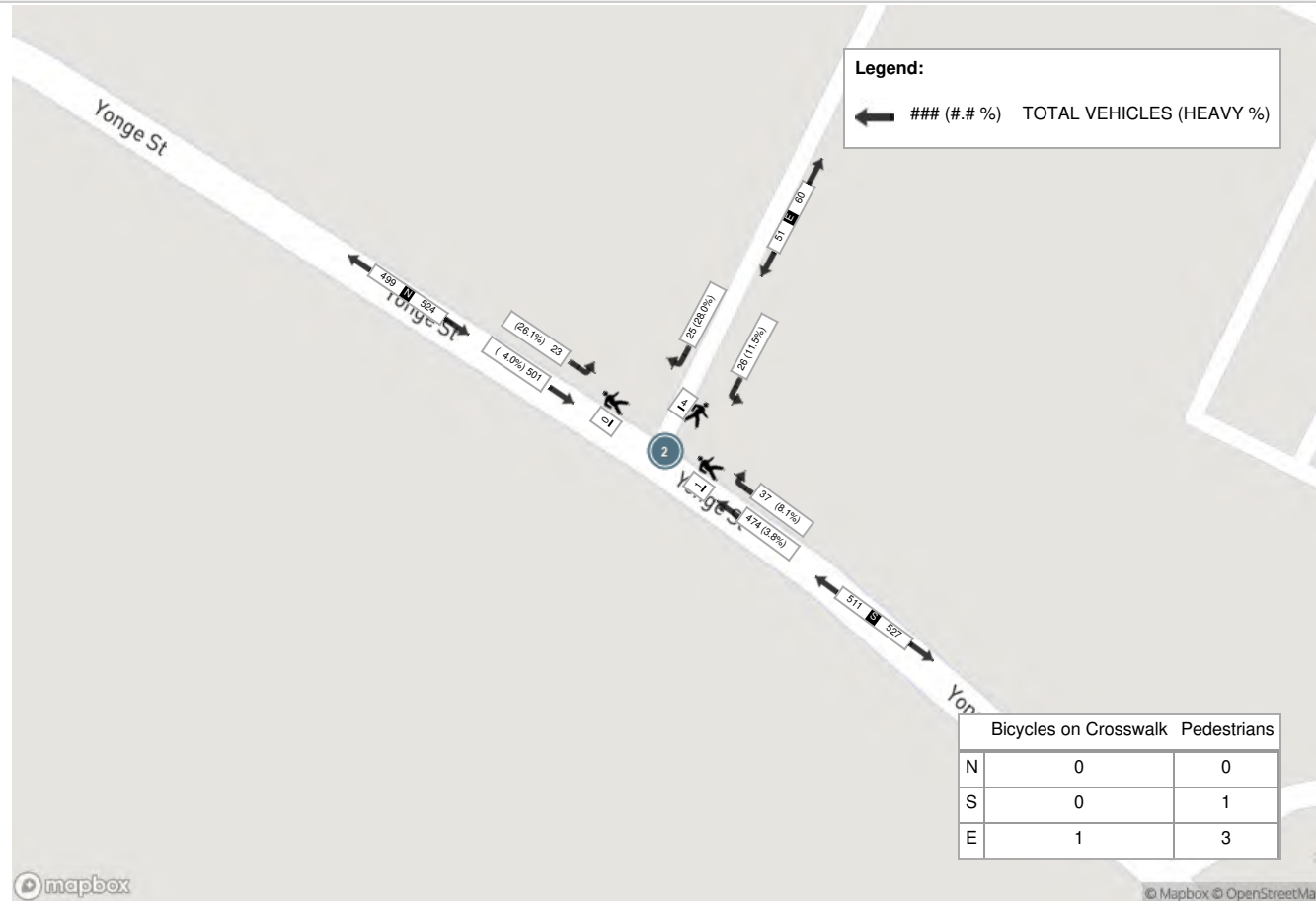
Start Time	N Approach YONGE ST					E Approach BARRIE SOUTH GO ACCESS					S Approach YONGE ST					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	
07:45:00	158	4	0	0	162	5	6	0	2	11	8	163	0	0	171	344
08:00:00	121	13	0	0	134	10	7	0	0	17	20	94	0	0	114	265
08:15:00	106	3	0	0	109	9	9	0	1	18	5	103	0	0	108	235
08:30:00	116	3	0	0	119	1	4	0	1	5	4	114	0	1	118	242
Grand Total	501	23	0	0	524	25	26	0	4	51	37	474	0	1	511	1086
Approach%	95.6%	4.4%	0%		-	49%	51%	0%		-	7.2%	92.8%	0%		-	-
Totals %	46.1%	2.1%	0%		48.3%	2.3%	2.4%	0%		4.7%	3.4%	43.6%	0%		47.1%	-
PHF	0.79	0.44	0		0.81	0.63	0.72	0		0.71	0.46	0.73	0		0.75	-
Heavy	20	6	0		26	7	3	0		10	3	18	0		21	-
Heavy %	4%	26.1%	0%		5%	28%	11.5%	0%		19.6%	8.1%	3.8%	0%		4.1%	-
Lights	481	17	0		498	18	23	0		41	34	456	0		490	-
Lights %	96%	73.9%	0%		95%	72%	88.5%	0%		80.4%	91.9%	96.2%	0%		95.9%	-
Single-Unit Trucks	8	0	0		8	0	0	0		0	0	8	0		8	-
Single-Unit Trucks %	1.6%	0%	0%		1.5%	0%	0%	0%		0%	0%	1.7%	0%		1.6%	-
Buses	11	6	0		17	7	3	0		10	3	8	0		11	-
Buses %	2.2%	26.1%	0%		3.2%	28%	11.5%	0%		19.6%	8.1%	1.7%	0%		2.2%	-
Articulated Trucks	1	0	0		1	0	0	0		0	0	2	0		2	-
Articulated Trucks %	0.2%	0%	0%		0.2%	0%	0%	0%		0%	0%	0.4%	0%		0.4%	-
Bicycles on Road	0	0	0		0	0	0	0		0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	0	-	-	-	-	3	-	-	-	-	1	-	-
Pedestrians%	-	-	-	0%	-	-	-	-	60%	-	-	-	-	20%	-	-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	0%	-	-	-	-	20%	-	-	-	-	0%	-	-



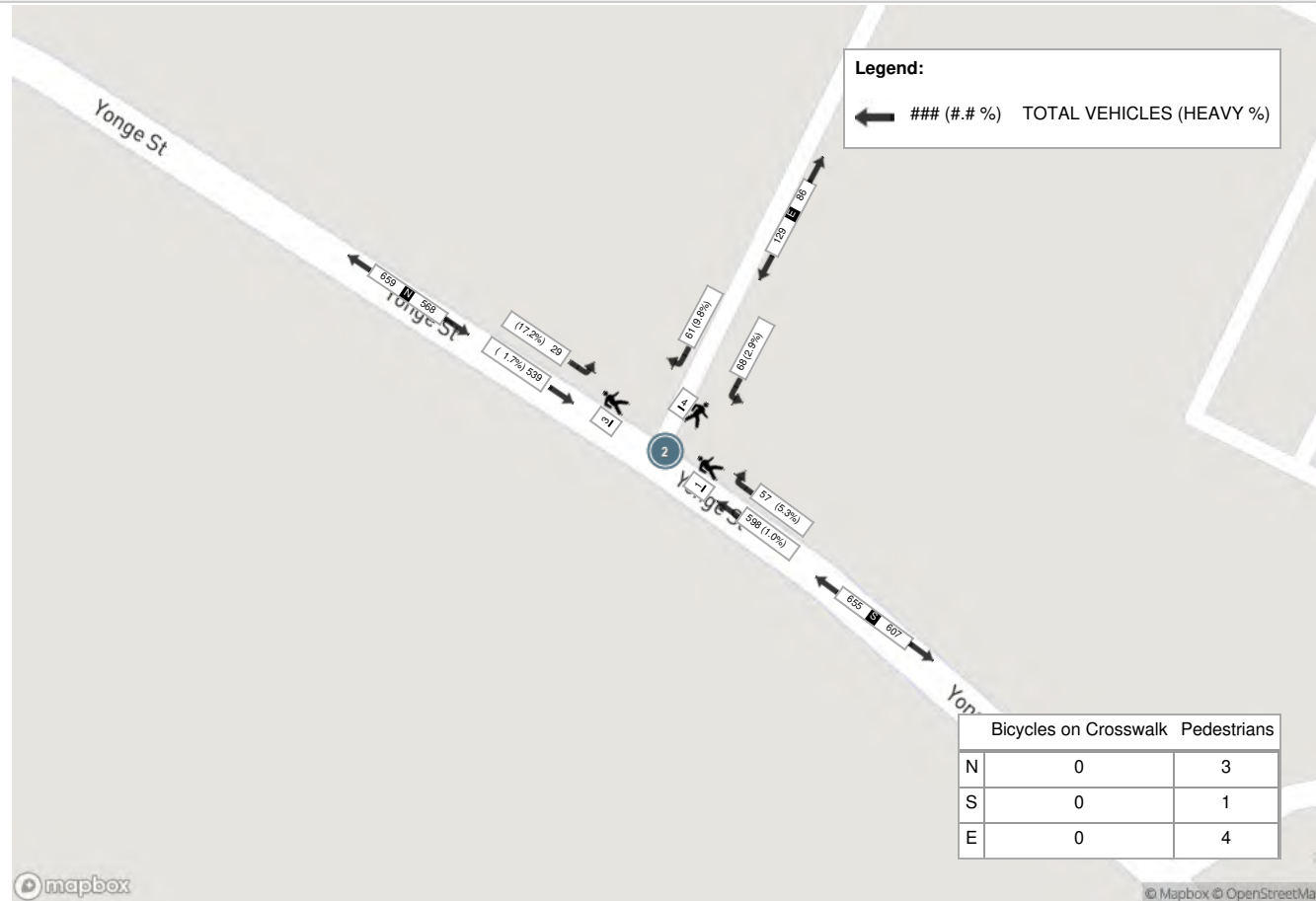
Peak Hour: 04:45 PM - 05:45 PM Weather: Clear Sky (14.83 °C)

Start Time	N Approach YONGE ST					E Approach BARRIE SOUTH GO ACCESS					S Approach YONGE ST					Int. Total (15 min)
	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	
16:45:00	132	3	0	1	135	5	5	0	0	10	13	168	0	0	181	326
17:00:00	116	5	0	0	121	10	7	0	2	17	9	168	0	0	177	315
17:15:00	152	15	0	2	167	17	22	0	2	39	21	129	0	0	150	356
17:30:00	139	6	0	0	145	29	34	0	0	63	14	133	0	1	147	355
Grand Total	539	29	0	3	568	61	68	0	4	129	57	598	0	1	655	1352
Approach%	94.9%	5.1%	0%		-	47.3%	52.7%	0%		-	8.7%	91.3%	0%		-	-
Totals %	39.9%	2.1%	0%		42%	4.5%	5%	0%		9.5%	4.2%	44.2%	0%		48.4%	-
PHF	0.89	0.48	0		0.85	0.53	0.5	0		0.51	0.68	0.89	0		0.9	-
Heavy	9	5	0		14	6	2	0		8	3	6	0		9	-
Heavy %	1.7%	17.2%	0%		2.5%	9.8%	2.9%	0%		6.2%	5.3%	1%	0%		1.4%	-
Lights	529	24	0		553	55	66	0		121	54	592	0		646	-
Lights %	98.1%	82.8%	0%		97.4%	90.2%	97.1%	0%		93.8%	94.7%	99%	0%		98.6%	-
Single-Unit Trucks	7	0	0		7	0	0	0		0	0	5	0		5	-
Single-Unit Trucks %	1.3%	0%	0%		1.2%	0%	0%	0%		0%	0%	0.8%	0%		0.8%	-
Buses	1	5	0		6	6	2	0		8	3	1	0		4	-
Buses %	0.2%	17.2%	0%		1.1%	9.8%	2.9%	0%		6.2%	5.3%	0.2%	0%		0.6%	-
Articulated Trucks	1	0	0		1	0	0	0		0	0	0	0		0	-
Articulated Trucks %	0.2%	0%	0%		0.2%	0%	0%	0%		0%	0%	0%	0%		0%	-
Bicycles on Road	1	0	0		1	0	0	0		0	0	0	0		0	-
Bicycles on Road %	0.2%	0%	0%		0.2%	0%	0%	0%		0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	3	-	-	-	-	4	-	-	-	-	1	-	-
Pedestrians%	-	-	-	37.5%	-	-	-	-	50%	-	-	-	-	12.5%	-	-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-

Peak Hour: 07:45 AM - 08:45 AM Weather: Broken Clouds (7.62 °C)



Peak Hour: 04:45 PM - 05:45 PM Weather: Clear Sky (14.83 °C)



Appendix C: Level of Service Definitions

CAPACITY ANALYSIS AT SIGNALIZED INTERSECTIONS

Highway Capacity Manual Methodology

The capacity of signalized intersections has been determined on the basis of control delay for each signalized lane group. The method of analysis is taken from the Highway Capacity Manual, Special Report 209, by the Transportation Research Board.

To assist in clarifying the arithmetic analysis associated with traffic engineering, it is often useful to refer to “Level of Service”. Level of Service (LOS) for signalized intersections is defined in terms of delay, which is made up of a number of factors that relate to control, geometrics, traffic, and incidents. Only the portion of total delay attributed to the control facility is quantified. This control delay includes initial deceleration, queue move-up time, stopped delay, and final acceleration delay. The following table describes in detail the characteristics of each level:

Level of Service	Expected Delay to Street Traffic	Average Control Delay ‘d’ (sec/veh)
A	Describes operations with very low control delay, up to 10 seconds/vehicle. This level of service occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all at this LOS. Short cycle lengths may also contribute to low delay.	$d \leq 10$
B	Describes operations with control delay greater than 10 seconds and up to 20 seconds/vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop at this level than at LOS A, causing longer average delays.	$10 \leq d \leq 20$
C	Describes operations with control delay greater than 20 seconds and up to 35 seconds/vehicle. These higher delays may result from fair progression, longer cycle length, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.	$20 \leq d \leq 35$
D	Describes operations with control delay greater than 35 seconds and up to 55 seconds/vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavourable progression, long cycle lengths, or high volume to capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures become noticeable.	$35 \leq d \leq 55$
E	Describes operations with control delay greater than 55 seconds and up to 80 seconds/vehicle. This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.	$55 \leq d \leq 80$
F	LOS F describes operations with control delay in excess of 80 seconds/vehicle. This oversaturation, considered to be unacceptable to most drivers, occurs when arrival flow rates exceed the design capacity of the intersection. It may also occur at high v/c ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors to such high delay levels.	$d > 80$

CAPACITY ANALYSIS AT UNSIGNALIZED INTERSECTIONS

Highway Capacity Manual Methodology

The level of service at an unsignalized intersection is determined on the basis of control delay for each critical lane. This method of analysis is taken from the Highway Capacity Manual, Special Report 209, by the Transportation Research Board.

The average control delay for any particular critical movement (control delay includes initial deceleration, queue move-up time, stopped delay, and final acceleration delay) is a function of the service rate or capacity of the approach and degree of saturation. The level of service criteria for unsignalized intersections is outlined below and is related to ranges in vehicle delay.

Level of Service	Expected Delay to Street Traffic	Average Control Delay 'd' (sec/veh)
A	Little or no delays	$d \leq 10$
B	Short traffic delays	$10 \leq d \leq 15$
C	Average traffic delays	$15 \leq d \leq 25$
D	Long traffic delays	$25 \leq d \leq 35$
E	Very long traffic delays	$35 \leq d \leq 50$
F	Extreme delays with queuing which may cause congestion affecting other traffic movements in the intersection	$d > 50$

Appendix D: Existing Operations

HCM Signalized Intersection Capacity Analysis

1: Yonge St & Country Ln/Turnberry Ln

2024 Existing Conditions
Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	5	45	33	11	26	25	530	17	13	550	12
Future Volume (vph)	24	5	45	33	11	26	25	530	17	13	550	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.86		1.00	0.89		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1739	1476		1680	1665		1519	3460		1788	3494	
Flt Permitted	0.73	1.00		0.72	1.00		0.36	1.00		0.38	1.00	
Satd. Flow (perm)	1330	1476		1265	1665		573	3460		720	3494	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	31	6	58	42	14	33	32	679	22	17	705	15
RTOR Reduction (vph)	0	51	0	0	29	0	0	1	0	0	1	0
Lane Group Flow (vph)	31	13	0	42	18	0	32	700	0	17	719	0
Confl. Peds. (#/hr)	7		8	5		4	8		5	4		7
Heavy Vehicles (%)	4%	2%	11%	8%	2%	2%	20%	5%	2%	2%	4%	8%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	11.6	11.6		11.6	11.6		76.2	72.2		73.6	70.9	
Effective Green, g (s)	11.6	11.6		11.6	11.6		76.2	72.2		73.6	70.9	
Actuated g/C Ratio	0.11	0.11		0.11	0.11		0.74	0.70		0.72	0.69	
Clearance Time (s)	6.0	6.0		6.0	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	
Lane Grp Cap (vph)	150	167		143	188		462	2437		545	2416	
v/s Ratio Prot		0.01			0.01		c0.00	0.20		0.00	c0.21	
v/s Ratio Perm	0.02			c0.03			0.05			0.02		
v/c Ratio	0.21	0.08		0.29	0.09		0.07	0.29		0.03	0.30	
Uniform Delay, d1	41.3	40.7		41.7	40.7		3.5	5.6		4.1	6.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.2		1.1	0.2		0.1	0.3		0.0	0.3	
Delay (s)	42.0	40.8		42.8	41.0		3.6	5.9		4.1	6.4	
Level of Service	D	D		D	D		A	A		A	A	
Approach Delay (s)		41.2			41.8			5.8			6.4	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay	10.0			HCM 2000 Level of Service			B					
HCM 2000 Volume to Capacity ratio	0.29											
Actuated Cycle Length (s)	102.5			Sum of lost time (s)			16.0					
Intersection Capacity Utilization	53.2%			ICU Level of Service			A					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Yonge St & GO Access

2024 Existing Conditions
Weekday AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	26	25	545	37	23	612
Future Volume (vph)	26	25	545	37	23	612
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		4.0	6.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.95
Frpb, ped/bikes	1.00	0.98	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3161	1252	3461		1447	3510
Flt Permitted	0.95	1.00	1.00		0.35	1.00
Satd. Flow (perm)	3161	1252	3461		530	3510
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	33	32	690	47	29	775
RTOR Reduction (vph)	0	30	3	0	0	0
Lane Group Flow (vph)	33	2	734	0	29	775
Confl. Peds. (#/hr)	5	4		5	4	
Heavy Vehicles (%)	12%	28%	4%	8%	26%	4%
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Actuated Green, G (s)	8.0	8.0	85.5		93.8	93.8
Effective Green, g (s)	8.0	8.0	85.5		93.8	93.8
Actuated g/C Ratio	0.07	0.07	0.75		0.82	0.82
Clearance Time (s)	6.0	6.0	6.0		4.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	222	88	2600		471	2893
v/s Ratio Prot	c0.01		c0.21		0.00	c0.22
v/s Ratio Perm		0.00			0.05	
v/c Ratio	0.15	0.03	0.28		0.06	0.27
Uniform Delay, d1	49.7	49.3	4.5		1.9	2.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.1	0.3		0.1	0.2
Delay (s)	50.0	49.4	4.7		2.0	2.5
Level of Service	D	D	A		A	A
Approach Delay (s)	49.7		4.7			2.5
Approach LOS	D		A			A
Intersection Summary						
HCM 2000 Control Delay			5.4		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.27			
Actuated Cycle Length (s)			113.8		Sum of lost time (s)	16.0
Intersection Capacity Utilization			47.7%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

3: Yonge St & Mapleview Dr E

2024 Existing Conditions
Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	253	31	89	313	129	31	363	28	115	363	83
Future Volume (vph)	77	253	31	89	313	129	31	363	28	115	363	83
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		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1659	3340		1721	3579	1506	1705	3491		1738	3418	
Flt Permitted	0.43	1.00		0.48	1.00	1.00	0.48	1.00		0.47	1.00	
Satd. Flow (perm)	743	3340		862	3579	1506	859	3491		852	3418	
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)	83	272	33	96	337	139	33	390	30	124	390	89
RTOR Reduction (vph)	0	9	0	0	0	118	0	4	0	0	13	0
Lane Group Flow (vph)	83	296	0	96	337	21	33	416	0	124	466	0
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Heavy Vehicles (%)	10%	8%	2%	6%	2%	7%	7%	3%	8%	5%	3%	6%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	21.3	15.1		21.3	15.1	15.1	56.1	52.0		63.3	55.6	
Effective Green, g (s)	21.3	15.1		21.3	15.1	15.1	56.1	52.0		63.3	55.6	
Actuated g/C Ratio	0.21	0.15		0.21	0.15	0.15	0.56	0.51		0.63	0.55	
Clearance Time (s)	4.0	6.0		4.0	6.0	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)	212	499		234	535	225	511	1797		601	1881	
v/s Ratio Prot	0.02	0.09		c0.03	c0.09		0.00	0.12		c0.02	c0.14	
v/s Ratio Perm	0.06			0.06		0.01	0.03			0.11		
v/c Ratio	0.39	0.59		0.41	0.63	0.09	0.06	0.23		0.21	0.25	
Uniform Delay, d1	33.2	40.1		33.3	40.3	37.0	10.2	13.5		7.7	11.8	
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	1.9		1.2	2.3	0.2	0.1	0.3		0.2	0.3	
Delay (s)	34.4	42.0		34.5	42.7	37.2	10.2	13.8		7.9	12.1	
Level of Service	C	D		C	D	D	B	B		A	B	
Approach Delay (s)		40.3			40.0			13.5			11.3	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			25.5			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.34									
Actuated Cycle Length (s)			101.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			72.7%			ICU Level of Service			C			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

4: Maplevue Dr E & Goodwin Dr

2024 Existing Conditions
Weekday AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	344	416	2	3	12
Future Volume (Veh/h)	10	344	416	2	3	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	11	382	462	2	3	13
Pedestrians		3	4		4	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		TWLT	TL			
Median storage (veh)		2	2			
Upstream signal (m)			354			
pX, platoon unblocked	0.95				0.95	0.95
vC, conflicting volume	468				684	239
vC1, stage 1 conf vol					467	
vC2, stage 2 conf vol					217	
vCu, unblocked vol	331				559	90
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	99				99	99
cM capacity (veh/h)	1158				600	896
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	11	191	191	308	156	16
Volume Left	11	0	0	0	0	3
Volume Right	0	0	0	0	2	13
cSH	1158	1700	1700	1700	1700	820
Volume to Capacity	0.01	0.11	0.11	0.18	0.09	0.02
Queue Length 95th (m)	0.2	0.0	0.0	0.0	0.0	0.5
Control Delay (s)	8.1	0.0	0.0	0.0	0.0	9.5
Lane LOS	A					A
Approach Delay (s)	0.2			0.0		9.5
Approach LOS						A
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			22.7%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

1: Yonge St & Country Ln/Turnberry Ln

2024 Existing Conditions

Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	9	25	23	5	19	27	728	32	18	626	31
Future Volume (vph)	19	9	25	23	5	19	27	728	32	18	626	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	0.88		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1769	1492		1445	1628		1641	3532		1787	3546	
Flt Permitted	0.74	1.00		0.73	1.00		0.38	1.00		0.35	1.00	
Satd. Flow (perm)	1380	1492		1117	1628		660	3532		661	3546	
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)	20	9	26	24	5	20	28	751	33	19	645	32
RTOR Reduction (vph)	0	24	0	0	18	0	0	2	0	0	2	0
Lane Group Flow (vph)	20	11	0	24	7	0	28	782	0	19	675	0
Confl. Peds. (#/hr)	9		9	8		8	9		8	8		9
Heavy Vehicles (%)	2%	2%	16%	25%	2%	2%	11%	2%	15%	2%	2%	3%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	8.4	8.4		8.4	8.4		78.2	74.3		75.6	73.0	
Effective Green, g (s)	8.4	8.4		8.4	8.4		78.2	74.3		75.6	73.0	
Actuated g/C Ratio	0.08	0.08		0.08	0.08		0.77	0.73		0.75	0.72	
Clearance Time (s)	6.0	6.0		6.0	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	
Lane Grp Cap (vph)	114	123		92	134		547	2590		522	2555	
v/s Ratio Prot		0.01			0.00		c0.00	c0.22		0.00	0.19	
v/s Ratio Perm	0.01			c0.02			0.04			0.03		
v/c Ratio	0.18	0.09		0.26	0.05		0.05	0.30		0.04	0.26	
Uniform Delay, d1	43.2	42.9		43.5	42.8		2.7	4.6		3.3	4.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.3		1.5	0.2		0.0	0.3		0.0	0.3	
Delay (s)	44.0	43.2		45.1	42.9		2.7	4.9		3.3	5.1	
Level of Service	D	D		D	D		A	A		A	A	
Approach Delay (s)		43.5			44.0			4.8			5.1	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay	7.5			HCM 2000 Level of Service			A					
HCM 2000 Volume to Capacity ratio	0.29											
Actuated Cycle Length (s)	101.3			Sum of lost time (s)			16.0					
Intersection Capacity Utilization	53.4%			ICU Level of Service			A					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Yonge St & GO Access

2024 Existing Conditions
Weekday PM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	←←	→	↑↑		←	↑↑
Traffic Volume (vph)	68	61	717	57	29	632
Future Volume (vph)	68	61	717	57	29	632
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		4.0	6.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.95
Frpb, ped/bikes	1.00	0.98	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3437	1451	3524		1559	3579
Flt Permitted	0.95	1.00	1.00		0.32	1.00
Satd. Flow (perm)	3437	1451	3524		517	3579
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	72	64	755	60	31	665
RTOR Reduction (vph)	0	59	3	0	0	0
Lane Group Flow (vph)	72	5	812	0	31	665
Confl. Peds. (#/hr)	5	7		5	7	
Heavy Vehicles (%)	3%	10%	2%	5%	17%	2%
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6
Permitted Phases		8			6	
Actuated Green, G (s)	8.0	8.0	77.4		85.6	85.6
Effective Green, g (s)	8.0	8.0	77.4		85.6	85.6
Actuated g/C Ratio	0.08	0.08	0.73		0.81	0.81
Clearance Time (s)	6.0	6.0	6.0		4.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	260	109	2582		460	2901
v/s Ratio Prot	c0.02		c0.23		0.00	c0.19
v/s Ratio Perm		0.00			0.05	
v/c Ratio	0.28	0.04	0.31		0.07	0.23
Uniform Delay, d1	46.1	45.3	4.9		2.2	2.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.6	0.2	0.3		0.1	0.2
Delay (s)	46.7	45.4	5.2		2.2	2.5
Level of Service	D	D	A		A	A
Approach Delay (s)	46.1		5.2			2.5
Approach LOS	D		A			A

Intersection Summary

HCM 2000 Control Delay	7.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	105.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3: Yonge St & Mapleview Dr E

2024 Existing Conditions

Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	375	69	69	238	137	71	446	49	130	484	98
Future Volume (vph)	101	375	69	69	238	137	71	446	49	130	484	98
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		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1738	3490		1789	3579	1580	1789	3525		1789	3475	
Flt Permitted	0.52	1.00		0.32	1.00	1.00	0.38	1.00		0.40	1.00	
Satd. Flow (perm)	944	3490		604	3579	1580	722	3525		760	3475	
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)	109	403	74	74	256	147	76	480	53	140	520	105
RTOR Reduction (vph)	0	14	0	0	0	120	0	6	0	0	12	0
Lane Group Flow (vph)	109	463	0	74	256	27	76	527	0	140	613	0
Confl. Peds. (#/hr)	1					1				1		1
Heavy Vehicles (%)	5%	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	3%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	29.0	21.2		25.8	19.6	19.6	58.8	52.9		62.6	54.8	
Effective Green, g (s)	29.0	21.2		25.8	19.6	19.6	58.8	52.9		62.6	54.8	
Actuated g/C Ratio	0.27	0.20		0.24	0.18	0.18	0.54	0.49		0.58	0.51	
Clearance Time (s)	4.0	6.0		4.0	6.0	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)	310	684		212	648	286	450	1725		514	1761	
v/s Ratio Prot	c0.03	c0.13		0.02	0.07		0.01	0.15		c0.02	c0.18	
v/s Ratio Perm	0.07			0.06		0.02	0.08			0.14		
v/c Ratio	0.35	0.68		0.35	0.40	0.09	0.17	0.31		0.27	0.35	
Uniform Delay, d1	30.9	40.3		32.9	39.0	36.8	11.8	16.6		10.6	16.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	2.7		1.0	0.4	0.1	0.2	0.5		0.3	0.5	
Delay (s)	31.6	42.9		33.9	39.4	37.0	12.0	17.0		10.9	16.5	
Level of Service	C	D		C	D	D	B	B		B	B	
Approach Delay (s)		40.8			37.8			16.4			15.5	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay	26.2			HCM 2000 Level of Service			C					
HCM 2000 Volume to Capacity ratio	0.43											
Actuated Cycle Length (s)	108.1			Sum of lost time (s)			20.0					
Intersection Capacity Utilization	75.6%			ICU Level of Service			D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

4: Mapleview Dr E & Goodwin Dr

2024 Existing Conditions
Weekday PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	509	403	12	6	3
Future Volume (Veh/h)	20	509	403	12	6	3
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)	22	553	438	13	7	3
Pedestrians		1	3		3	
Lane Width (m)		3.7	3.7		3.7	
Walking Speed (m/s)		1.1	1.1		1.1	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		TWLT	TL			
Median storage (veh)		2	2			
Upstream signal (m)			354			
pX, platoon unblocked	0.98				0.98	0.98
vC, conflicting volume	454				771	230
vC1, stage 1 conf vol					448	
vC2, stage 2 conf vol					324	
vCu, unblocked vol	411				733	182
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	98				99	100
cM capacity (veh/h)	1122				538	812
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	22	276	276	292	159	10
Volume Left	22	0	0	0	0	7
Volume Right	0	0	0	0	13	3
cSH	1122	1700	1700	1700	1700	599
Volume to Capacity	0.02	0.16	0.16	0.17	0.09	0.02
Queue Length 95th (m)	0.5	0.0	0.0	0.0	0.0	0.4
Control Delay (s)	8.3	0.0	0.0	0.0	0.0	11.1
Lane LOS	A					B
Approach Delay (s)	0.3			0.0		11.1
Approach LOS						B
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			26.9%		ICU Level of Service	A
Analysis Period (min)			15			

Appendix E: Background Development Study Excerpts

673 MAPLEVIEW DRIVE EAST PROPOSED COMMERCIAL DEVELOPMENT

Urban Transportation Considerations
City of Barrie

Prepared For: Sobeys Canada

April 12, 2022



2.0 PROPOSED DEVELOPMENT

2.1 DEVELOPMENT PROGRAM

The proposed development will be completed in two phases. The phasing line is located to the south of the proposed east-west driveway. “Phase 1” includes the portion north of this line and is planned as a commercial development, while “Phase 2” is located south of this line and is currently planned as a mixed-use development. For the purposes of the report, “Phase 2” lands have not been included and will be subject to a separate approval process.

Development statistics for “Phase 1” of the development are summarized in **Table 1** and the site plan is illustrated in **Figure 2**. Reduced scale architectural plans area attached in **APPENDIX A**.

TABLE 1 DEVELOPMENT CONCEPT PLAN

Use		Proposed Statistics		
	Commercial	Gross Floor Area (GFA)	Building A 'Food Store'	4,024 m²
			Building B	732 m²
			Building C	905 m²
			Building D	732 m²
			Building E	738 m²
			Building F	505 m²
			Total	7,636 m²
	Vehicle Parking spaces	Total	445 spaces	
	Bicycle Parking Spaces	Total	12 spaces	
	Loading Facilities	Five (5) loading spaces		
	Site Access	The development proposes three (3) vehicular site accesses: • one (1) un-signalized East-West driveway connection to Yonge Street, • one North-South driveway connection to the extension of Street 'V' • one (1) channelized inbound right turn driveway off of Mapleview Drive East		
	Drive-Through	One (1) drive-through proposed in Building F		

2.2 SITE ACCESS AND VEHICLE CIRCULATION

There are two primary public road vehicle access points proposed for the site. One is the proposed North-South driveway connection to the proposed extension of Street 'V'. The extension of Street 'V' will form a proposed un-signalized intersection with Maplevue Drive East. It will permit all movements into and out of the site.

The second access point is the proposed East-West driveway, which will form a proposed un-signalized intersection with Yonge Street. It will permit all movements into and out of the site.

2.3 PEDESTRIAN ACCESS AND CIRCULATION

The movement of pedestrians between the site and the surrounding area will primarily be facilitated by the two site access points off of Yonge Street and Maplevue Drive East. Within the site, pedestrian movements will be facilitated by pedestrian facilities proposed adjacent to the internal private driveway network.

The proposed extension of Street 'V' will provide sidewalks on both sides of the road in accordance with the City of Barrie's design guidelines for 18-metre right-of-ways.

2.4 VEHICULAR PARKING

Vehicular parking is provided through the site for retail uses. The application of Zoning By-law 2009-141 results in a requirement of 234 parking spaces. A total of 445 parking spaces are proposed in the surface parking lot. A detailed breakdown of the Zoning By-law requirements is provided in **Section 8.0** of the report.

2.5 LOADING AND SERVICING

Loading spaces will be provided for the proposed retail uses based on the respective by-law requirements. The loading facilities are proposed in strategic locations to be shared between commercial buildings. A detailed breakdown of Zoning By-law requirements is provided in **Section 10.0** of the report.

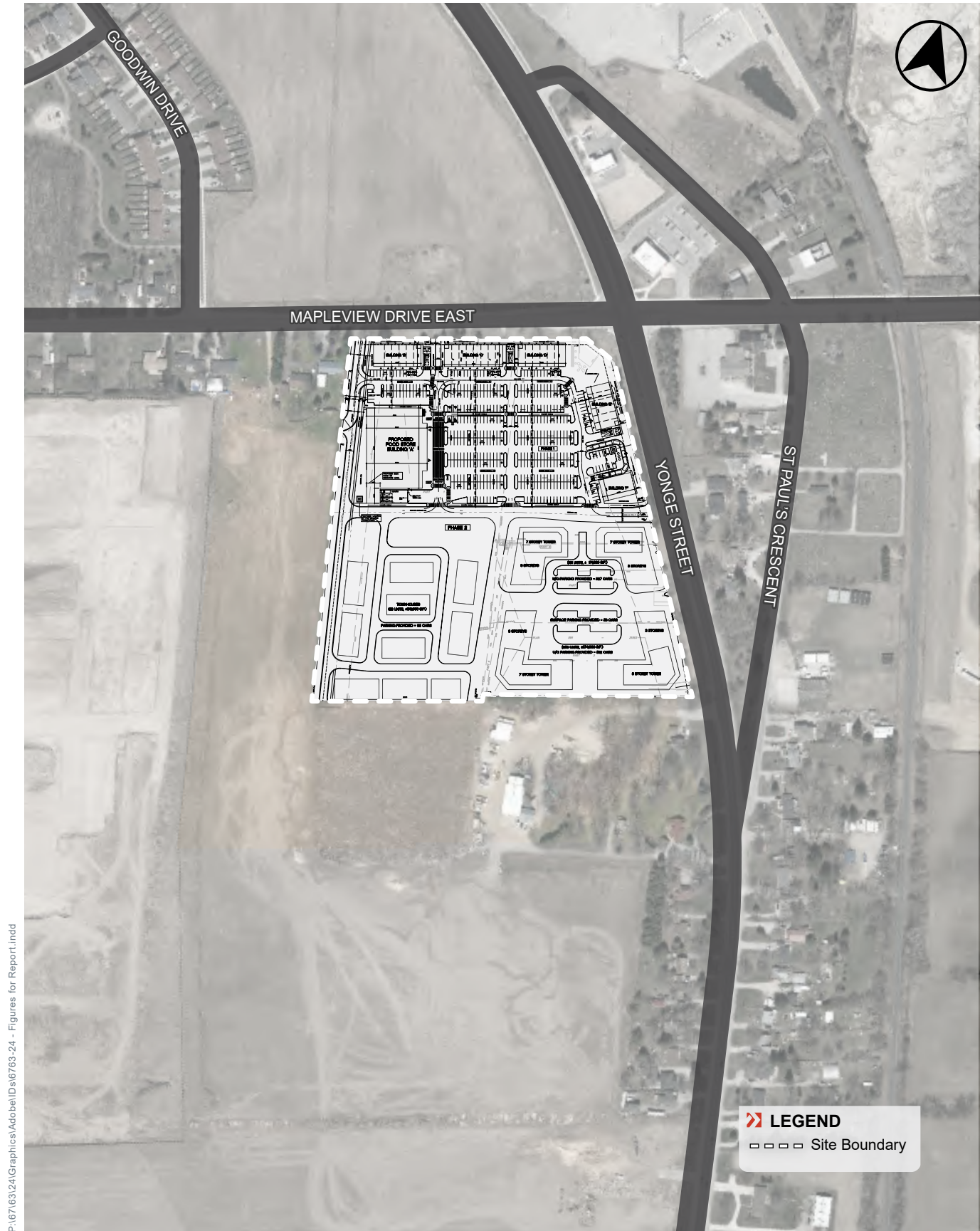


FIGURE 2 PROPOSED SITE PLAN

5.0 VEHICLE TRAFFIC ASSESSMENT

5.1 SCOPE

The traffic volumes forecasts, intersection and driveway operations and new site traffic related impacts have been reviewed as part of this study. Future lane configurations and traffic control have been adopted as per the *Hewitt Landowners Group Master Transportation Study* undertaken by LEA in February 2017. The scope of this study includes the following intersections:

Signalized Intersections

- Mapleview Drive East / Goodwin Drive (signalized in future only)
- Yonge Street / Mapleview Drive East
- St Paul's Crescent / Mapleview Drive East (signalized in future only)
- Yonge Street / St Paul's Crescent North (signalized in future only)

Unsignalized Intersections

- Mapleview Drive East / Goodwin Drive (unsignalized in existing only)
- Site Driveway (West) / Mapleview Drive East
- Site Driveway (Eastbound Right-In Only) / Mapleview Drive East
- St Paul's Crescent / Mapleview Drive East (unsignalized in existing only)
- Yonge Street / St Paul's Crescent North (unsignalized in existing only)
- Yonge Street / Site Driveway (East)
- Yonge Street / St Paul's Crescent South

5.2 HORIZON YEARS

This study includes an analysis of the traffic volumes for the site at the following horizon years:

- Baseline existing year (2022);
- Build out year (2026); and
- 5 years post-build out year (2031).

5.3 ANALYSIS SCENARIOS

Traffic operations analyses have been undertaken during the weekday morning, afternoon and Saturday midday peak hours under the following traffic conditions:

- **Baseline existing traffic conditions:** using 2022 counted traffic volumes;
- **Future background conditions:** based upon the 2031 future total volumes outlined in the master transportation study (LEA), and interpolated volumes for the 2026 horizon year;
- **Future total traffic conditions:** Including new traffic generated by the proposed development at the 2026 and 2031 horizon years.

5.6 FUTURE BACKGROUND TRAFFIC VOLUMES

Traffic growth in the site vicinity has been considered based on the *Hewitt Landowners Group Master Transportation Study* completed by LEA Consulting Ltd. in February 2017 (herein referred to as “the Hewitt TIS”).

To forecast future background volumes for the 2031 horizon year, Figure 4-2 and Figure 4-3 of the Hewitt TIS were used as a baseline for the weekday morning and afternoon peak hours. Given that the Hewitt TIS did not include all intersections within the study area into its analysis for both peak periods, volumes for the missing intersections (primarily Yonge Street / Mapleview Drive East) were forecast through a network balancing exercise and by utilizing 2022 existing traffic counts to determine the percentage of vehicles utilizing each movement at the intersections.

In order to ensure the operation of the Yonge Street / Mapleview Drive East intersection in the weekday afternoon peak hour, engineering judgement was applied to estimate that 300 (out of an approximate 550) southbound left-turning vehicles at the intersection would instead, under constrained traffic conditions, continue further south through the intersection before making a southbound left-turn outside the study area. This adjustment ensured that future background volumes were balanced and sensible given the lack of detailed information available for this intersection.

For the Saturday midday peak hour, 2031 future background volumes were based on the weekday afternoon peak hour future background volumes as a conservative estimation.

Forecasting 2026 future background volumes was completed through linear interpolation, assuming that the net growth from existing conditions would be half of growth to the year 2031.

Future background traffic volumes for the 2026 horizon year are illustrated on **Figure 9**. Future background traffic volumes for the 2031 horizon year are illustrated on **Figure 10**.

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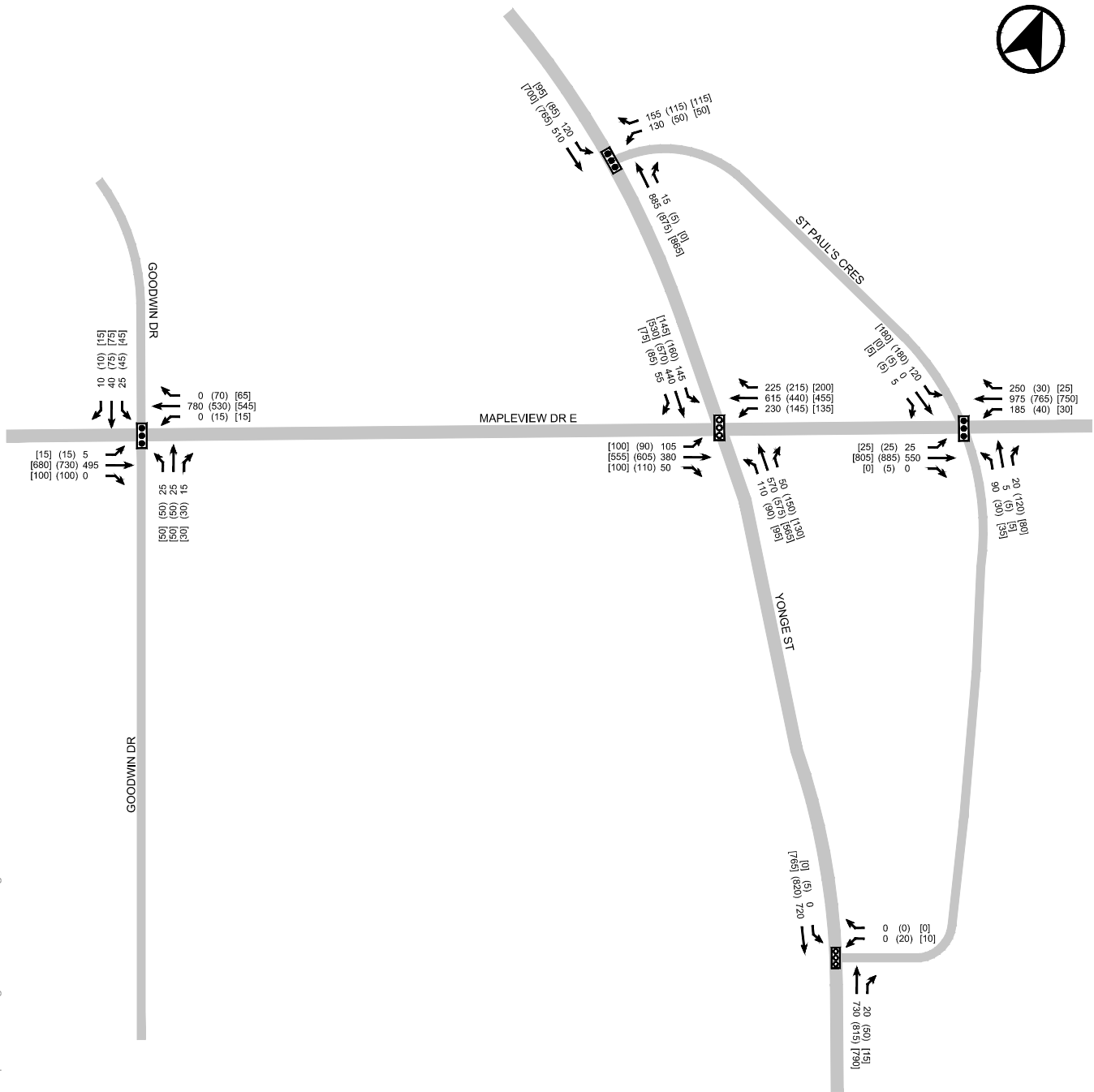


FIGURE 9 FUTURE BACKGROUND 2026 TRAFFIC VOLUMES

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FIGURE 10 FUTURE BACKGROUND 2031 TRAFFIC VOLUMES

5.7 SITE TRAFFIC

5.7.1 Existing Site Traffic

While there is no traffic being generated by the site today, future background traffic projections likely incorporate some site traffic generation as a result of the land parcel being developed. However, it was conservatively assumed that the site does not generate any traffic under future background conditions.

5.7.2 Site Trip Generation

Forecast shopping center and fast-food outlet vehicular traffic generation for the site is based on the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition, utilizing land use codes 820 (Shopping Center) and 934 (Fast-Food Restaurant with Drive-Through Window).

Given the land use types and their inclination to attract pass-by trips, this was accounted for as part of the trip generation projections. The ITE Trip Generation Handbook, 3rd Edition (September 2017) was referenced to determine appropriate pass-by trip percentages for each land use. The pass-by trips were then separated from the gross trip generation projections to determine the number of primary trips generated. For peak periods without pass-by information in the ITE handbook, the lowest other peak percentage was adopted.

Trip generation for the weekday morning and afternoon peak, as Saturday midday peak hours are summarized in **Table 6**.

TABLE 6 SITE TRIP GENERATION

	GFA (1,000 sqft)	AM Peak Hour			PM Peak Hour			SAT Peak Hour		
		In	Out	2-Way	In	Out	2-Way	In	Out	2-Way
ITE Trip Generation Manual, 11th Edition										
Shopping Center (LUC 820)	-	0.52	0.32	0.84	1.63	1.77	3.40	2.29	2.11	4.40
Fast-Food Restaurant with Drive-Through Window (LUC 934)	-	22.75	21.86	44.61	17.18	15.85	33.03	28.18	27.07	55.25
Trips Generated										
Shopping Center Total Trips	70.02	35	20	55	115	125	240	160	150	310
Pass-By Trips (34% PM, 26% AM / SAT)	-	10	10	20	40	40	80	40	40	80
Primary Trips	-	25	10	35	75	85	160	120	110	230
Fast-Food Restaurant Total Trips	5.40	125	120	245	95	85	180	150	145	295
Pass-By Trips (49% AM, 50% PM)	-	60	60	120	50	50	100	75	75	150
Primary Trips	-	65	60	125	45	35	80	75	70	145
Total Trips Generated	-	160	140	300	210	210	420	310	295	605
Total "Pass-By Trips" Generated	-	70	70	140	90	90	180	115	115	230
Total "Primary Trips" Generated	-	90	70	160	120	120	240	195	180	375

Notes:

1. Trips generation rates in trips per 1,000 sqft GFA as per the ITE Trip Generation Manual.

The development is expected to generate **300** two-way trips during the morning peak hour; including **140** pass-by trips and **160** primary trips. During the afternoon peak hour, the development is expected to generate **420** two-way trips; including **180** pass-by trips and **240** primary trips. During the Saturday midday peak hour, the development is expected to generate **605** two-way trips; including **230** pass-by trips and **375** primary trips.

New site traffic volumes are illustrated on **Figure 11**.

5.7.3 Trip Distribution and Assignment

Site traffic has been assigned onto the area road network based on a review of travel information provided by the 2016 Transportation for Tomorrow Survey (TTS) and existing road network traffic patterns and connectivity. The site traffic distribution is summarized in **Table 7**. Detailed output TTS data and distribution assumptions are included in **APPENDIX F**.

TABLE 7 SITE TRAFFIC DISTRIBUTION

Directions	Outbound ¹	Inbound ²
To / From the North on Yonge Street	20%	25%
To / From the South on Yonge Street ³	25%	20%
To / From the East on Maplevue Drive East	10%	10%
To / From the West on Maplevue Drive East	45%	45%
Total	100%	100%

Notes:

1. Based upon morning peak period residential outbound trips.
2. Based upon afternoon peak period residential inbound trips.
3. Based on trips to/from TTS zones 8527, 8528, 8529, 8530, 8531, 8590.

New Site traffic generated by the proposed development was assigned onto the area road network based on the directional distribution summarized in **Table 7**. New site traffic volumes for the weekday morning and afternoon peak hours are illustrated in **Figure 11**.

Considering that the distribution obtained from TTS resembles existing road network patterns, using engineering judgement, BA Group calibrated the percentages in anticipation of increased development south of the site.

5.8 FUTURE TOTAL TRAFFIC VOLUMES

Future total traffic volumes are the sum of future background traffic volumes and traffic that is expected to be generated by the site in future. 2026 future total traffic volumes are illustrated on **Figure 12**. The 2031 future total traffic volumes are illustrated on **Figure 13**.

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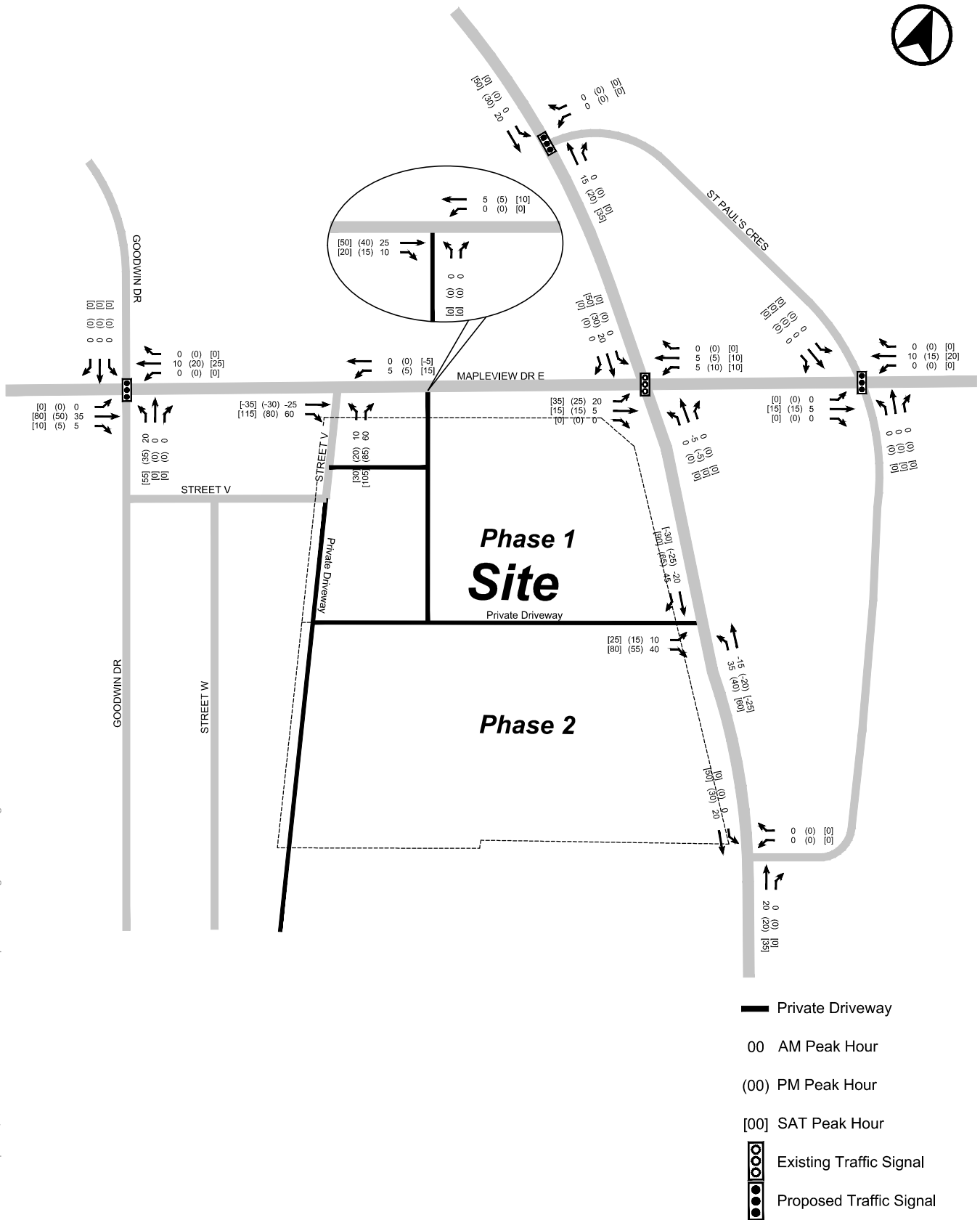


FIGURE 11 NEW SITE TRAFFIC VOLUMES



BA Group

BARRIE HERITAGE PHASE IV TRAFFIC IMPACT STUDY

Prepared For: Barrie Heritage Developments Ltd.

August, 2016

DRAFT

**MOVEMENT
IN URBAN
ENVIRONMENTS**

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1.0 INTRODUCTION

BA Group is retained by Barrie Heritage Developments Ltd. To provide transportation consulting services in support of a new predominantly residential neighbourhood (the Project) proposed on a parcel of land (the Site) bound by Yonge Street to the west¹, Barrie South GO Station to the south, St. Peter's Catholic Secondary School to the north, and a GO Transit rail line to the east. The total area of the Site is approximately 22 Hectares, the majority of which is currently agricultural.

1.1 THE PROJECT

The Project consists of the following:

- 179 townhouse units;
- 168 stacked townhouse units;
- 192 back to back stacked townhouse units; and
- 756 units and approximately 2,785 square metres of retail space in mid-rise buildings.

The total residential unit count is 1,295.

The Project also includes two public parks and a series of new public streets connecting the various buildings with Yonge Street. The planned street network consists of local roads 18 metres rights-of-way.

Vehicular access to the Project is from two new streets connecting to Yonge Street opposite Esther Drive and Country Lane. These new roads will be constructed with widened 11 metre pavement width on their approach to Yonge Street. One or both of the intersections of Yonge Street with Esther Drive and Country Lane will be signalized as part of the Project, with the intersection at Country Lane being signalized initially.

Pedestrian and cycling access to the Project will be via the roads intersecting Yonge Street, a walkway extending to Yonge Street aligned with one of the planned parks, and a pedestrian plaza connecting the Project with Barrie South GO Station.

The Project is subdivided into a series of blocks containing planned buildings or parks / walkways. Individual blocks with larger residential buildings would be the subject to Site Plan Control, through which details with respect to access, site design, loading and servicing, and parking supply will be finalized.

1.2 TRANSPORTATION CONTEXT

The Site is located immediately north of Barrie South GO Station. This transit hub connects GO Transit commuter rail service, GO regional bus services, and Barrie Transit routes 3, 4, and 8. Bus connectivity at Barrie South GO station is planned to increase with links to four routes (2, 3, 4 and 10) planned for the year 2031. Residents of the Project will enjoy easy access to the rail hub by foot or by bike.

¹ Notwithstanding that Yonge Street runs southeast to northwest in the vicinity of the Site, for the purposes of this report we describe Yonge Street as a north-south road.



4.0 VEHICULAR TRAFFIC FORECASTS

4.1 EXISTING TRAFFIC VOLUMES

BA Group undertook a series of traffic volumes counts at the following intersections on Wednesday, June 8th 2016:

- Yonge Street / Mapleview Drive East
- Yonge Street / Barrie South GO access
- Yonge Street / Country Lane (south site access)
- Yonge Street / Esther Drive (north site access)
- Yonge Street / Madelaine Drive / Ashford Drive

These counts were conducted during the morning and afternoon peak periods, with the count at Yonge Street & Esther Drive was extended to a full 8-hour count to allow for the preparation of traffic signal warrants.

Existing traffic volumes are summarized in Figure 5.

4.2 BACKGROUND GROWTH

The anticipated timeline for the development of the Project is five years. For the purposes of our analysis we have adopted a two percent annual growth rate on the Yonge Street corridor for a five year period to account for changes in traffic volumes unrelated to the Project.

Corridor growth traffic volumes are illustrated in Figure 6 and Future Background traffic volumes (existing traffic plus growth allowances) are illustrated in Figure 7.

4.3 SITE-RELATED TRAFFIC GENERATION

Project-related vehicular traffic was estimated based on trip generation rates set-out in the Institute for Transportation Engineers (ITE) Trip Generation Handbook 9th edition with the exception of the townhouse component of the development, which in our experience may generate traffic at rates slightly in excess of the rates estimated based on ITE methodologies.

The following table summarizes rates we have observed at townhouse developments in the Greater Toronto Area, rates stated in the ITE Trip Generation 9th Edition, and our selected rates for the Project.



TABLE 1 TOWNHOUSE TRIP GENERATION RATES

	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Dashwood and Pine Glen, Oakville	0.11	0.69	0.80	0.68	0.26	0.94
Leewood / Lindsay Dorval and North Service Road, Oakville	N/A	N/A	N/A	0.31	0.22	0.53
McCraney Street, Kristie Court and Kelsey Court, Oakville	0.15	0.40	0.55	0.51	0.28	0.79
Reeves Gate Townhouses, Upper Middle Road and Reeves Gate, Oakville	0.14	0.41	0.55	0.36	0.23	0.59
Caboto Trail Subdivision, McCowan and Highway 407, Markham	0.13	0.61	0.79	0.39	0.20	0.59
Average	0.13	0.54	0.67	0.45	0.24	0.69
ITE – 9th Edition	0.07	0.37	0.44	0.35	0.17	0.52
Selected Rates for This Project	0.11	0.56	0.67	0.46	0.23	0.69

The following table summarizes our trip generation estimate for the residential component of the Project.

TABLE 2 VEHICULAR TRIP GENERATION ESTIMATE

	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Townhouse & Stacked Townhouse						
Rates	0.11	0.56	0.67	0.46	0.23	0.69
Trips 539 Units	60	300	360	245	125	370
Mid-Rise						
Rates	0.10	0.25	0.35	0.26	0.18	0.44
Trips 756 Units	75	190	265	200	135	335
Residential Total	135	490	625	445	260	705

The following table summarizes our trip generation estimate for the retail component of the Project. The allowance for pass-by traffic, which is existing traffic that would divert from Yonge Street to access the Project before continuing onto their initial destination, is based on ITE methodologies. We have not made an allowance for internalization of trips (i.e. a reduction in trips associated with residents of the Project shopping in the on-site retail) or the chaining of trips to / from the adjacent Barrie South GO Station. Both of these would logically lead to a reduction in the number of external trips associated with the Project, the estimate stated below should be seen as quite conservative.



TABLE 3 RETAIL TRIP GENERATION ESTIMATE

	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Total trips ITE Land Use 820 formula for 30,000 square feet of retail GFA	45	30	75	130	140	270
Pass-by Trips (55% of total)	0	0	0	75	75	150
Primary Trips	45	30	75	55	65	120

The following table summarize the total vehicular trip generation associated with the Project.

TABLE 4 TOTAL TRIP GENERATION ESTIMATE

	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Residential	135	490	625	445	260	705
Retail - Total	45	30	75	130	140	270
Total Trips without pass- by adjustment	180	520	700	575	400	975
Retail – Primary only	45	30	75	55	65	120
Total Trips with pass-by adjustment	180	520	700	500	325	825

The Project will generate approximate 640 and 925 *total* two-way vehicular trips in the weekday morning and afternoon peak hours, respectively. These trips include pass-by trips (i.e. trips that are already expected on Yonge Street and would divert into and out of the Project's retail component); without these net trip generation (i.e. traffic that will impact the area road network beyond the site boundaries) is reduced to 640 and 765 two-way trips in the morning and afternoon peak hour, respectively.

4.4 ASSIGNMENT OF SITE TRAFFIC

4.4.1 Assignment Methodology

Residential traffic was assigned to the network based on a review of the results of the 2011 Transportation Tomorrow Survey (TTS), a comprehensive household survey used to estimate and model travel behaviour in the Greater Toronto Area. Detailed analysis results from TTS are attached as Appendix D.

The following table summarizes the results of our review; these percentages were used to assign residential traffic onto the area road network.



TABLE 5 RESIDENTIAL TRAFFIC DIRECTION OF APPROACH / DEPARTURE

Direction of Approach / Departure	Percentage of Trips
North on Yonge St	20%
West on Big Bay Point Rd	25%
Within the neighbourhood	15%
East on Mapleview	5%
South on Yonge	5%
West on Mapleview	30%
Total	100%

Retail traffic was assigned to the road network based on prevailing traffic patterns on Yonge Street.

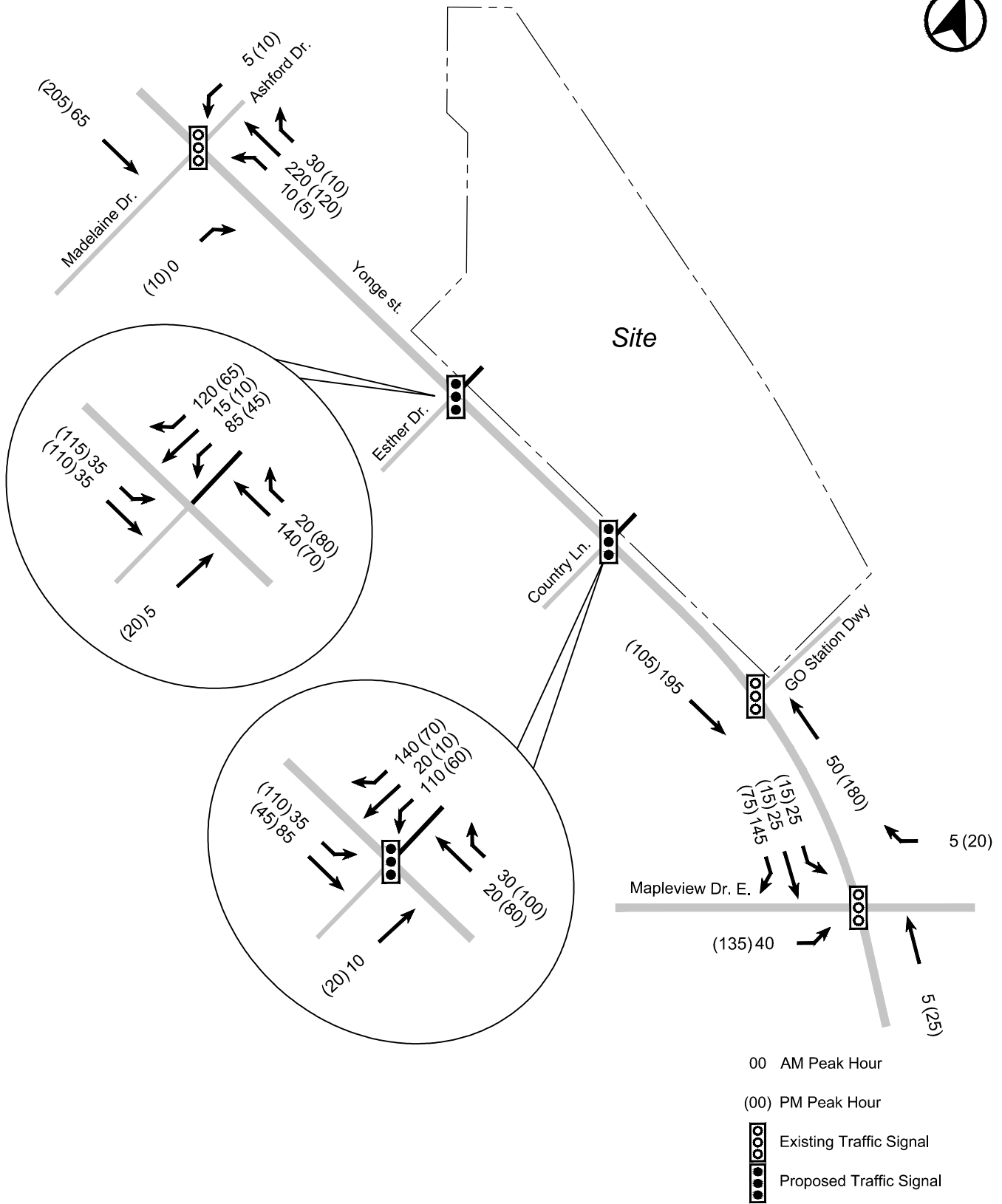
4.4.2 Traffic Assignment Scenarios

Two traffic volume forecasts were conducted. The first, Scenario 1, assumes a single traffic signal serving the Project at Yonge Street / Country Lane (Yonge Street and Esther Drive remains unsignalized). The second, Scenario 2, assumes the intersections of Yonge Street with both Esther Drive and Country Lane are signalized.





Figure 3



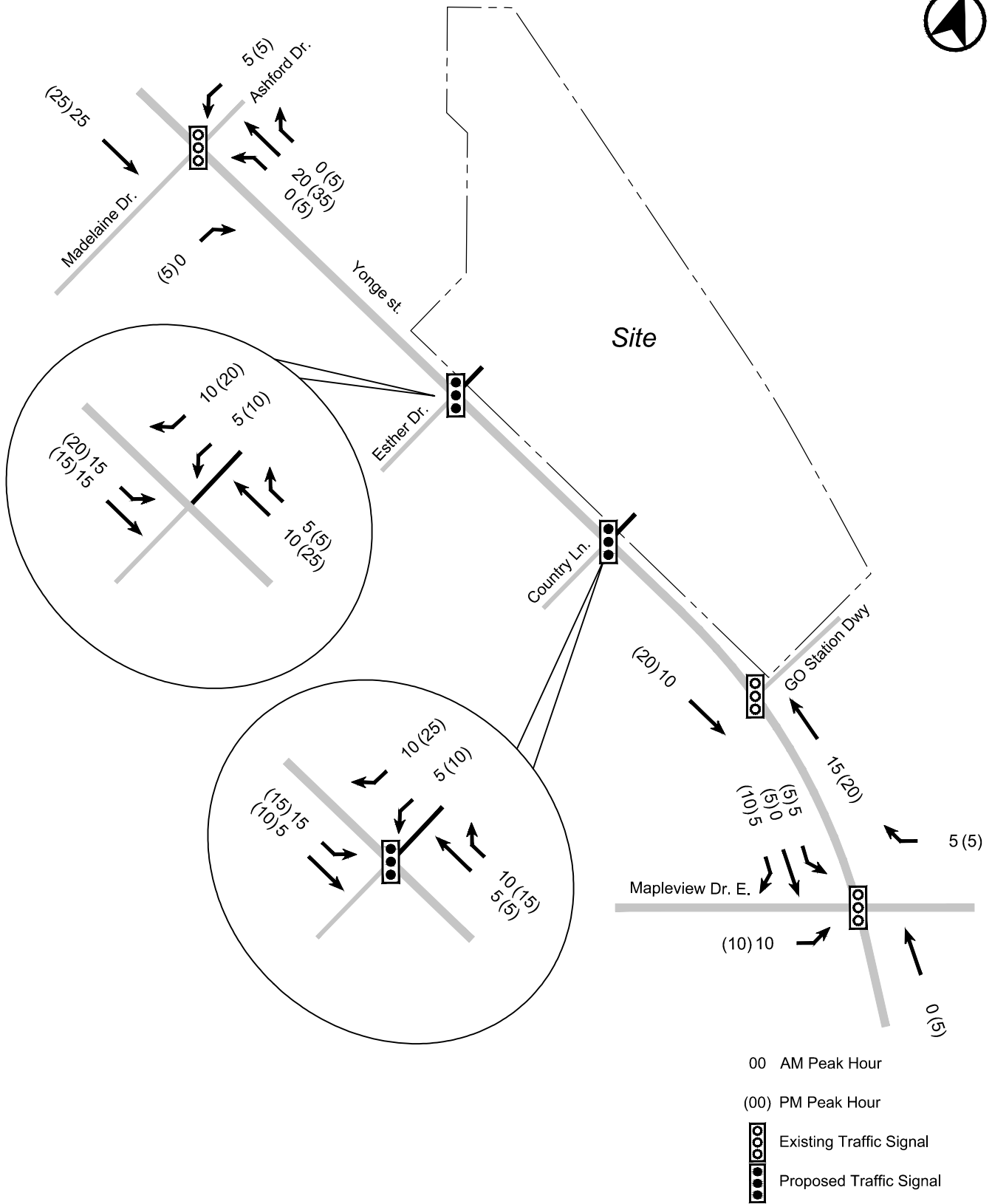
RESIDENTIAL SITE TRAFFIC VOLUMES Scenario 2



BA Group

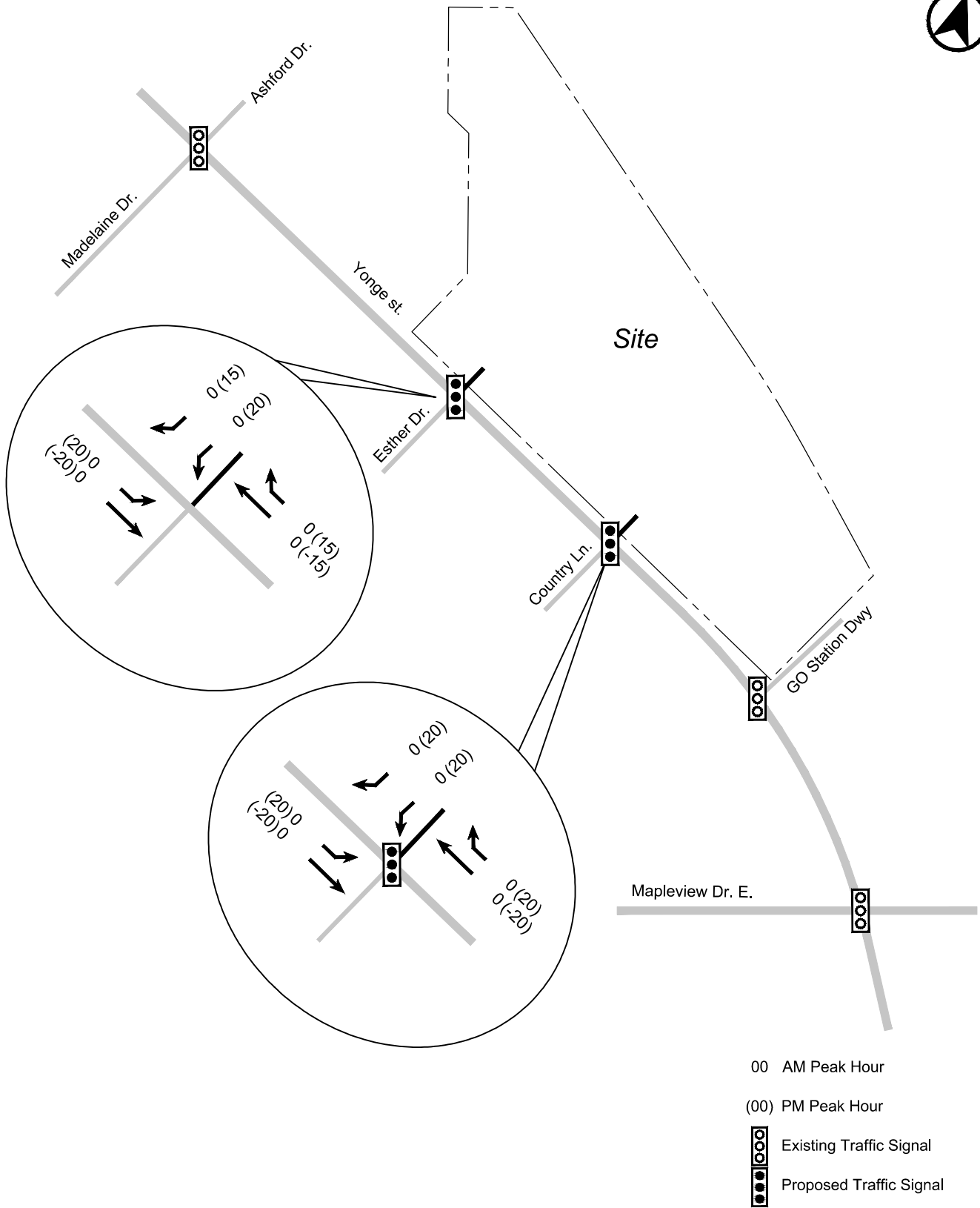
Barrie Heritage - Phase IV - TIA
7783-01 July 2016

Figure 9



PRIMARY RETAIL SITE TRAFFIC VOLUMES
Scenario 2





PASS-BY RETAIL SITE TRAFFIC VOLUMES Scenario 2



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7783-01 July 2016

Figure 13



Enhancing our communities



Barrie West Development

TRAFFIC IMPACT STUDY

Armel Corporation

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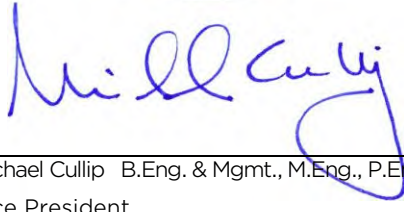
December
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Issue	Date	Description
1	December 7, 2022	Issued for Site Plan Approval (Metro)

4 Proposed Development

This chapter will provide additional details with report to the proposed development, including its location, land-use, site access, trips generated by the development and assignment of said trips to the adjacent road network.

4.1 SITE LOCATION

The subject site is located on the northwest corner of the intersection of Yonge Street with Mapleview Drive in the City of Barrie (as illustrated in Figure 1). The main site is approximately 8.9 hectares in size and consists of the properties known municipally as 658 Mapleview Drive East, 662 Mapleview Drive East and 800 Yonge Street. The site is bounded by Mapleview Drive to the south, Yonge Street to the east, County Lane to the north and Goodwin Drive to the west.

4.2 LAND-USE & PHASING

The proposed development will consist of 3 sub-developments located within parcels of land severed from the properties noted above. Details of each parcel and their associated development are provided below.

North Parcel

The north parcel of land is approximately 4.1 hectares in size. While the details of the proposed development are not yet final, for the purpose of this study the development is assumed to consist of a large retirement/care complex (192 long-term care beds, 449 assisted living beds and 106 senior's apartments) and two residential apartment towers containing 374 units. Exact timing of construction is currently unknown. For the purpose of this study, construction is assumed to commence in 2024 with full build-out assumed by the 2026 horizon.

Southeast Parcel

The southeast parcel of land is approximately 3.2 hectares in size and is being developed by Armel Corporation. Armel Corporation does not yet have a concept for development; for the purpose of this study the development is assumed to include 900 high-rise residential units and 2,230 m² (24,000 ft²) of commercial space. Full build-out is assumed by 2026.

Southwest Parcel

The southwest parcel of land is approximately 1.6 hectares in size and will include a 4,064 m² (43,748 ft²) Metro grocery store. A site plan for this development is provided in Figure 14. This site is assumed to be fully built by the 2024 horizon.



4.3 SITE ACCESS & CIRCULATION

Access

External access to the surrounding road network will be provided via the following:

- the Yonge Access will be located on Yonge Street opposite the Barrie South GO access and will be configured for full moves into and out of the site;
- the Goodwin Access will be located on Goodwin Drive and configured for full moves;
- the Maplevue Access will be located on Maplevue Drive and will be configured as a right-in, right-out access; and
- the Country Access will be provided to County Lane to service the development in the north parcel and configured for full moves.

Each access will be constructed according to the Transportation Association of Canada (TAC) standards for a commercial access point (the City of Barrie Engineering Standards adhere to TAC standards). This will allow for safe and efficient two-way operations at each access.

Circulation

Two new internal driveways will be constructed to provide internal connectivity and access within the subject development.

- An east-west driveway (Driveway A) will provide east-west connectivity between the Yonge Access and the Goodwin Access, separating the north parcel from the south parcels.
- A north-south driveway (Driveway B) will provide connectivity between the Maplevue Access and Driveway A, separating the southwest parcel from the southeast parcel.

Each internal driveway has been designed to facilitate the manoeuvring requirements of emergency vehicles and other large vehicles expected to access each individual parcel.

4.4 SITE TRAFFIC

4.4.1 Trip Generation

The number of vehicle trips to be generated by the proposed development for the weekday AM and weekday PM peak hours has been determined based on type of use, development size and trip generation rates per the *ITE Trip Generation Manual*⁹. Based on the developments proposed for each parcel, the following ITE land uses have been applied:

⁹ *Trip Generation Manual, 11th Edition*. Institute of Transportation Engineers. September 2021.



- multifamily housing – high-rise, not close to rail transit;
- senior adult housing – multifamily;
- assisted living;
- nursing home;
- strip retail plaza (<40,000 ft²); and
- supermarket.

It is noted that ITE provides another sub-category for high-rise residential developments located close to rail transit, with slightly lower vehicle trip rates reflective of the use of rail transit instead of private vehicles. These rates were not used to provide a more conservative trip estimate for the proposed residential uses. The associated trip rates for each of the above noted land uses are summarized in Table 8, with resulting trip estimates provided in Table 9.

Table 8: Trip Rates – Barrie West Development

LAND USE	ITE CODE	VARIABLE	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			In	Out	Total	In	Out	Total
multifamily housing - high-rise	222	units	0.09	0.18	0.27	0.18	0.14	0.32
senior adult housing - multifamily	252	units	0.07	0.13	0.20	0.14	0.11	0.25
assisted living	254	beds	0.11	0.07	0.18	0.09	0.15	0.24
nursing home	620	beds	0.10	0.04	0.14	0.05	0.09	0.14
strip retail plaza (<40,000 ft ²)	822	1000 ft ² GLA	1.42	0.94	2.36	3.30	3.30	6.59
supermarket	850	1000 ft ² GFA	1.69	1.17	2.86	4.48	4.48	8.95



Table 9: Gross Trip Estimates – Barrie West Development

SITE	LAND USE	ITE CODE	SIZE	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
				In	Out	Total	In	Out	Total
North Parcel	market residential	222	374 units	34	67	101	67	53	120
	senior's apartments	252	106 units	7	14	21	15	12	27
	assisted living	254	449 beds	49	32	81	42	66	108
	long-term care	620	192 beds	19	8	27	9	18	27
	Total			109	121	230	133	149	282
SE	apartments	222	900 units	83	160	243	161	127	288
	commercial/retail	822	24,000 ft ²	34	23	57	79	79	158
	Total			117	183	300	240	206	446
SW	grocery store	850	43,748 ft ²	74	51	125	196	196	392
Site Total				300	355	655	569	551	1120

As indicated, the combined generation of each development within the subject site is 655 trips during the weekday AM peak hour and 1,120 trips during the weekday PM peak hour.

It is noted that not all of these trips are expected to be new trips on the network. Interactions between the various residential and commercial uses on-site will result in internal trips contained entirely within the development. To account for internal trips, a 10% reduction has been applied to the gross trip generation of the subject site. Additionally, the commercial uses will generate pass-by trips – trips which are already on the road network for another purpose which will stop at the subject site before continuing to their destination. Per pass-by rates contained within the *ITE Trip Generation Handbook*¹⁰, the following pass-by rates have been applied to the weekday PM peak generation (pass-by rates for the weekday AM peak are not provided):

- strip retail plaza (ITE 822) – 34% (applicable to general commercial/retail); and
- supermarket (ITE 850) – 36% (applicable to Metro store).

¹⁰ *Trip Generation Handbook, 3rd Edition*. Institute of Transportation Engineers. September 2017.



A summary of the trip estimates by type and the resulting net trip generation is provided in Table 10. As indicated, the subject site is expected to generate 590 new trips during the weekday AM peak hour and 814 new trips during the weekday PM peak hour.

Table 10: Net Trip Estimates – Barrie West Development

TRIP TYPE	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
	In	Out	Total	In	Out	Total
Gross Trips	300	355	655	569	551	1120
Internal Trips	30	35	65	57	55	112
Pass-by Trips	-	-	-	97	97	194
Net (New) Trips	270	320	590	415	399	814

4.4.2 Trip Modal Split

Modal split is the distribution of trips to/from a specific area or location across different modes of transportation, such as automobiles, public transit, walking, etc.

Data from the 2016 *Transportation Tomorrow Survey* (TTS) was used to determine the existing modal split in the area. The TTS is comprehensive travel survey conducted every 5 years in the Greater Golden Horseshoe which can be used to identify the primary mode of transportation used for a trip between two *zones* in order to determine the modal split within one or more zones.

Regarding the subject development, it is located within *2006 GTA Zone 8529*. Trips to and from this zone were separated by type to determine the proportion of each type of trip. The following modal split was realized:

- public transit (local, GO train, or both) – 1.6%;
- active transportation (walking, cycling, etc.) – 4.8%; and
- automobile (driver or passenger) – 93.6%;

As indicated, 93.6% of all trips used a personal automobile to complete the trip, either as a driver or passenger. It is noted that the above modal split excludes home based school trips; the presence of several schools within Zone 8529 (and associated trips made by students) was found to substantially increase the number of non-auto trips. Since most school aged children are unable to drive (thus will walk or ride a school bus to/from school), the subsequent increase in non-auto modes was considered to be an inaccurate representation of the zone's true modal split.



The City's TMP identifies a City-wide modal split target of 7% public transit and 12% active transportation by 2041 – resulting in a total non-automobile modal share of 19% of all trips city-wide. Based on the proposed transit improvements identified in Section 3.2, expansion of the City's active transportation network (more sidewalks and bicycle infrastructure) identified in the City's TMP and proximity of the subject site to a major transit hub (Barrie South GO), it is considered reasonable that the City's modal split targets can be achieved by the 2041 horizon. For the interim horizon years, modal split proportions have been linearly interpolated between the current modal split and target split values. The modal split applied at each horizon is summarized in Table 11. Applying the above rates to the trip generation determined in Section 4.4.1, the total automobile and non-automobile trips generated by the site can be determined for each horizon. Modal trip generation is summarized in Table 12.

Table 11: Modal Splits by Horizon Year

YEAR	PUBLIC TRANSIT	ACTIVE TRANSPORTATION	AUTOMOBILE
2022	1.6%	4.8%	93.6%
2024	2.2%	5.6%	92.2%
2026	2.7%	6.3%	90.9%
2031	4.2%	8.2%	87.6%
2036	5.6%	10.1%	84.3%

Table 12: Modal Trip Estimates – Barrie West Development

YEAR	PUBLIC TRANSIT		ACTIVE TRANSPORTATION		AUTOMOBILE	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
2024	2	4	6	10	95	167
2026	15	20	34	45	482	647
2031	21	28	42	55	445	591
2036	27	36	49	64	410	537



4.4.3 Trip Assignment & Distribution

New Trips

The distribution of new trips generated by the site has been developed based on trip distribution data provided in the 2016 TTS. In addition to the use identified in Section 4.4.2, the TTS can also be used to identify travel patterns between different zones within the study area, determining how many trips are travelling between zones of interest.

In the case of the subject development (located within *2006 GTA Zone 8529*), approximately 75% of all trips to and from this zone were found to be trips made internally within the City of Barrie, thus 25% of all trips to and from this zone are trips made outside Barrie. The overall directional distribution of trips to and from the zone was realized (assuming a central position within the zone):

- to/from the north – 25% (22% internal, 3% external);
- to/from the south – 26% (5% internal, 21% external);
- to/from the east – 13% (13% internal, 0% external); and
- to/from the west – 36% (35% internal, 1% external).

Based on the above, in consideration of expected travel routes and the location of the site within Zone 8529 (near the southeast corner), the following assignment was applied to new trips generated by the north and southeast parcels:

- to/from the north – 30%;
- to/from the south – 20%;
- to/from the east – 10%; and
- to/from the west – 40%

As the southwest parcel is to be developed as a Metro grocery store, new trips for this parcel have been established based on the location of the site in relation to nearby residential areas, including both existing neighbourhoods and new developments currently under construction. The Metro store is expected to predominantly attract local residents looking to purchase groceries; therefore, most trips can be expected to travel to/from the surrounding neighbourhoods. The following distribution has been applied:

- to/from the north – 35%;
- to/from the south – 10%;
- to/from the east – 25%; and



- to/from the west – 30%

Pass-By Trips

As previously indicated, pass-by trips are those trips already on the road network which are expected to stop at the subject site as they travel past. The distribution of these pass-by trips is proportional to the directional volumes present on Yonge Street and Maplevue Drive during the weekday PM peak hour. The largest approach volume past the site will generate the largest number of pass-by trips. The following distribution was realized:

- from the north – 30%;
- from the south – 33%;
- from the east – 12%; and
- from the west – 25%

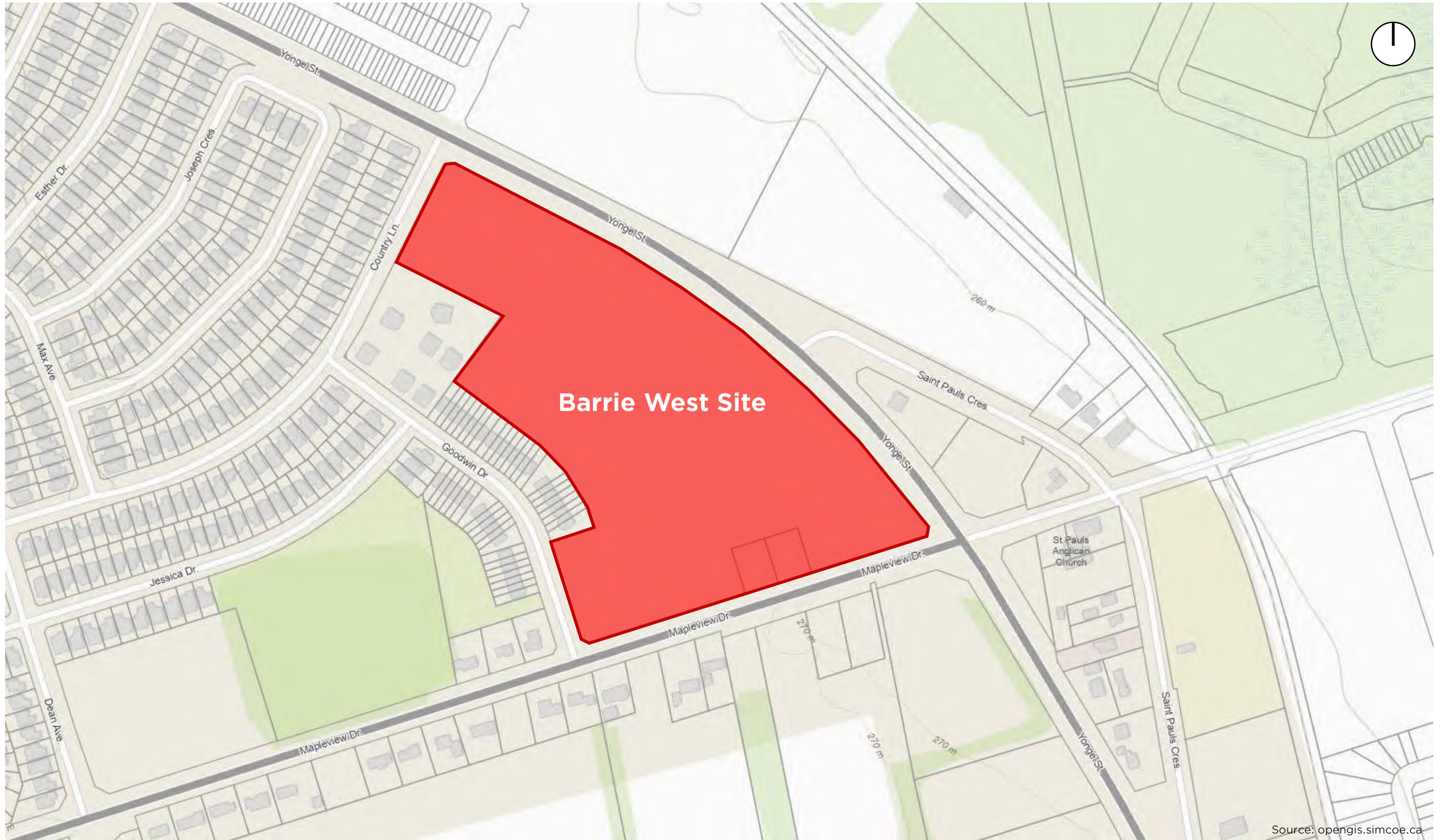
These proportions were applied to the relevant accesses. The relative proportion of traffic from each direction could then be determined. The following distribution was realized:

- Yonge Access: 47% from the north and 53% from the south (63% of all pass-by trips);
- Maplevue Access: 32% from the east (12% of all pass-by trips); and
- Goodwin Access: 68% from the west (25% of all pass-by trips)

Total Trips

The resulting total site-generated volumes (new trips at each horizon + pass-by trips) assigned to the adjacent road network are illustrated in Figure 16 through Figure 18. Detailed assignment of new trips and pass-by trips generated by each sub-development at each horizon year are provided in Appendix E (north parcel), Appendix F (southeast parcel) and Appendix G (southwest parcel).



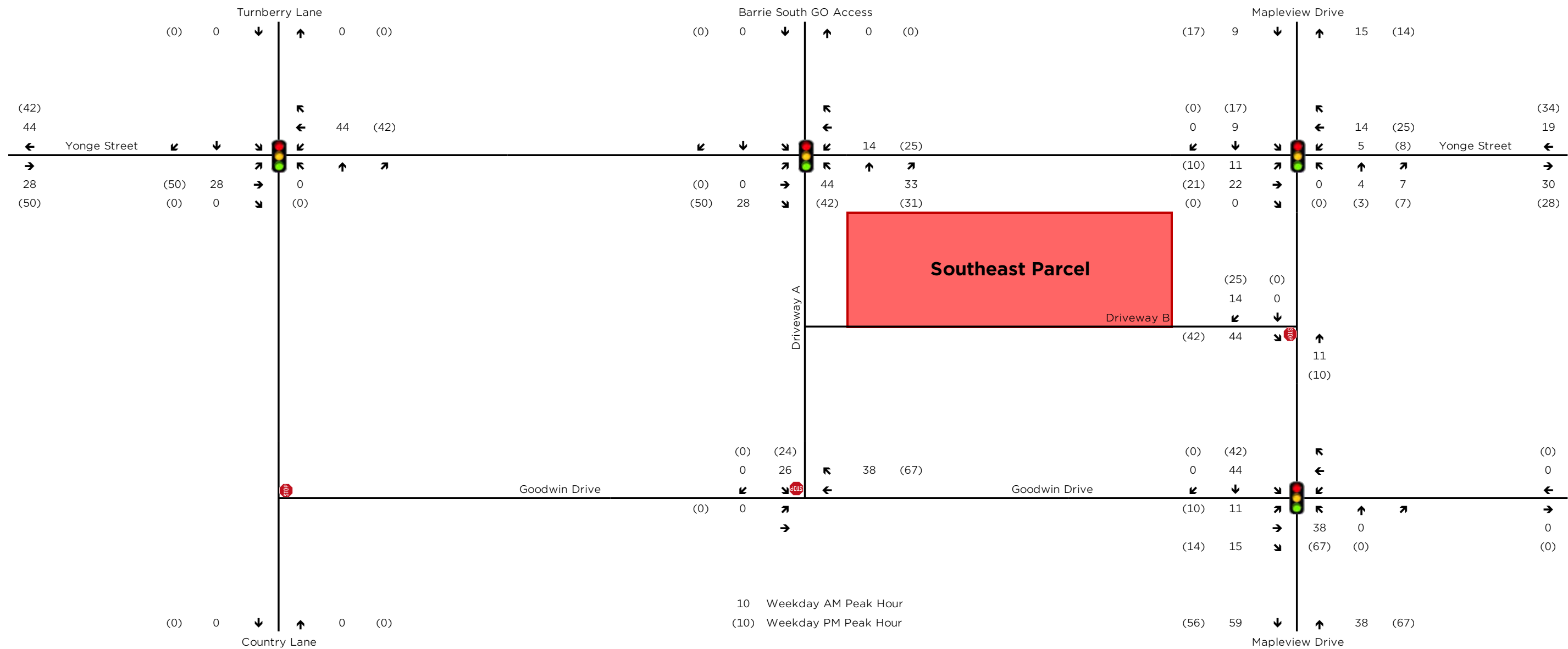


BARRIE WEST DEVELOPMENT

Figure 1: Site Location

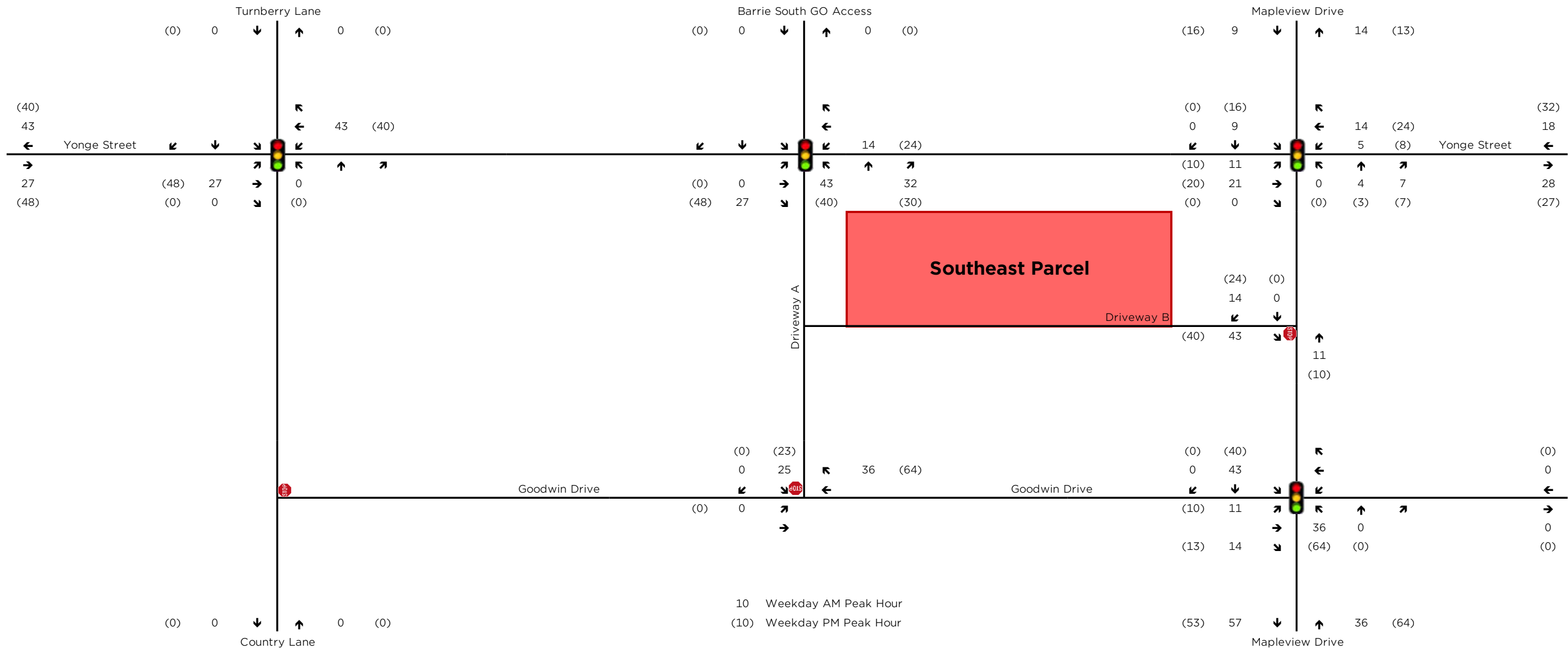


Appendix F: Southeast Parcel Trip Assignment



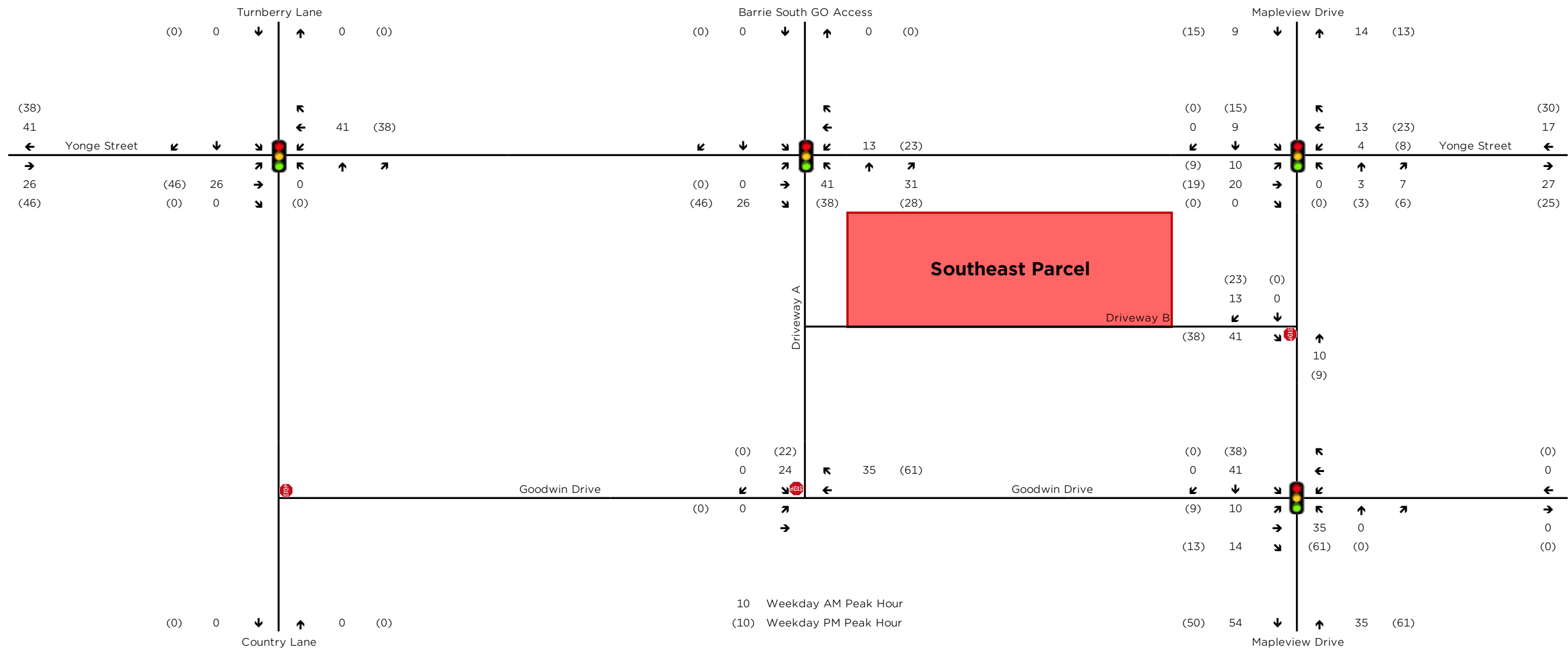
BARRIE WEST DEVELOPMENT
Figure F1: New Trips – Southeast Parcel (2026)





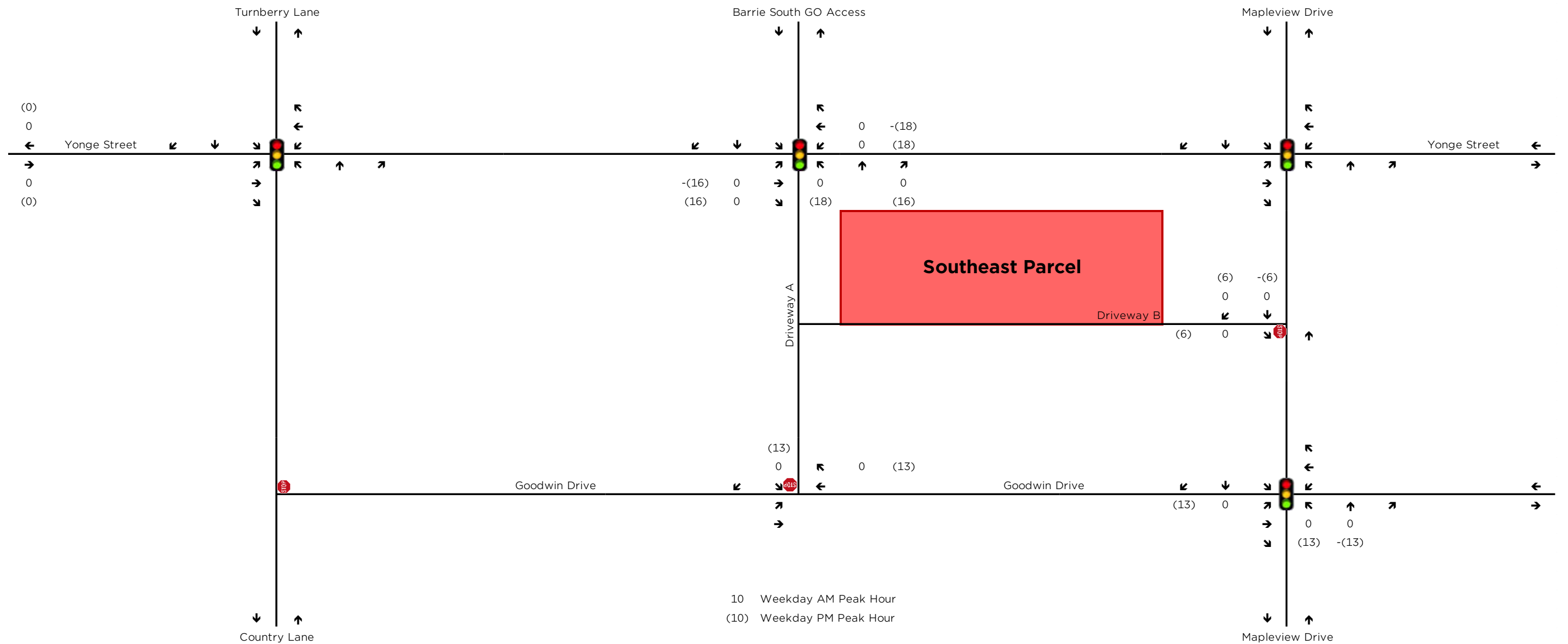
BARRIE WEST DEVELOPMENT
Figure F2: New Trips - Southeast Parcel (2031)





BARRIE WEST DEVELOPMENT
Figure F3: New Trips - Southeast Parcel (2036)

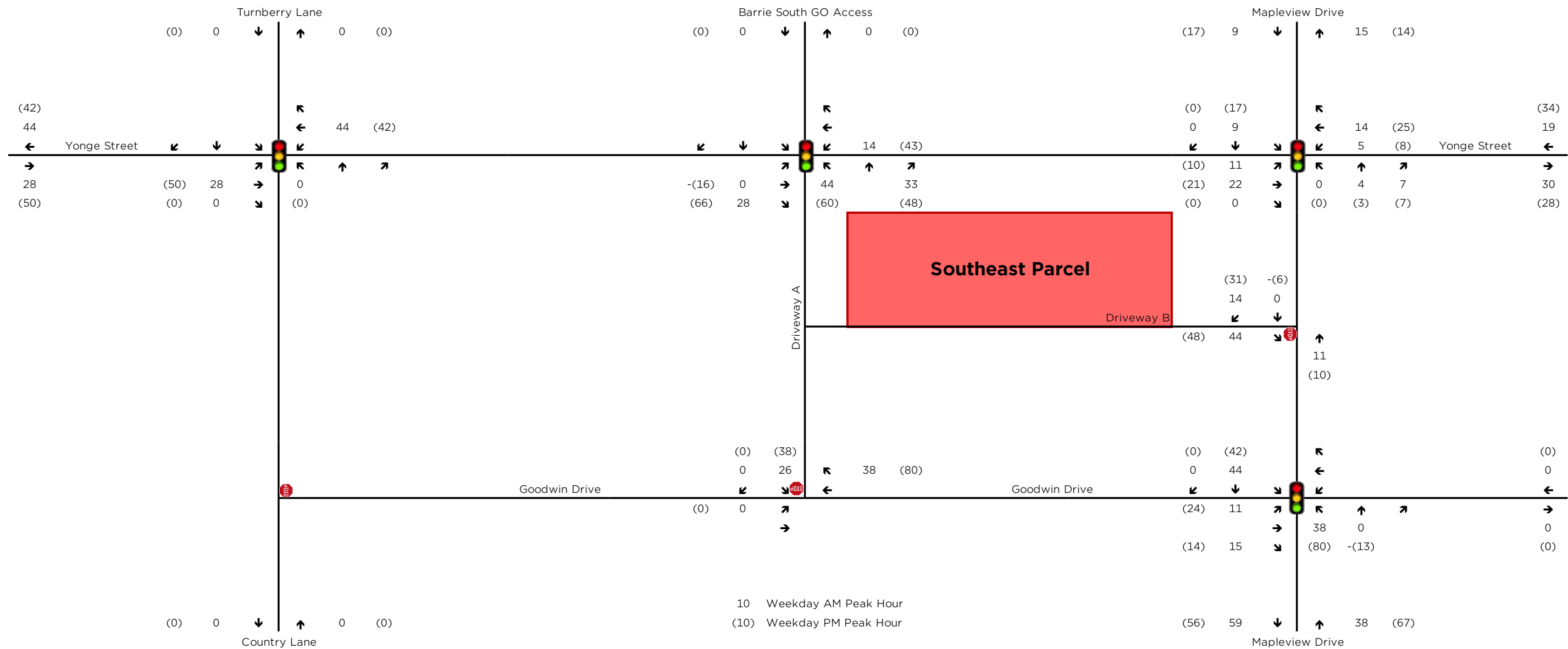




BARRIE WEST DEVELOPMENT

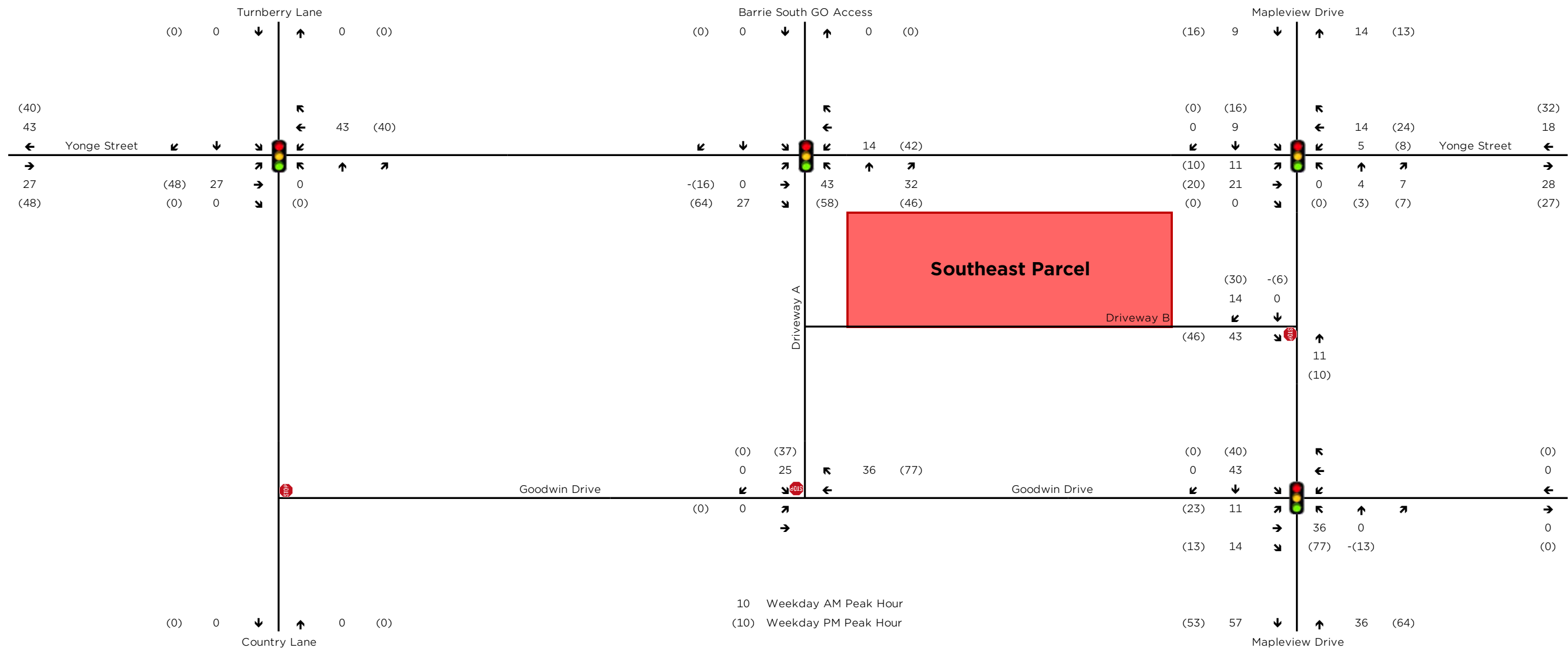
Figure F4: Pass-by Trips – Southeast Parcel





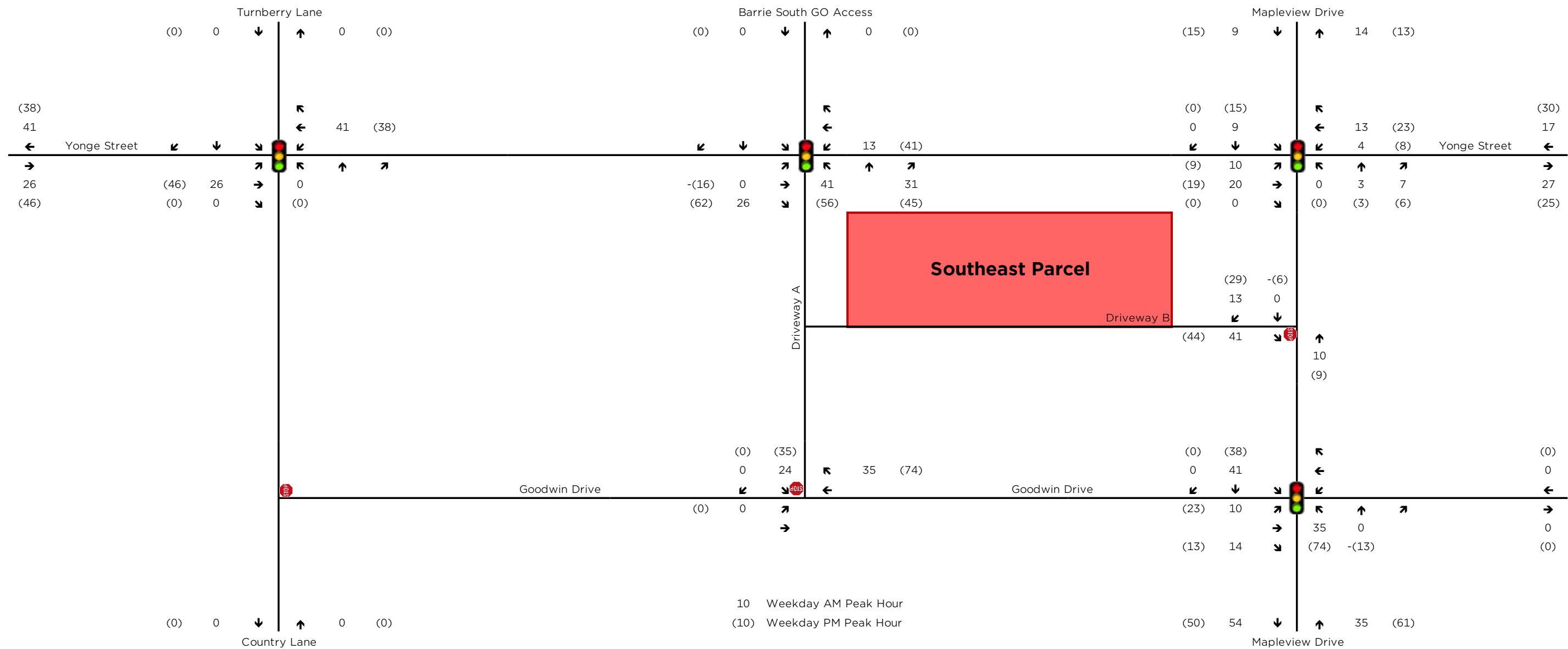
BARRIE WEST DEVELOPMENT
Figure F5: Total Trips – Southeast Parcel (2026)





BARRIE WEST DEVELOPMENT
Figure F6: Total Trips – Southeast Parcel (2031)





BARRIE WEST DEVELOPMENT
Figure F7: Total Trips – Southeast Parcel (2036)





Enhancing our communities



Metro Grocery Store No. 145

TRAFFIC IMPACT BRIEF

Metro Ontario Inc.

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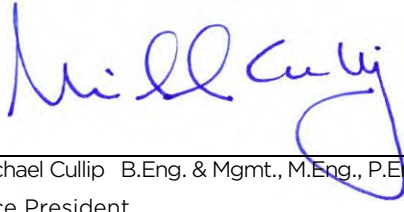
December
7, 2022

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Issue	Date	Description
1	December 7, 2022	Issued for Site Plan Approval

3 Proposed Development

3.1 SITE LOCATION

The location of the proposed development is at the northeast corner of the intersection of Mapleview Drive and Goodwin Drive. This site is part of the larger Barrie West development located on the north side of Mapleview Drive extending from Goodwin Drive to Yonge Street (consisting of the properties of 658 Mapleview Drive, 662 Mapleview Drive and 800 Yonge Street).

The location of the site is illustrated in Figure 1.

3.2 LAND USE

The proposed development will consist of a 4,064 m² (43,748 ft²) Metro grocery store.

A site plan is illustrated in Figure 4.

3.3 SITE PARKING

Standard Parking

According to the City's *Zoning By-law*⁷, the applicable parking rate is:

- 1 parking space per 30 m² of gross floor area (GFA) of retail use.

The minimum parking requirement is therefore:

- $4,064 \text{ m}^2 \times 1 \text{ space per } 30 \text{ m}^2 = 136 \text{ spaces}.$

As indicated on the site plan, the proposed development will provide 236 parking spaces, thus exceeding the City's requirements (the supply rate is 1 space per 17 m²).

Barrier-Free Parking

As per the *Zoning By-law*, any site requiring more than 100 standard parking spaces must supply 1 barrier-free space plus 3% of the required standard parking spaces as barrier-free spaces. With the requirement of 136 standard spaces noted above, the barrier-free requirement is:

- $1 \text{ space} + 136 \times 3\% = 6 \text{ spaces}.$

As indicated on the site plan, the development will provide 8 barrier-free spaces, thus satisfying the City's requirements.

⁷ City of Barrie Comprehensive Zoning By-law 2009-141.



Loading Spaces

As per the *Zoning By-law*, any commercial use with a GFA between 3,000 m² and 7,499 m² must provide 2 permanent loading spaces.

As indicated on the site plan, 3 loading spaces will be provided, thus satisfying the City's requirements.

3.4 SITE ACCESS & ON-SITE CIRCULATION

Site Access

As evident in the site plan of Figure 4, access to the site will be provided by three connections to the internal road network within the Barrie West development. Two accesses will connect to the Barrie West east-west driveway (Driveway A) – the westmost access (West Access) and the central access (Centre Access). Driveway A in turn connects to Goodwin Drive to the west and Yonge Street opposite the GO access to the east. The third access (East Access) connects to the Barrie-West north-south driveway (Driveway B) which in turn connects to Driveway A to the north and to Maplevue Drive to the south (via a right-in/right-out).

The Centre Access and East Access will each be configured as full-moves accesses to their respective internal driveway and will be designed in accordance with Transportation Association of Canada (TAC) standards for a commercial access, recognizing that they must accommodate truck traffic. The West Access, which is also a full moves access, will be 6.3 metres wide sufficient to accommodate automobile traffic.

Site Circulation

Internal aisles within the site providing access to the parking spaces (which are oriented perpendicular to the aisle) will be a minimum of 6.4 metres wide as required by the City's *Zoning By-law*.

A vehicle turning assessment was completed to ensure that sufficient room is provided on-site to accommodate the manoeuvring requirements of typical design vehicles, namely a tractor with semi-trailer, a fire truck, and a garbage truck. Results of the assessment are provided in Appendix D. As indicated, sufficient manoeuvring space is provided for the design vehicles.

3.5 SITE TRAFFIC

3.5.1 Trip Generation

The number of vehicle trips to be generated by the proposed development for the weekday AM and PM, and Saturday peak hours has been determined based on type of use, development size,



and trip generation rates per the *ITE Trip Generation Manual, 11th Edition*⁸. Based on the proposed development, trip rates for the *supermarket* (ITE land use code 850) land-use have been applied. Trip rates and trip estimates are summarized in Table 3.

Table 3: Trip Rates & Gross Trip Estimates

LAND USE	VARIABLE/ SIZE	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR			SATURDAY PEAK HOUR		
		In	Out	Total	In	Out	Total	In	Out	Total
supermarket (ITE 850)	1000 ft ² GFA	1.69	1.17	2.86	4.48	4.48	8.95	5.05	5.05	10.10
Metro	43,748 ft ²	74	51	125	196	196	392	221	221	442

As indicated, the site is expected to generate 125 trips during the weekday AM peak hour, 392 trips during the weekday PM peak hour, and 442 trips during the Saturday peak hour.

Given the commercial nature of the site, not all trips generated by the development will be new trips on the road network. A portion of the trips are expected to be internal trips (i.e. trips made between different land uses within the Barrie West development site) and/or pass-by trips (i.e. trips that stop at the grocery store as they drive by). To remain conservative, no internal trip reduction has been applied, recognizing that the proposed Metro store will be built out before any of the remaining developments within the Barrie West development. A pass-by rate of 36% (as detailed in the *ITE Trip Generation Handbook*⁹ for the *supermarket* land use) has been applied to the weekday PM peak hour and Saturday peak hour trip generation (pass-by rates are not available for the AM peak hour). A summary of the trip estimates by type and the resulting net new trip estimates is provided in Table 4.

Table 4: Net Trip Estimates

TRIP TYPE	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR			SATURDAY PEAK HOUR		
	In	Out	Total	In	Out	Total	In	Out	Total
Gross Trips	74	51	125	196	196	392	221	221	442
Pass-by Trips	-	-	-	71	71	142	80	80	160
Net (New) Trips	74	51	125	125	125	250	141	141	282

⁸ *Trip Generation Manual, 11th Edition*. Institute of Transportation Engineers. September 2021.

⁹ *Trip Generation Handbook, 3rd Edition*. Institute of Transportation Engineers. September 2017.



As indicated, the site is expected to generate 125 new trips during the weekday AM peak hour, 250 new trips during the weekday PM peak hour, and 282 new trips during the Saturday peak hour.

3.5.2 Trip Modal Split

The City's *Transportation Master Plan* identifies a City-wide modal split target of 7% public transit and 12% active transportation by 2041 – resulting in a total non-automobile modal share of 19% of all trips city-wide. Based on the City's proposed transit improvements, expansion of the City's active transportation network (more sidewalks and bicycle infrastructure) and proximity of the subject site to a major transit hub (Barrie South GO), it is considered reasonable that the City's modal split targets can be achieved by the 2041 horizon.

For the interim horizon years (2024 and 2031), modal split proportions have been linearly interpolated between the current modal split (1.6% public transit, 4.8% active transportation and 93.6% automobile as per the 2016 *Transportation Tomorrow Survey* and further detailed in the Barrie West TIS) and target split values, as summarized in Table 5. Applying the noted rates to the trip generation determined in Section 3.5.1, the total automobile and non-automobile trips generated by the site was determined for each horizon, as summarized in Table 6

Table 5: Modal Splits by Horizon Year

YEAR	PUBLIC TRANSIT	ACTIVE TRANSPORTATION	AUTOMOBILE
2022	1.6%	4.8%	93.6%
2024	2.2%	5.6%	92.2%
2031	4.2%	8.2%	87.6%
2041	7%	12%	81%

Table 6: Modal Trip Estimates

YEAR	PUBLIC TRANSIT			ACTIVE TRANSPORTATION			AUTOMOBILE		
	AM Peak	PM Peak	SAT Peak	AM Peak	PM Peak	SAT Peak	AM Peak	PM Peak	SAT Peak
2024	3	5	5	6	12	14	106	203	229
2031	5	8	9	9	17	19	96	177	199



3.5.3 Trip Distribution & Assignment

The distribution of site-generated trips was considered from two perspectives: new trips and pass-by trips.

New Trips

New trips have been established based on the location of the proposed development in relation to nearby residential areas, including both existing neighbourhoods and new developments currently under construction. The Metro store is expected to predominantly attract local residents looking to purchase groceries; therefore, most trips can be expected to travel to/from the surrounding neighbourhoods. The following distribution has been applied:

- to/from the north – 35%;
- to/from the south – 10%;
- to/from the east – 25%; and
- to/from the west – 30%

Assignment of new trips is illustrated in Figure 5 (2024) and Figure 6 (2031).

Pass-by Trips

The pass-by distribution established in the Barrie West TIS has been applied to the site. The distribution is as follows:

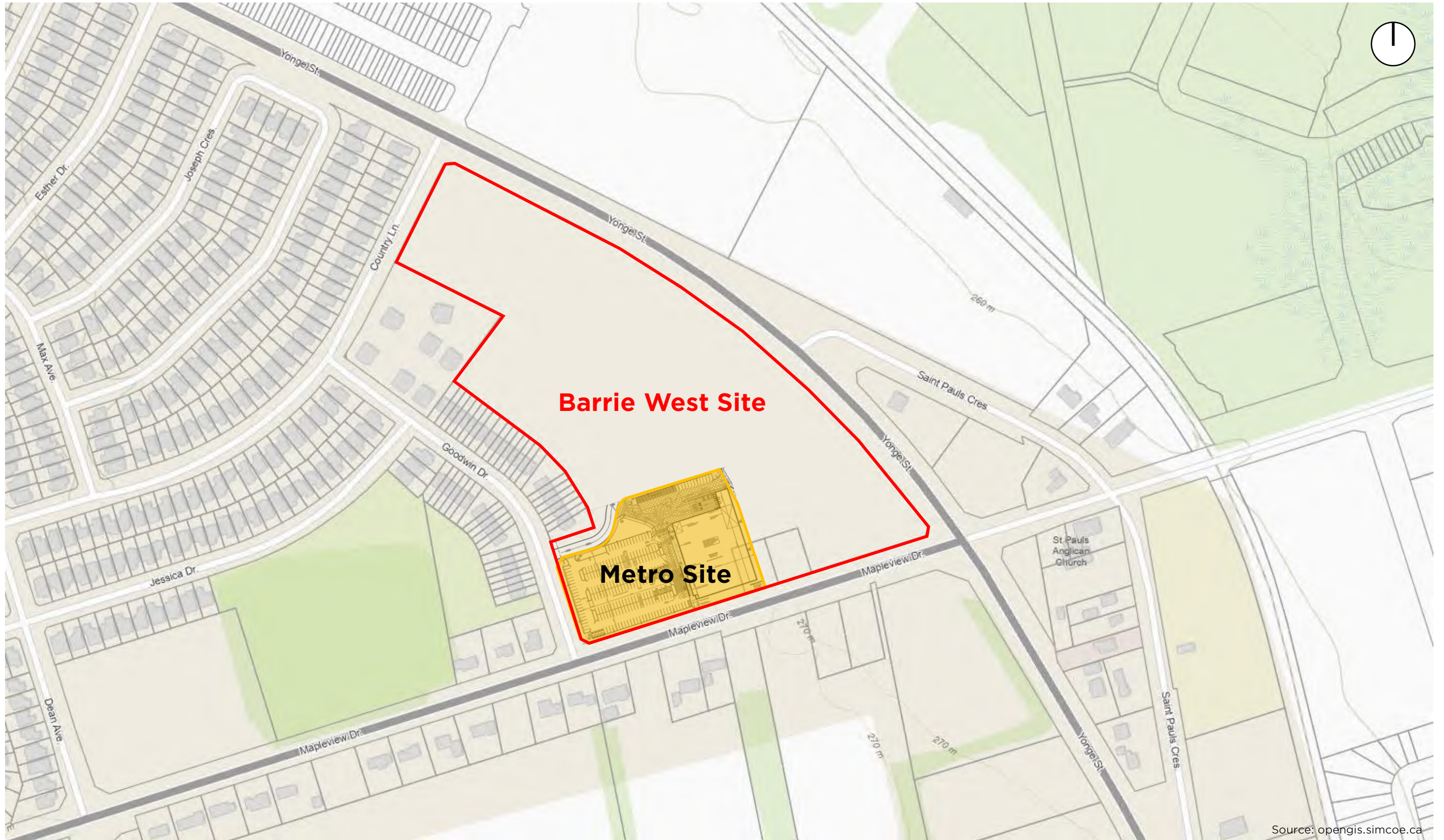
- Yonge Street access – 47% from the north and 53% from the south (63% of all pass-by trips);
- Mapleview Drive access – 32% from the east (12% of all pass-by trips); and
- Goodwin Drive access – 68% from west (25% of all pass-by trips)

Assignment of pass-by trips is illustrated in Figure 7.

Total Trips

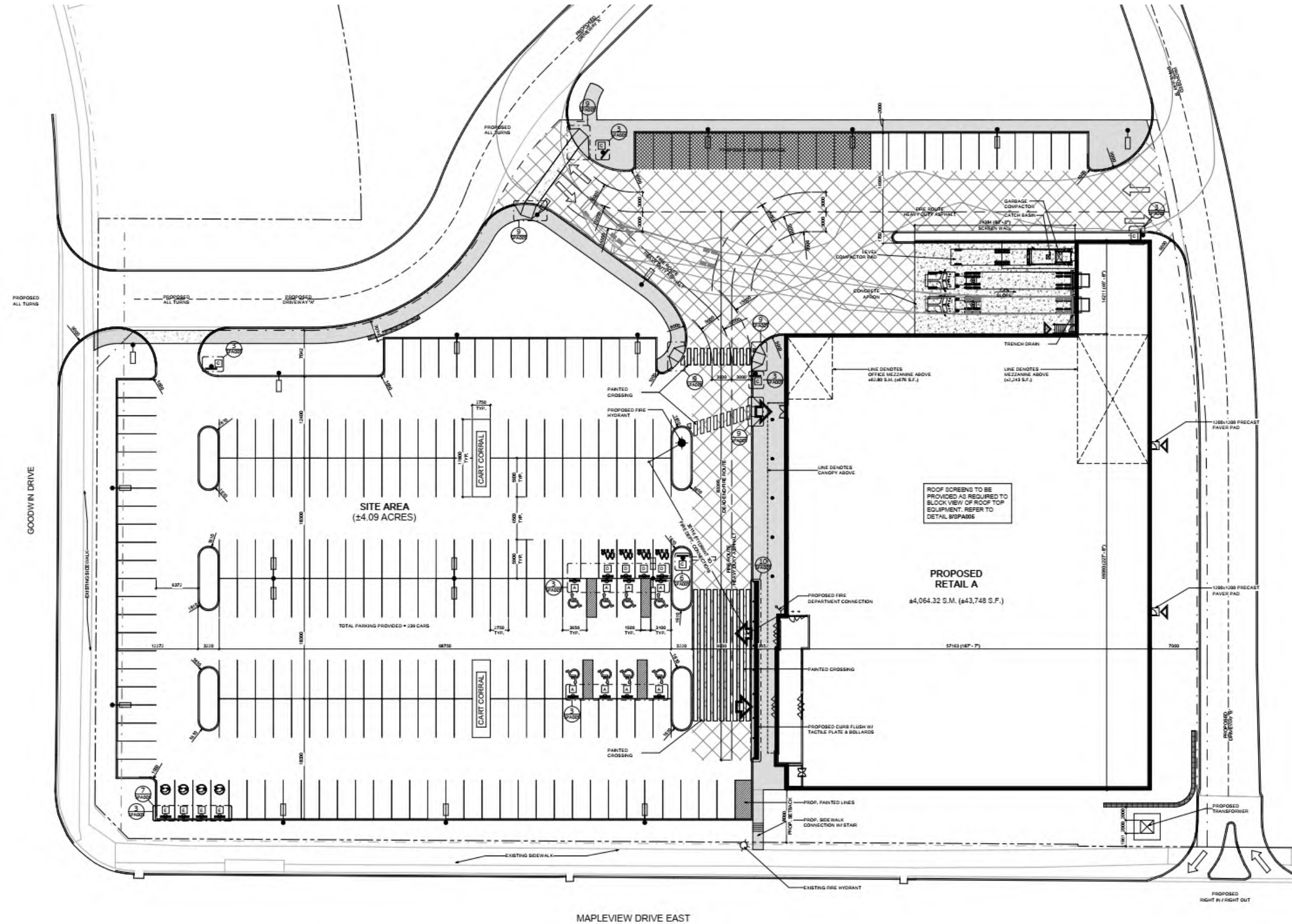
The resulting total site-generated trips (new trips + pass-by trips) assigned to the road network are illustrated in Figure 8 (2024) and Figure 9 (2031).





METRO GROCERY STORE NO. 145
Figure 1: Site Location

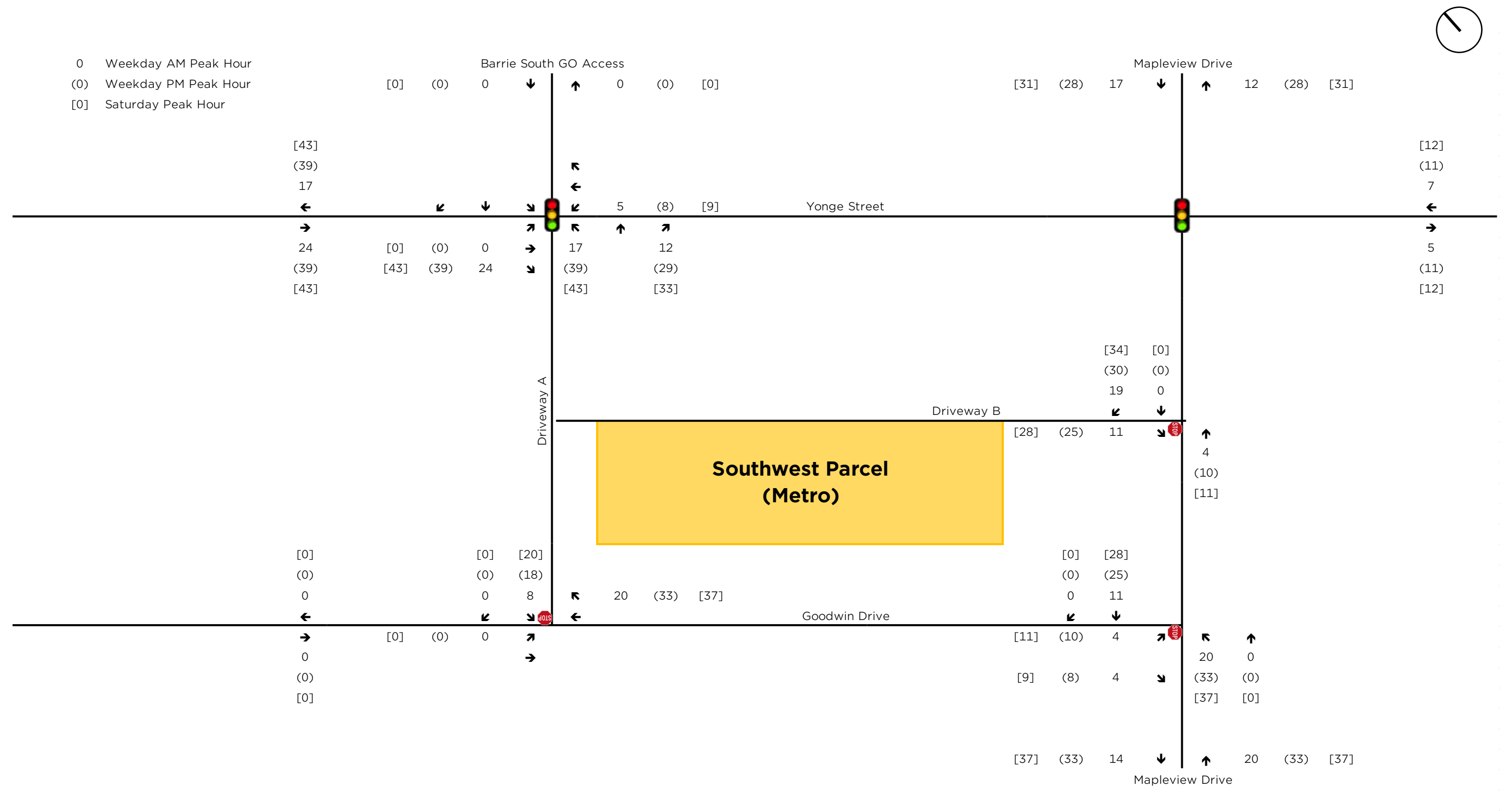




METRO GROCERY STORE NO. 145

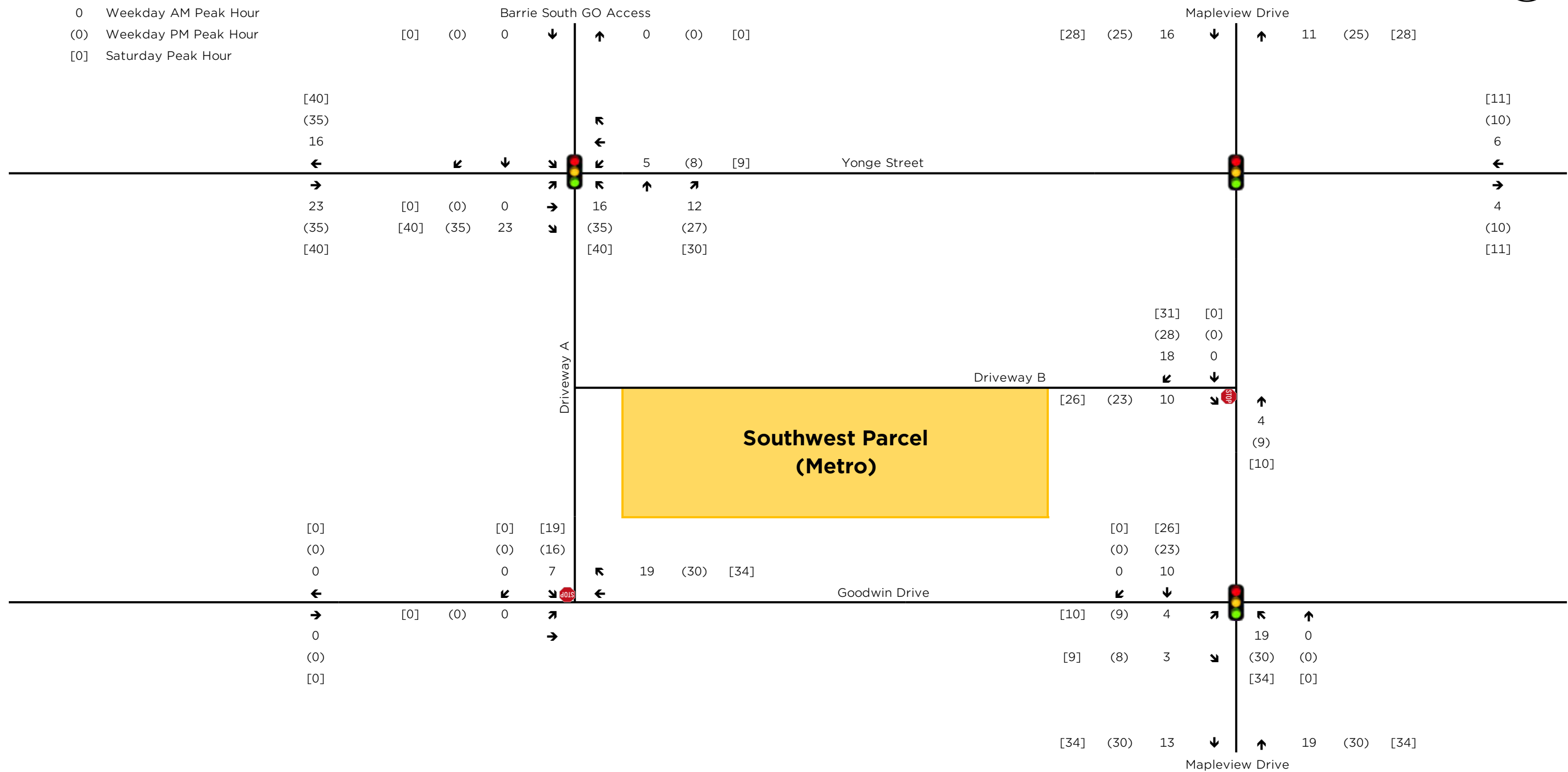
Figure 4: Site Plan





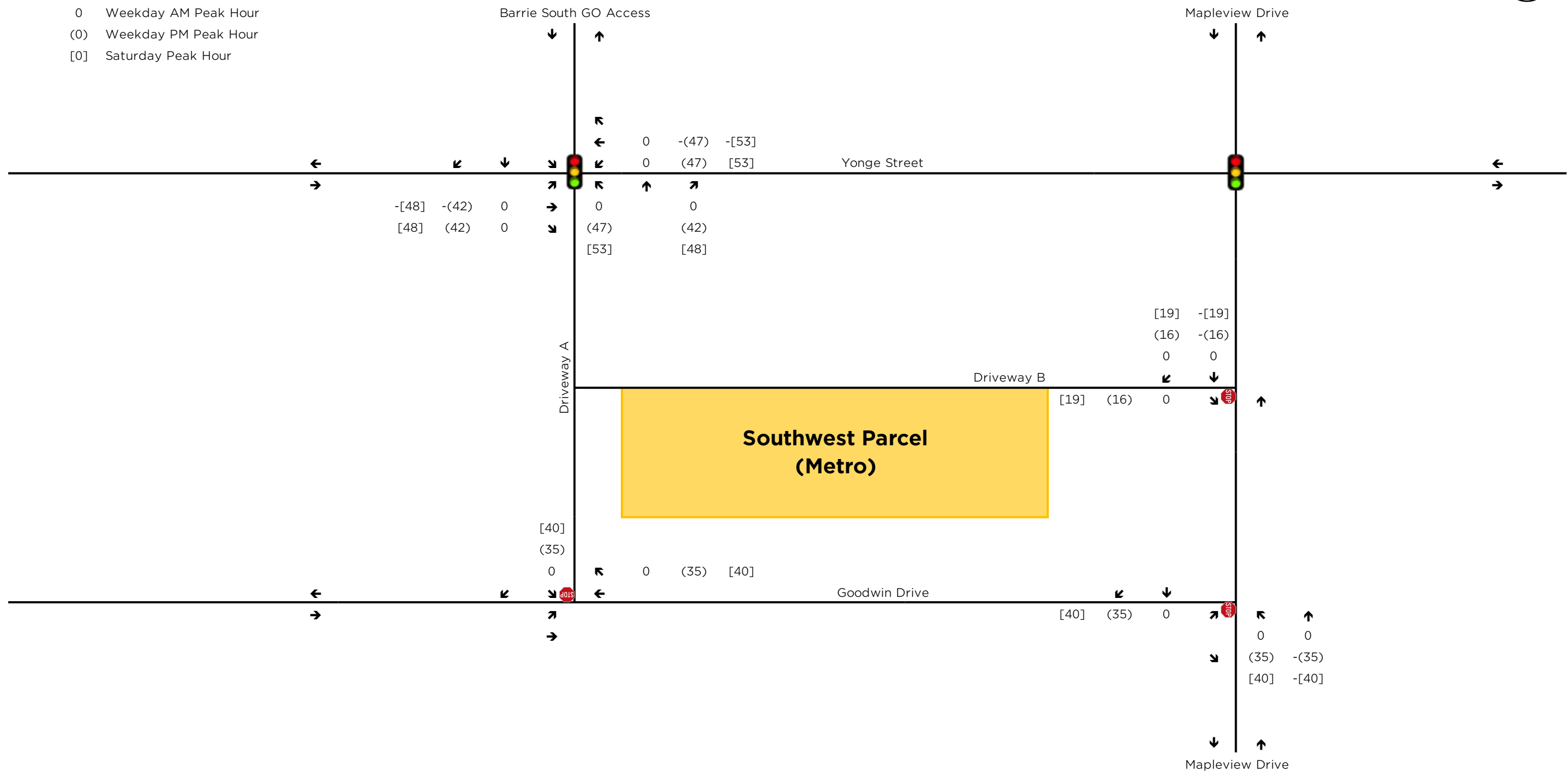
METRO GROCERY STORE NO. 145
Figure 5: Site Trip Generation – New Trips (2024)





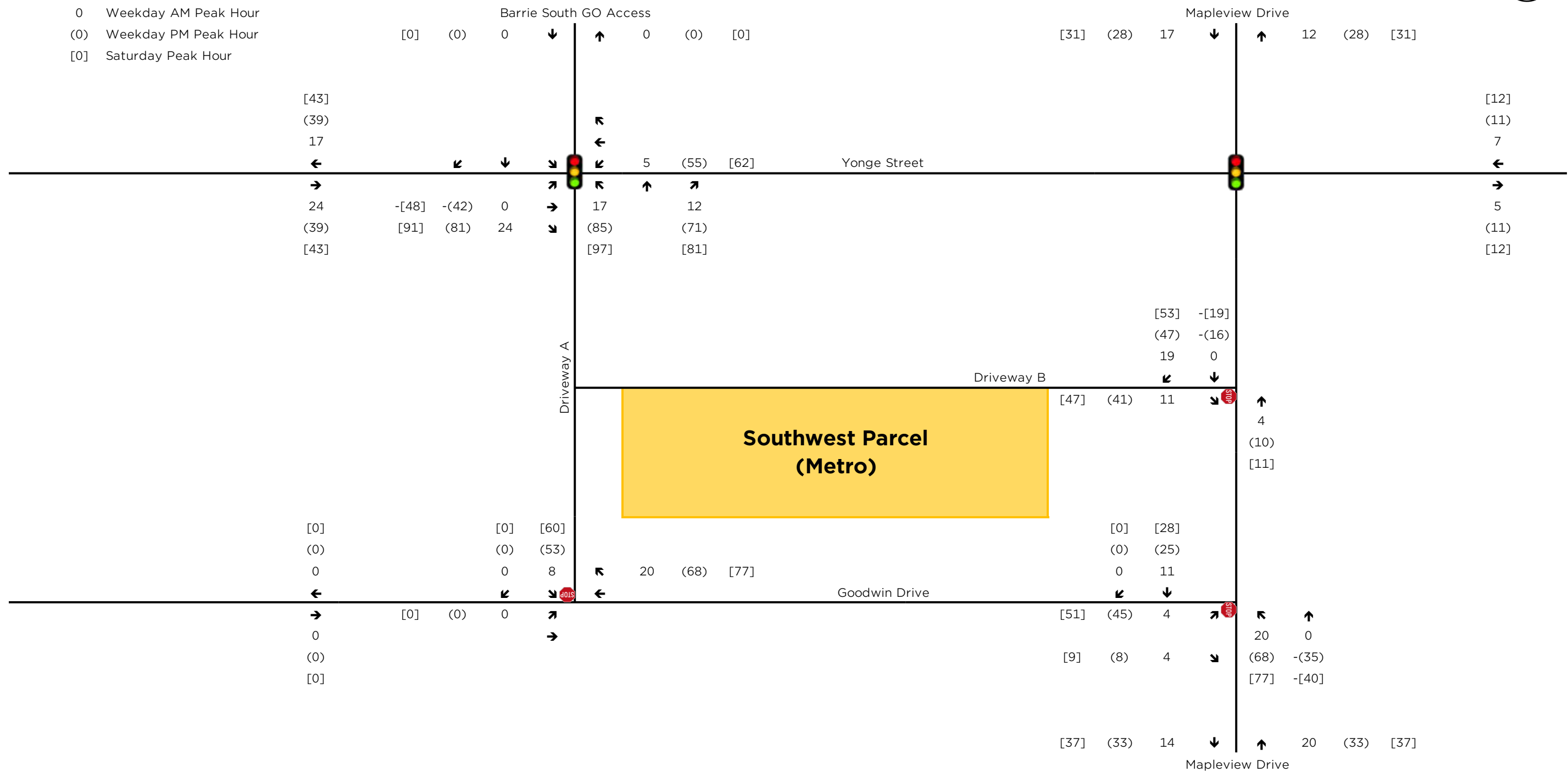
METRO GROCERY STORE NO. 145
Figure 6: Site Trip Generation – New Trips (2031)





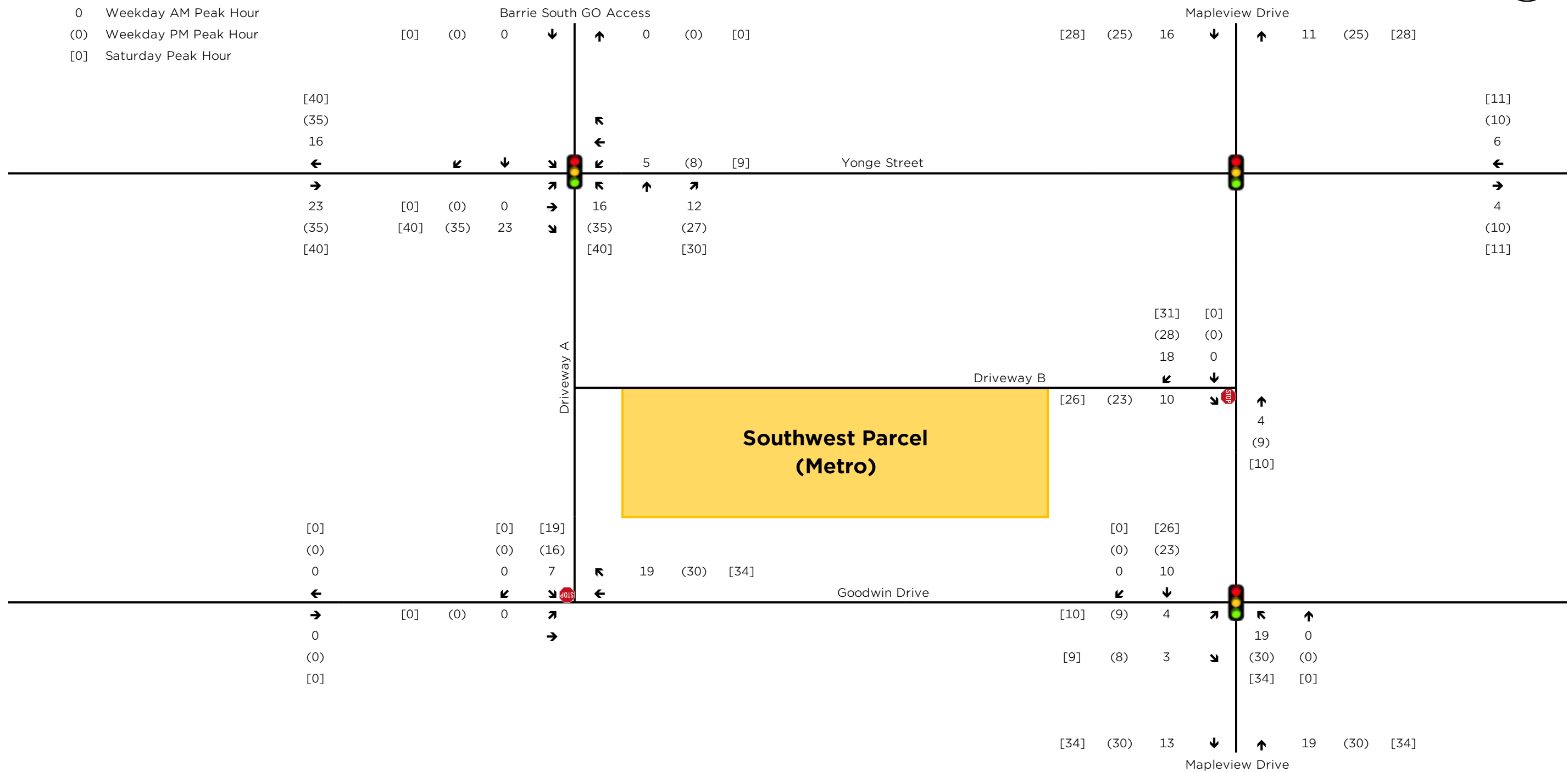
METRO GROCERY STORE NO. 145
Figure 7: Site Trip Generation – Pass-by Trips





METRO GROCERY STORE NO. 145
Figure 8: Site Trip Generation – Total Trips (2024)

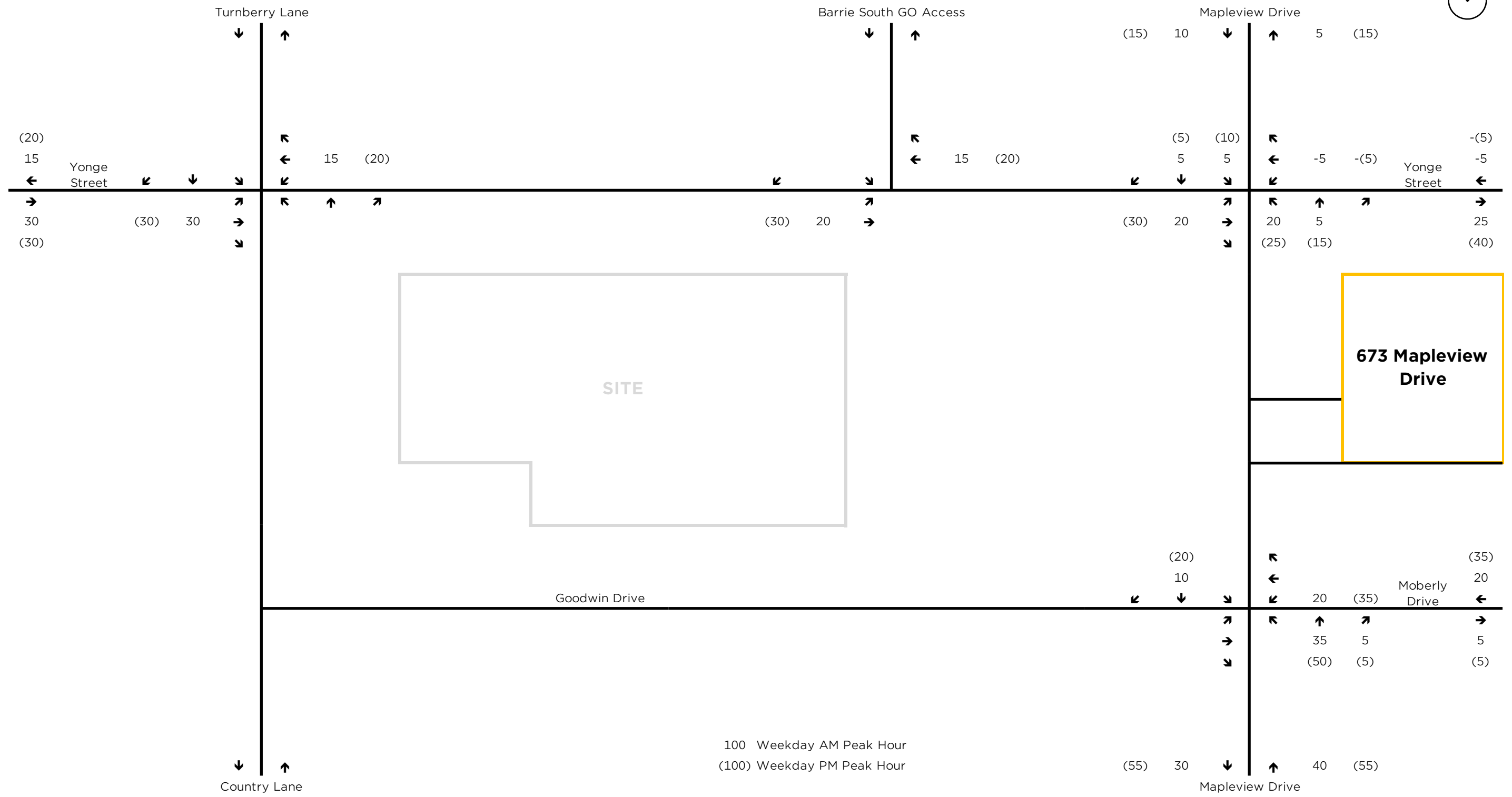


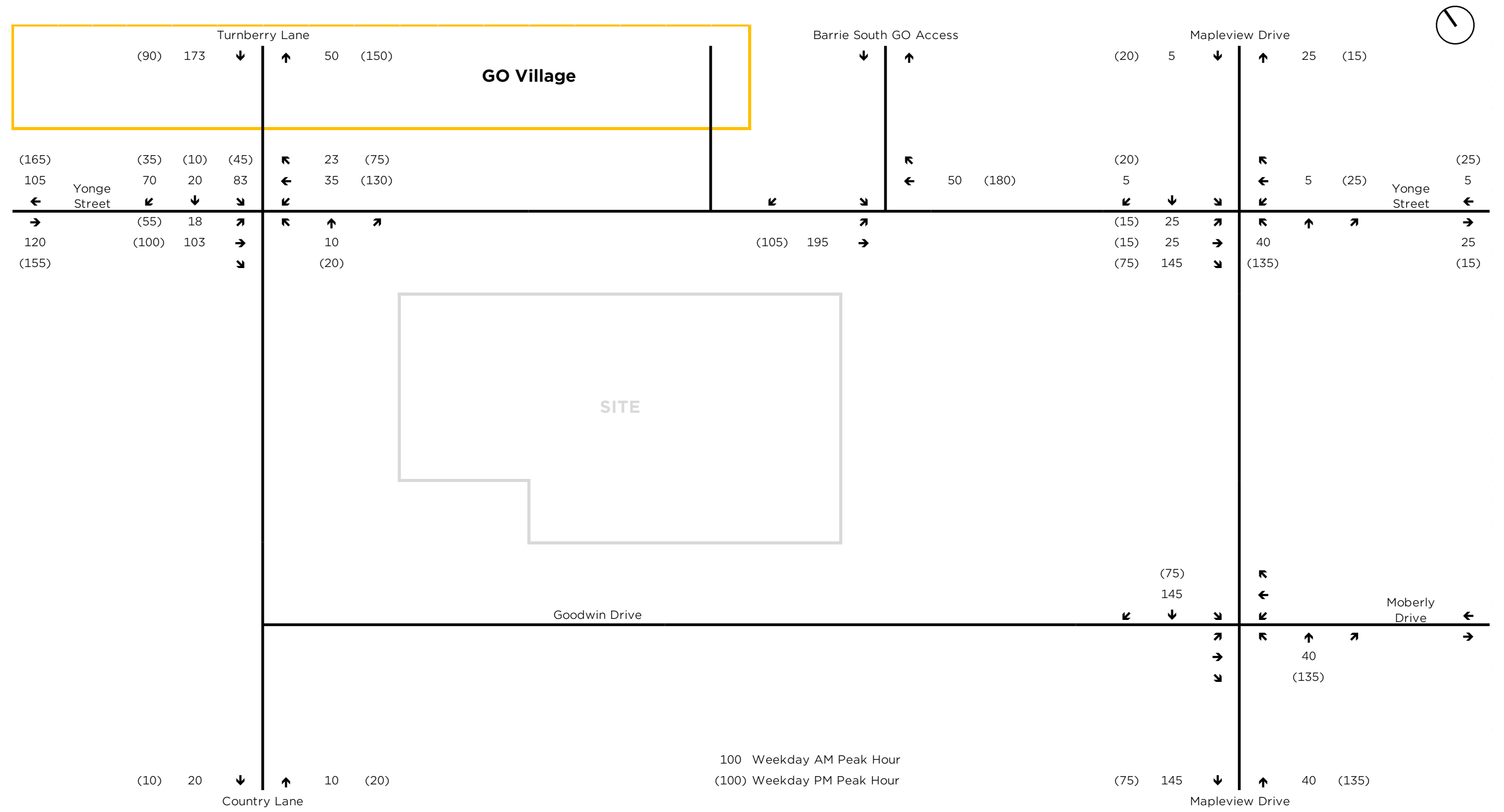


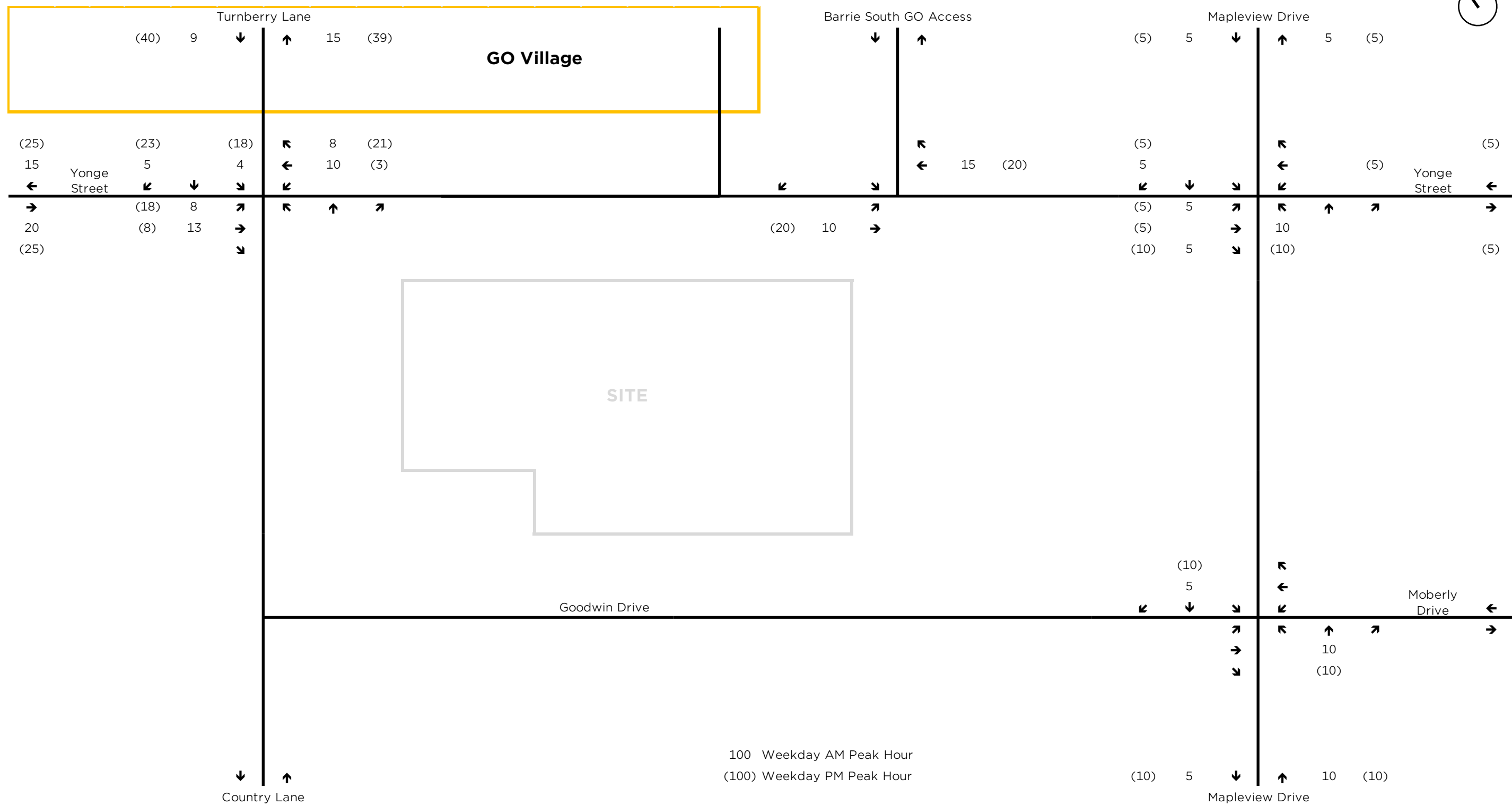
METRO GROCERY STORE NO. 145
Figure 9: Site Trip Generation – Total Trips (2031)



Appendix F: Background Development Trip Assignment



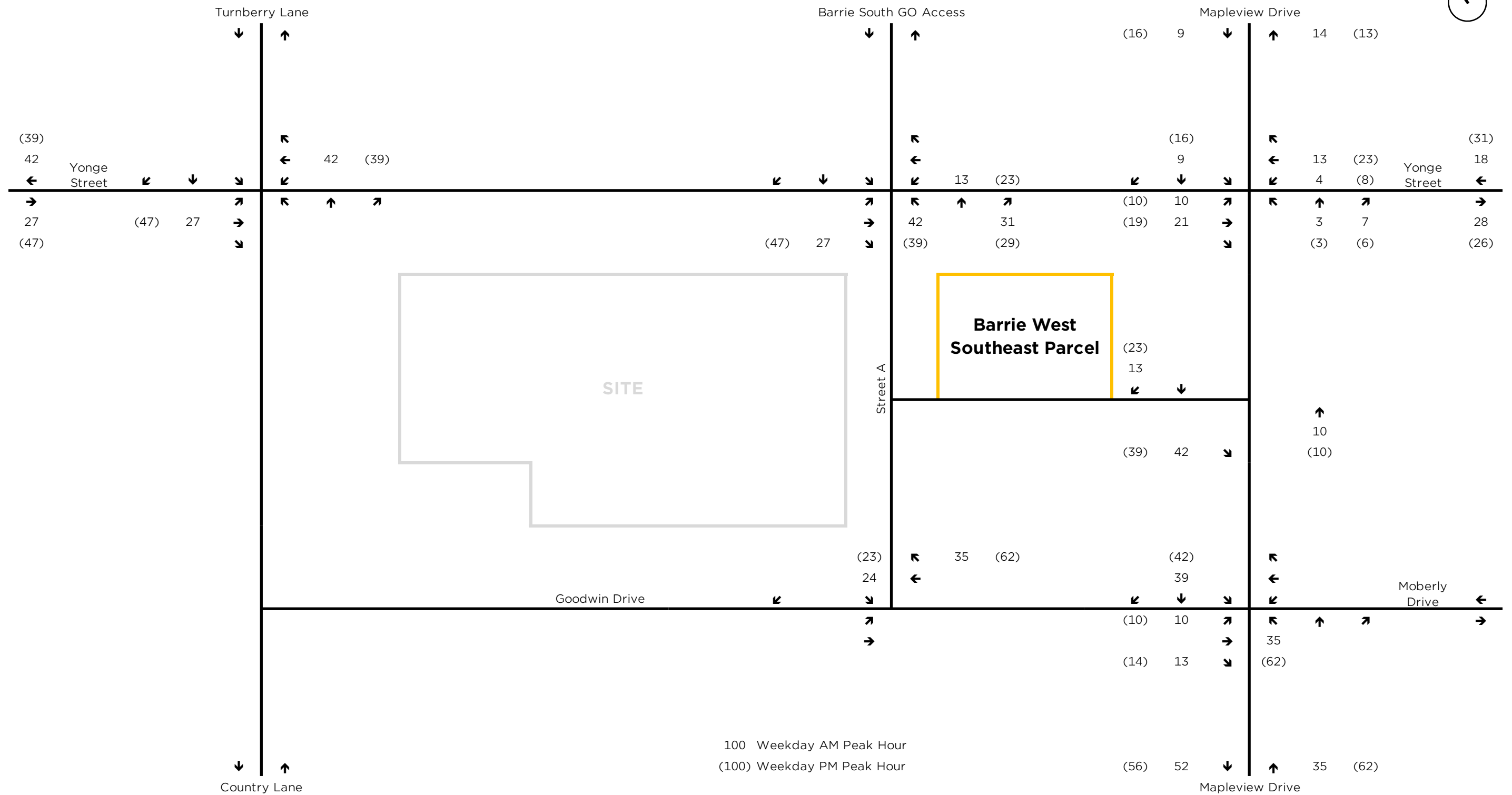




THE VILLAGE OF INNIS LANDING – TIS APPENDIX F

Figure F3: GO Village – Commercial Trips

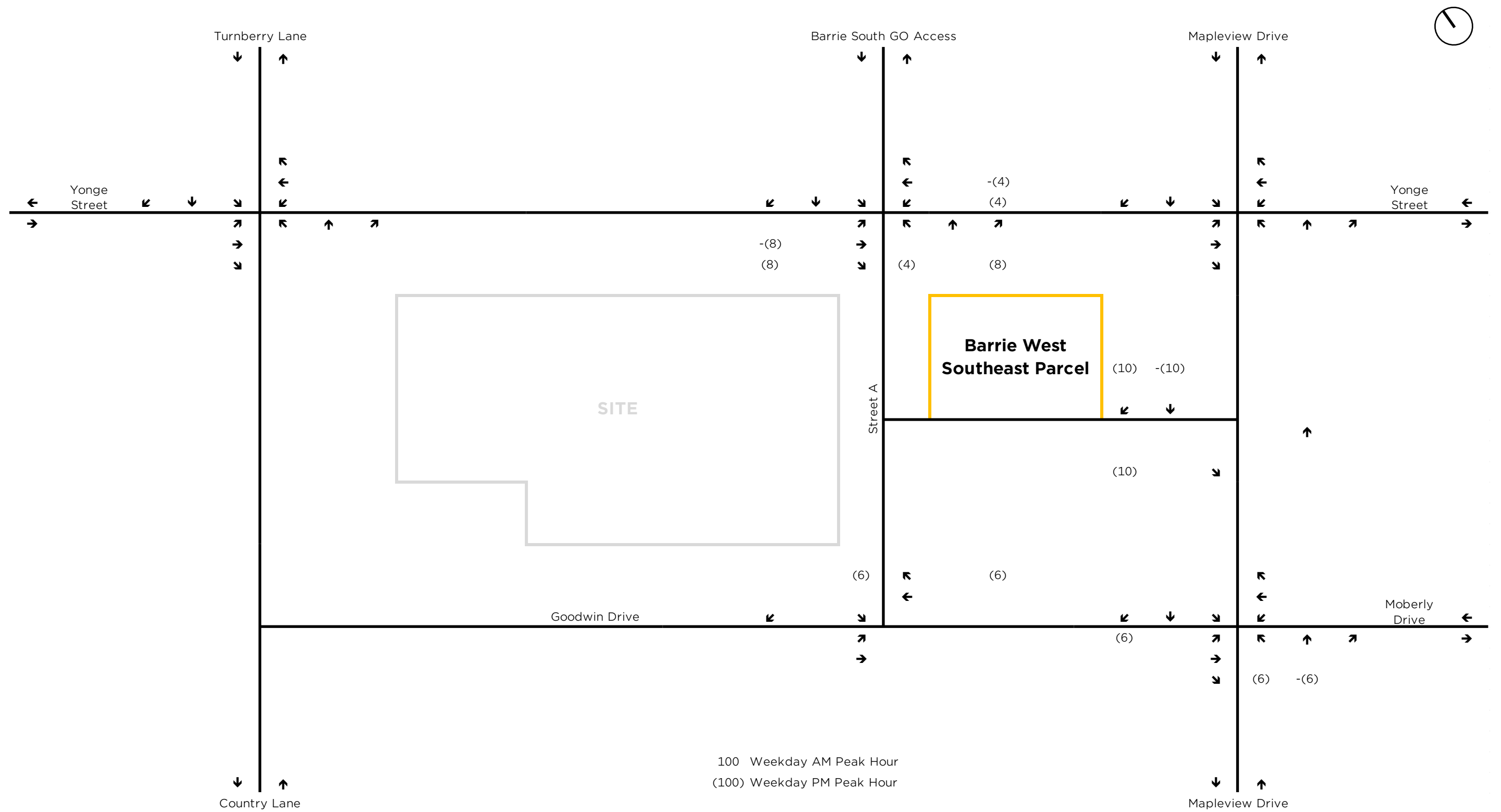




THE VILLAGE OF INNIS LANDING – TIS APPENDIX F

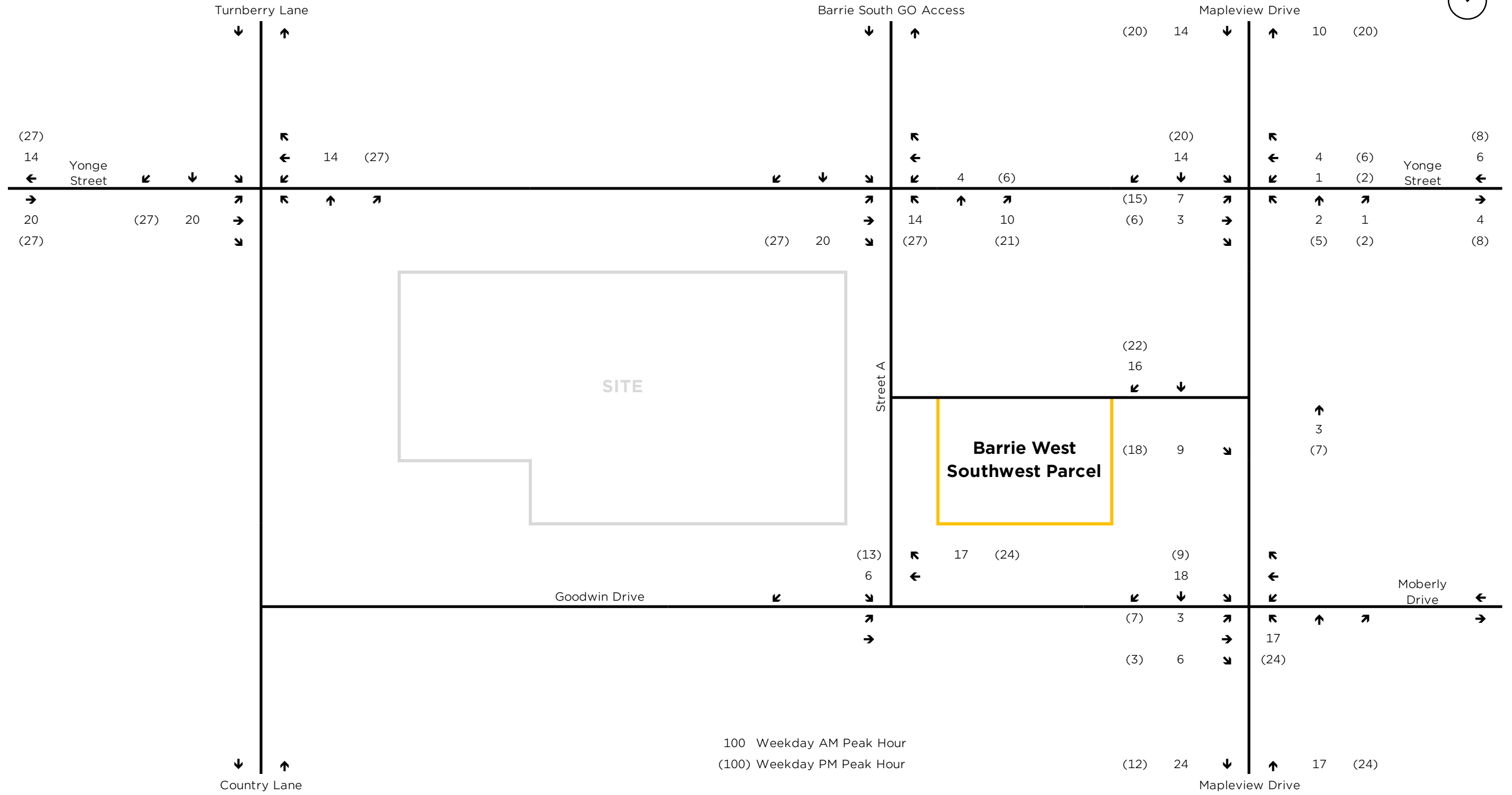
Figure F4: Barrie West Southeast Parcel – New Trips





THE VILLAGE OF INNIS LANDING – TIS APPENDIX F

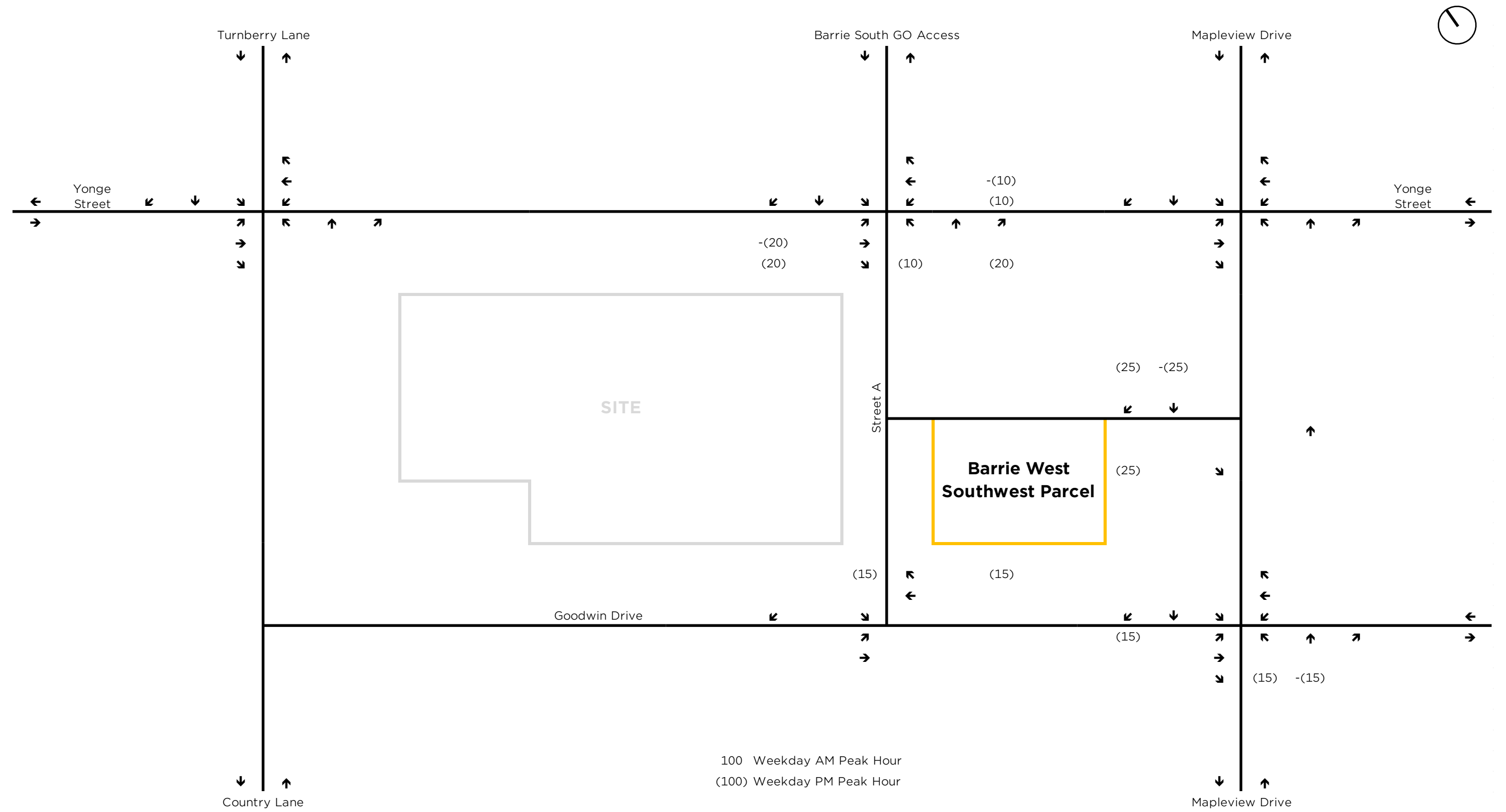
Figure F5: Barrie West Southeast Parcel – Pass-by Trips



THE VILLAGE OF INNIS LANDING – TIS APPENDIX F

Figure F6: Barrie West Southwest Parcel – New Trips





THE VILLAGE OF INNIS LANDING – TIS APPENDIX F

Figure F7: Barrie West Southwest Parcel – Pass-by Trips



Appendix G: Future Background Operations

HCM Signalized Intersection Capacity Analysis

1: Yonge St & Country Ln/Turnberry Ln

2027 Background Conditions

Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	12	45	98	26	83	25	796	41	34	890	12
Future Volume (vph)	24	12	45	98	26	83	25	796	41	34	890	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.88		1.00	0.89		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1745	1526		1682	1648		1521	3451		1789	3500	
Flt Permitted	0.67	1.00		0.71	1.00		0.19	1.00		0.19	1.00	
Satd. Flow (perm)	1227	1526		1256	1648		297	3451		364	3500	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	31	15	58	126	33	106	32	1021	53	44	1141	15
RTOR Reduction (vph)	0	46	0	0	84	0	0	4	0	0	1	0
Lane Group Flow (vph)	31	27	0	126	55	0	32	1070	0	44	1155	0
Confl. Peds. (#/hr)	7		8	5		4	8		5	4		7
Heavy Vehicles (%)	4%	2%	11%	8%	2%	2%	20%	5%	2%	2%	4%	8%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.8	15.8		15.8	15.8		44.5	41.8		47.3	43.2	
Effective Green, g (s)	15.8	15.8		15.8	15.8		44.5	41.8		47.3	43.2	
Actuated g/C Ratio	0.20	0.20		0.20	0.20		0.57	0.54		0.61	0.56	
Clearance Time (s)	6.0	6.0		6.0	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	
Lane Grp Cap (vph)	249	310		255	335		212	1856		296	1945	
v/s Ratio Prot		0.02			0.03		0.01	0.31		c0.01	c0.33	
v/s Ratio Perm	0.03			c0.10			0.08			0.08		
v/c Ratio	0.12	0.09		0.49	0.16		0.15	0.58		0.15	0.59	
Uniform Delay, d1	25.3	25.1		27.4	25.5		8.0	12.0		7.1	11.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.1		1.5	0.2		0.3	1.3		0.2	1.3	
Delay (s)	25.5	25.2		28.9	25.7		8.3	13.3		7.3	12.8	
Level of Service	C	C		C	C		A	B		A	B	
Approach Delay (s)		25.3			27.2			13.2			12.6	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			14.8			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			77.7			Sum of lost time (s)				16.0		
Intersection Capacity Utilization			53.2%			ICU Level of Service				A		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: Yonge St & Street A/GO Access

2027 Background Conditions
Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	5	27	35	5	33	11	781	48	31	995	34
Future Volume (vph)	35	5	27	35	5	33	11	781	48	31	995	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	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	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	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	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1883	1580	1621	1883	1255	1789	3466		1448	3495	
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.18	1.00		0.24	1.00	
Satd. Flow (perm)	1420	1883	1580	1287	1883	1255	335	3466		360	3495	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	44	6	34	44	6	42	14	989	61	39	1259	43
RTOR Reduction (vph)	0	0	31	0	0	38	0	3	0	0	2	0
Lane Group Flow (vph)	44	6	3	44	6	4	14	1047	0	39	1300	0
Confl. Peds. (#/hr)			1	5		4	1		5	4		
Heavy Vehicles (%)	2%	2%	2%	12%	2%	28%	2%	4%	8%	26%	4%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	5.6	5.6	5.6	5.6	5.6	5.6	43.8	42.6		46.2	43.8	
Effective Green, g (s)	5.6	5.6	5.6	5.6	5.6	5.6	43.8	42.6		46.2	43.8	
Actuated g/C Ratio	0.08	0.08	0.08	0.08	0.08	0.08	0.66	0.64		0.69	0.66	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	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	3.0	
Lane Grp Cap (vph)	119	158	132	108	158	105	246	2216		288	2298	
v/s Ratio Prot		0.00			0.00		0.00	0.30		c0.00	c0.37	
v/s Ratio Perm	0.03		0.00	c0.03		0.00	0.04			0.09		
v/c Ratio	0.37	0.04	0.02	0.41	0.04	0.03	0.06	0.47		0.14	0.57	
Uniform Delay, d1	28.8	28.0	28.0	28.9	28.0	28.0	4.3	6.2		3.5	6.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.9	0.1	0.1	2.5	0.1	0.1	0.1	0.7		0.2	1.0	
Delay (s)	30.8	28.1	28.1	31.4	28.1	28.1	4.4	6.9		3.7	7.2	
Level of Service	C	C	C	C	C	C	A	A		A	A	
Approach Delay (s)		29.5			29.7			6.9			7.1	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			8.6				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			66.6				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			61.0%				ICU Level of Service			B		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

3: Yonge St & Mapleview Dr E

2027 Background Conditions

Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	163	348	47	124	444	182	46	496	38	190	538	225
Future Volume (vph)	163	348	47	124	444	182	46	496	38	190	538	225
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		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1659	3336		1721	3579	1506	1706	3491		1738	3345	
Flt Permitted	0.29	1.00		0.40	1.00	1.00	0.29	1.00		0.36	1.00	
Satd. Flow (perm)	507	3336		719	3579	1506	514	3491		664	3345	
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)	175	374	51	133	477	196	49	533	41	204	578	242
RTOR Reduction (vph)	0	11	0	0	0	148	0	5	0	0	38	0
Lane Group Flow (vph)	175	414	0	133	477	48	49	569	0	204	782	0
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Heavy Vehicles (%)	10%	8%	2%	6%	2%	7%	7%	3%	8%	5%	3%	6%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	27.3	19.3		25.3	18.3	18.3	46.9	42.8		52.7	45.7	
Effective Green, g (s)	27.3	19.3		25.3	18.3	18.3	46.9	42.8		52.7	45.7	
Actuated g/C Ratio	0.28	0.20		0.26	0.19	0.19	0.49	0.45		0.55	0.48	
Clearance Time (s)	4.0	6.0		4.0	6.0	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)	239	669		262	681	286	301	1554		442	1590	
v/s Ratio Prot	c0.06	0.12		0.04	0.13		0.01	0.16		c0.03	c0.23	
v/s Ratio Perm	c0.15			0.10		0.03	0.07			0.22		
v/c Ratio	0.73	0.62		0.51	0.70	0.17	0.16	0.37		0.46	0.49	
Uniform Delay, d1	28.0	35.0		28.4	36.3	32.5	13.2	17.7		11.5	17.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.0	1.7		1.5	3.3	0.3	0.3	0.7		0.8	1.1	
Delay (s)	39.0	36.8		29.9	39.6	32.8	13.5	18.3		12.3	18.3	
Level of Service	D	D		C	D	C	B	B		B	B	
Approach Delay (s)		37.4			36.3			17.9			17.1	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			26.4			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			96.1			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			82.2%			ICU Level of Service			E			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2027 Background Conditions

4: Moberly Dr/Goodwin Dr & Mapleview Dr E

Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	535	5	0	719	2	41	21	13	12	32	25
Future Volume (vph)	10	535	5	0	719	2	41	21	13	12	32	25
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		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95			0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	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		1.00	1.00	
Frt	1.00	1.00			1.00		1.00	0.94		1.00	0.93	
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	3407			3577		1788	1767		1784	1749	
Flt Permitted	0.31	1.00			1.00		0.72	1.00		0.73	1.00	
Satd. Flow (perm)	580	3407			3577		1346	1767		1376	1749	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	594	6	0	799	2	46	23	14	13	36	28
RTOR Reduction (vph)	0	0	0	0	0	0	0	13	0	0	25	0
Lane Group Flow (vph)	11	600	0	0	801	0	46	24	0	13	39	0
Confl. Peds. (#/hr)	3		1	2		4	1		2	4		3
Heavy Vehicles (%)	2%	7%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	44.5	44.5			39.3		5.9	5.9		5.9	5.9	
Effective Green, g (s)	44.5	44.5			39.3		5.9	5.9		5.9	5.9	
Actuated g/C Ratio	0.71	0.71			0.63		0.09	0.09		0.09	0.09	
Clearance Time (s)	4.0	6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	436	2429			2252		127	167		130	165	
v/s Ratio Prot	0.00	c0.18			c0.22			0.01			0.02	
v/s Ratio Perm	0.02						c0.03			0.01		
v/c Ratio	0.03	0.25			0.36		0.36	0.15		0.10	0.23	
Uniform Delay, d1	2.8	3.1			5.5		26.5	25.9		25.8	26.2	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.2			0.4		1.8	0.4		0.3	0.7	
Delay (s)	2.8	3.4			6.0		28.2	26.3		26.2	26.9	
Level of Service	A	A			A		C	C		C	C	
Approach Delay (s)		3.3			6.0			27.4			26.8	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			7.1				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.36									
Actuated Cycle Length (s)			62.4				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			39.6%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

5: Goodwin Dr & Street A

2027 Background Conditions
Weekday AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	19	0	33	36	0	47
Future Volume (Veh/h)	19	0	33	36	0	47
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	0	36	39	0	51
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			86			
pX, platoon unblocked						
vC, conflicting volume	106	56			75	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	106	56			75	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			100	
cM capacity (veh/h)	891	1011			1524	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	21	75	51			
Volume Left	21	0	0			
Volume Right	0	39	0			
cSH	891	1700	1524			
Volume to Capacity	0.02	0.04	0.00			
Queue Length 95th (m)	0.5	0.0	0.0			
Control Delay (s)	9.1	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.1	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		1.3				
Intersection Capacity Utilization		13.9%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis

2027 Background Conditions

1: Yonge St & Country Ln/Turnberry Ln

Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	24	25	75	12	68	27	1143	109	77	1003	31
Future Volume (vph)	19	24	25	75	12	68	27	1143	109	77	1003	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	0.87		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1775	1608		1449	1614		1644	3485		1789	3558	
Flt Permitted	0.70	1.00		0.72	1.00		0.24	1.00		0.14	1.00	
Satd. Flow (perm)	1315	1608		1104	1614		412	3485		261	3558	
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)	20	25	26	77	12	70	28	1178	112	79	1034	32
RTOR Reduction (vph)	0	22	0	0	60	0	0	6	0	0	2	0
Lane Group Flow (vph)	20	29	0	77	22	0	28	1284	0	79	1064	0
Confl. Peds. (#/hr)	9		9	8		8	9		8	8		9
Heavy Vehicles (%)	2%	2%	16%	25%	2%	2%	11%	2%	15%	2%	2%	3%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	11.6	11.6		11.6	11.6		47.3	44.6		52.7	47.3	
Effective Green, g (s)	11.6	11.6		11.6	11.6		47.3	44.6		52.7	47.3	
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.61	0.57		0.68	0.61	
Clearance Time (s)	6.0	6.0		6.0	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	
Lane Grp Cap (vph)	196	240		165	241		293	2002		283	2168	
v/s Ratio Prot		0.02			0.01		0.00	c0.37		c0.02	0.30	
v/s Ratio Perm	0.02			c0.07			0.05			0.17		
v/c Ratio	0.10	0.12		0.47	0.09		0.10	0.64		0.28	0.49	
Uniform Delay, d1	28.5	28.6		30.2	28.5		6.2	11.1		6.4	8.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.2		2.1	0.2		0.1	1.6		0.5	0.8	
Delay (s)	28.7	28.8		32.3	28.6		6.3	12.7		7.0	9.2	
Level of Service	C	C		C	C		A	B		A	A	
Approach Delay (s)		28.8			30.4			12.6			9.1	
Approach LOS		C			C			B			A	
Intersection Summary												
HCM 2000 Control Delay			12.6			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			77.6			Sum of lost time (s)				16.0		
Intersection Capacity Utilization			68.5%			ICU Level of Service				C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Yonge St & Street A/GO Access

2027 Background Conditions
Weekday PM Peak Hour

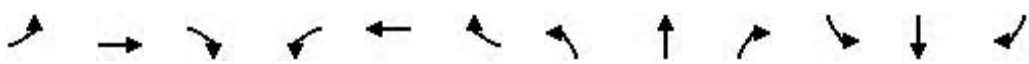
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	5	61	91	5	82	30	1010	67	39	950	77
Future Volume (vph)	61	5	61	91	5	82	30	1010	67	39	950	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	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	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1784	1883	1580	1762	1883	1456	1789	3533		1560	3532	
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.23	1.00		0.20	1.00	
Satd. Flow (perm)	1416	1883	1580	1400	1883	1456	434	3533		321	3532	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	64	5	64	96	5	86	32	1063	71	41	1000	81
RTOR Reduction (vph)	0	0	56	0	0	75	0	4	0	0	4	0
Lane Group Flow (vph)	64	5	8	96	5	11	32	1130	0	41	1077	0
Confl. Peds. (#/hr)	3		1	5		7	1		5	7		3
Heavy Vehicles (%)	2%	2%	2%	3%	2%	10%	2%	2%	5%	17%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	9.0	9.0	9.0	9.0	9.0	9.0	45.2	42.6		47.8	43.9	
Effective Green, g (s)	9.0	9.0	9.0	9.0	9.0	9.0	45.2	42.6		47.8	43.9	
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13	0.13	0.63	0.60		0.67	0.61	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	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	3.0	
Lane Grp Cap (vph)	178	237	198	176	237	183	323	2104		282	2168	
v/s Ratio Prot		0.00			0.00		0.00	c0.32		c0.01	0.30	
v/s Ratio Perm	0.05		0.01	c0.07		0.01	0.06			0.09		
v/c Ratio	0.36	0.02	0.04	0.55	0.02	0.06	0.10	0.54		0.15	0.50	
Uniform Delay, d1	28.6	27.4	27.5	29.3	27.4	27.5	5.1	8.6		4.8	7.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	0.0	0.1	3.4	0.0	0.1	0.1	1.0		0.2	0.8	
Delay (s)	29.9	27.4	27.5	32.8	27.4	27.7	5.3	9.6		5.0	8.5	
Level of Service	C	C	C	C	C	C	A	A		A	A	
Approach Delay (s)		28.7			30.3			9.5			8.4	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			11.5				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.51									
Actuated Cycle Length (s)			71.5				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			63.5%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Yonge St & Mapleview Dr E

2027 Background Conditions

Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	271	524	97	102	352	203	101	633	66	211	711	197
Future Volume (vph)	271	524	97	102	352	203	101	633	66	211	711	197
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		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1738	3490		1789	3579	1580	1789	3528		1789	3445	
Flt Permitted	0.42	1.00		0.20	1.00	1.00	0.17	1.00		0.27	1.00	
Satd. Flow (perm)	772	3490		378	3579	1580	315	3528		511	3445	
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)	291	563	104	110	378	218	109	681	71	227	765	212
RTOR Reduction (vph)	0	15	0	0	0	169	0	7	0	0	23	0
Lane Group Flow (vph)	291	652	0	110	378	49	109	745	0	227	954	0
Confl. Peds. (#/hr)	1					1				1		1
Heavy Vehicles (%)	5%	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	3%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	32.3	23.3		29.9	22.1	22.1	47.1	40.1		47.1	40.1	
Effective Green, g (s)	32.3	23.3		29.9	22.1	22.1	47.1	40.1		47.1	40.1	
Actuated g/C Ratio	0.33	0.24		0.30	0.23	0.23	0.48	0.41		0.48	0.41	
Clearance Time (s)	4.0	6.0		4.0	6.0	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	828		227	805	355	256	1440		336	1406	
v/s Ratio Prot	c0.08	0.19		0.04	0.11		0.03	0.21		c0.05	c0.28	
v/s Ratio Perm	c0.20			0.11		0.03	0.17			0.28		
v/c Ratio	0.85	0.79		0.48	0.47	0.14	0.43	0.52		0.68	0.68	
Uniform Delay, d1	28.7	35.1		26.0	33.0	30.4	16.0	21.8		16.5	23.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	18.0	5.0		1.6	0.4	0.2	1.1	1.3		5.3	2.7	
Delay (s)	46.7	40.1		27.7	33.4	30.6	17.2	23.1		21.8	26.4	
Level of Service	D	D		C	C	C	B	C		C	C	
Approach Delay (s)		42.1			31.6			22.4			25.6	
Approach LOS		D			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			30.2									HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			98.2									Sum of lost time (s) 20.0
Intersection Capacity Utilization			87.2%									ICU Level of Service E
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2027 Background Conditions

4: Moberly Dr/Goodwin Dr & Mapleview Dr E

Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	842	89	13	656	12	78	43	26	36	64	13
Future Volume (vph)	20	842	89	13	656	12	78	43	26	36	64	13
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	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.94		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	3527		1789	3500		1789	1769		1785	1832	
Flt Permitted	0.37	1.00		0.25	1.00		0.70	1.00		0.71	1.00	
Satd. Flow (perm)	689	3527		462	3500		1323	1769		1331	1832	
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)	22	915	97	14	713	13	85	47	28	39	70	14
RTOR Reduction (vph)	0	7	0	0	1	0	0	24	0	0	11	0
Lane Group Flow (vph)	22	1005	0	14	725	0	85	51	0	39	73	0
Confl. Peds. (#/hr)	1			2		3			2	3		1
Heavy Vehicles (%)	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	37.9	36.7		37.9	36.7		8.7	8.7		8.7	8.7	
Effective Green, g (s)	37.9	36.7		37.9	36.7		8.7	8.7		8.7	8.7	
Actuated g/C Ratio	0.61	0.59		0.61	0.59		0.14	0.14		0.14	0.14	
Clearance Time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	438	2067		305	2051		183	245		184	254	
v/s Ratio Prot	c0.00	c0.28		0.00	0.21			0.03			0.04	
v/s Ratio Perm	0.03			0.03			c0.06			0.03		
v/c Ratio	0.05	0.49		0.05	0.35		0.46	0.21		0.21	0.29	
Uniform Delay, d1	4.9	7.5		5.1	6.8		24.8	23.9		23.9	24.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.8		0.1	0.5		1.9	0.4		0.6	0.6	
Delay (s)	5.0	8.3		5.2	7.2		26.7	24.3		24.5	24.8	
Level of Service	A	A		A	A		C	C		C	C	
Approach Delay (s)		8.2			7.2			25.6			24.7	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay	10.2			HCM 2000 Level of Service			B					
HCM 2000 Volume to Capacity ratio	0.47											
Actuated Cycle Length (s)	62.6			Sum of lost time (s)			16.0					
Intersection Capacity Utilization	47.7%			ICU Level of Service			A					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 5: Goodwin Dr & Street A

2027 Background Conditions
Weekday PM Peak Hour

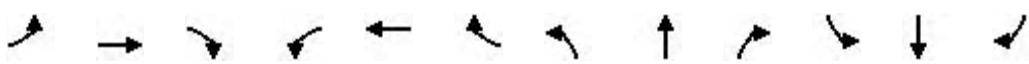
						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	43	0	75	75	0	73
Future Volume (Veh/h)	43	0	75	75	0	73
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	47	0	82	82	0	79
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			86			
pX, platoon unblocked						
vC, conflicting volume	202	123			164	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	202	123			164	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	100			100	
cM capacity (veh/h)	787	928			1414	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	47	164	79			
Volume Left	47	0	0			
Volume Right	0	82	0			
cSH	787	1700	1414			
Volume to Capacity	0.06	0.10	0.00			
Queue Length 95th (m)	1.4	0.0	0.0			
Control Delay (s)	9.9	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.9	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			18.5%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

1: Yonge St & Country Ln/Turnberry Ln

2031 Background Conditions

Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	12	45	98	26	83	25	1002	41	34	1096	12
Future Volume (vph)	24	12	45	98	26	83	25	1002	41	34	1096	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.88		1.00	0.89		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1745	1526		1682	1648		1521	3456		1789	3502	
Flt Permitted	0.67	1.00		0.71	1.00		0.11	1.00		0.12	1.00	
Satd. Flow (perm)	1227	1526		1256	1648		178	3456		220	3502	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	31	15	58	126	33	106	32	1285	53	44	1405	15
RTOR Reduction (vph)	0	46	0	0	84	0	0	3	0	0	1	0
Lane Group Flow (vph)	31	27	0	126	55	0	32	1335	0	44	1419	0
Confl. Peds. (#/hr)	7		8	5		4	8		5	4		7
Heavy Vehicles (%)	4%	2%	11%	8%	2%	2%	20%	5%	2%	2%	4%	8%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.8	15.8		15.8	15.8		44.5	41.8		47.3	43.2	
Effective Green, g (s)	15.8	15.8		15.8	15.8		44.5	41.8		47.3	43.2	
Actuated g/C Ratio	0.20	0.20		0.20	0.20		0.57	0.54		0.61	0.56	
Clearance Time (s)	6.0	6.0		6.0	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	
Lane Grp Cap (vph)	249	310		255	335		148	1859		216	1947	
v/s Ratio Prot		0.02			0.03		0.01	0.39		c0.01	c0.41	
v/s Ratio Perm	0.03			c0.10			0.12			0.11		
v/c Ratio	0.12	0.09		0.49	0.16		0.22	0.72		0.20	0.73	
Uniform Delay, d1	25.3	25.1		27.4	25.5		9.3	13.5		8.6	12.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.1		1.5	0.2		0.7	2.4		0.5	2.4	
Delay (s)	25.5	25.2		28.9	25.7		10.1	15.9		9.0	15.3	
Level of Service	C	C		C	C		B	B		A	B	
Approach Delay (s)		25.3			27.2			15.8			15.1	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			16.7			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			77.7			Sum of lost time (s)				16.0		
Intersection Capacity Utilization			54.7%			ICU Level of Service				A		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: Yonge St & Street A/GO Access

2031 Background Conditions
Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	5	42	44	5	42	18	968	61	39	1210	46
Future Volume (vph)	55	5	42	44	5	42	18	968	61	39	1210	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	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	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1883	1580	1621	1883	1255	1789	3466		1448	3493	
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.10	1.00		0.15	1.00	
Satd. Flow (perm)	1420	1883	1580	1286	1883	1255	183	3466		228	3493	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	70	6	53	56	6	53	23	1225	77	49	1532	58
RTOR Reduction (vph)	0	0	47	0	0	47	0	4	0	0	2	0
Lane Group Flow (vph)	70	6	6	56	6	6	23	1298	0	49	1588	0
Confl. Peds. (#/hr)			1	5		4	1		5	4		
Heavy Vehicles (%)	2%	2%	2%	12%	2%	28%	2%	4%	8%	26%	4%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	8.3	8.3	8.3	8.3	8.3	8.3	44.1	41.5		46.7	42.8	
Effective Green, g (s)	8.3	8.3	8.3	8.3	8.3	8.3	44.1	41.5		46.7	42.8	
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12	0.12	0.63	0.60		0.67	0.61	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	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	3.0	
Lane Grp Cap (vph)	169	224	188	153	224	149	175	2063		221	2144	
v/s Ratio Prot		0.00			0.00		0.00	0.37		c0.01	c0.45	
v/s Ratio Perm	c0.05		0.00	0.04		0.01	0.08			0.14		
v/c Ratio	0.41	0.03	0.03	0.37	0.03	0.04	0.13	0.63		0.22	0.74	
Uniform Delay, d1	28.4	27.1	27.2	28.3	27.1	27.2	6.8	9.1		5.3	9.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	0.0	0.1	1.5	0.0	0.1	0.3	1.5		0.5	2.3	
Delay (s)	30.1	27.2	27.2	29.8	27.2	27.3	7.1	10.6		5.8	11.9	
Level of Service	C	C	C	C	C	C	A	B		A	B	
Approach Delay (s)		28.8			28.5			10.5			11.7	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			12.5				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			69.7				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			66.9%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Yonge St & Mapleview Dr E

2031 Background Conditions

Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	190	438	61	155	558	227	59	630	47	235	676	254
Future Volume (vph)	190	438	61	155	558	227	59	630	47	235	676	254
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		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1659	3335		1722	3579	1506	1706	3492		1738	3360	
Flt Permitted	0.21	1.00		0.31	1.00	1.00	0.20	1.00		0.26	1.00	
Satd. Flow (perm)	372	3335		560	3579	1506	367	3492		471	3360	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	200	461	64	163	587	239	62	663	49	247	712	267
RTOR Reduction (vph)	0	11	0	0	0	133	0	5	0	0	33	0
Lane Group Flow (vph)	200	514	0	163	587	106	62	707	0	247	946	0
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Heavy Vehicles (%)	10%	8%	2%	6%	2%	7%	7%	3%	8%	5%	3%	6%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	33.9	23.9		31.5	22.7	22.7	46.5	41.0		55.5	46.0	
Effective Green, g (s)	33.9	23.9		31.5	22.7	22.7	46.5	41.0		55.5	46.0	
Actuated g/C Ratio	0.33	0.23		0.30	0.22	0.22	0.45	0.39		0.53	0.44	
Clearance Time (s)	4.0	6.0		4.0	6.0	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)	244	764		267	779	328	234	1374		378	1483	
v/s Ratio Prot	c0.08	0.15		0.05	0.16		0.01	0.20		c0.07	0.28	
v/s Ratio Perm	c0.19			0.13		0.07	0.10			c0.28		
v/c Ratio	0.82	0.67		0.61	0.75	0.32	0.26	0.51		0.65	0.64	
Uniform Delay, d1	27.9	36.6		28.3	38.1	34.3	17.4	24.0		14.9	22.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	18.9	2.3		4.1	4.2	0.6	0.6	1.4		4.0	2.1	
Delay (s)	46.8	38.9		32.4	42.3	34.9	18.0	25.4		18.9	24.7	
Level of Service	D	D		C	D	C	B	C		B	C	
Approach Delay (s)		41.1			38.9			24.8			23.6	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			31.3			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			104.2			Sum of lost time (s)				20.0		
Intersection Capacity Utilization			89.3%			ICU Level of Service				E		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2031 Background Conditions

4: Moberly Dr/Goodwin Dr & Mapleview Dr E

Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	656	5	0	883	2	70	50	30	17	75	31
Future Volume (vph)	62	656	5	0	883	2	70	50	30	17	75	31
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		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95			0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00			1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00			1.00		1.00	0.94		1.00	0.96	
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	3408			3577		1788	1770		1784	1794	
Flt Permitted	0.22	1.00			1.00		0.68	1.00		0.70	1.00	
Satd. Flow (perm)	416	3408			3577		1283	1770		1313	1794	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	69	729	6	0	981	2	78	56	33	19	83	34
RTOR Reduction (vph)	0	0	0	0	0	0	0	29	0	0	23	0
Lane Group Flow (vph)	69	735	0	0	983	0	78	60	0	19	94	0
Confl. Peds. (#/hr)	3		1	2		4	1		2	4		3
Heavy Vehicles (%)	2%	7%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	43.8	43.8			35.6		8.5	8.5		8.5	8.5	
Effective Green, g (s)	43.8	43.8			35.6		8.5	8.5		8.5	8.5	
Actuated g/C Ratio	0.68	0.68			0.55		0.13	0.13		0.13	0.13	
Clearance Time (s)	4.0	6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	373	2321			1980		169	233		173	237	
v/s Ratio Prot	0.01	c0.22			c0.27			0.03			0.05	
v/s Ratio Perm	0.11						c0.06			0.01		
v/c Ratio	0.18	0.32			0.50		0.46	0.26		0.11	0.40	
Uniform Delay, d1	4.2	4.2			8.8		25.8	25.1		24.6	25.6	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.4			0.9		2.0	0.6		0.3	1.1	
Delay (s)	4.5	4.5			9.7		27.8	25.7		24.9	26.7	
Level of Service	A	A			A		C	C		C	C	
Approach Delay (s)		4.5			9.7			26.7			26.4	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay	10.2			HCM 2000 Level of Service			B					
HCM 2000 Volume to Capacity ratio	0.48											
Actuated Cycle Length (s)	64.3			Sum of lost time (s)			16.0					
Intersection Capacity Utilization	54.8%			ICU Level of Service			A					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

5: Goodwin Dr & Street A

2031 Background Conditions
Weekday AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	31	0	62	52	0	90
Future Volume (Veh/h)	31	0	62	52	0	90
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	34	0	67	57	0	98
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			86			
pX, platoon unblocked						
vC, conflicting volume	194	96			124	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	194	96			124	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	100			100	
cM capacity (veh/h)	795	961			1463	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	34	124	98			
Volume Left	34	0	0			
Volume Right	0	57	0			
cSH	795	1700	1463			
Volume to Capacity	0.04	0.07	0.00			
Queue Length 95th (m)	1.0	0.0	0.0			
Control Delay (s)	9.7	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.7	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		1.3				
Intersection Capacity Utilization		16.4%		ICU Level of Service	A	
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis

1: Yonge St & Country Ln/Turnberry Ln

2031 Background Conditions

Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	24	25	75	12	68	27	1416	109	77	1245	31
Future Volume (vph)	19	24	25	75	12	68	27	1416	109	77	1245	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	0.87		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1775	1608		1449	1614		1644	3501		1789	3562	
Flt Permitted	0.70	1.00		0.72	1.00		0.16	1.00		0.08	1.00	
Satd. Flow (perm)	1315	1608		1104	1614		278	3501		159	3562	
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)	20	25	26	77	12	70	28	1460	112	79	1284	32
RTOR Reduction (vph)	0	22	0	0	60	0	0	5	0	0	2	0
Lane Group Flow (vph)	20	29	0	77	22	0	28	1567	0	79	1314	0
Confl. Peds. (#/hr)	9		9	8		8	9		8	8		9
Heavy Vehicles (%)	2%	2%	16%	25%	2%	2%	11%	2%	15%	2%	2%	3%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	11.6	11.6		11.6	11.6		47.3	44.6		52.7	47.3	
Effective Green, g (s)	11.6	11.6		11.6	11.6		47.3	44.6		52.7	47.3	
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.61	0.57		0.68	0.61	
Clearance Time (s)	6.0	6.0		6.0	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	
Lane Grp Cap (vph)	196	240		165	241		216	2012		221	2171	
v/s Ratio Prot		0.02			0.01		0.00	c0.45		c0.02	0.37	
v/s Ratio Perm	0.02			c0.07			0.07			0.22		
v/c Ratio	0.10	0.12		0.47	0.09		0.13	0.78		0.36	0.61	
Uniform Delay, d1	28.5	28.6		30.2	28.5		6.8	12.7		9.4	9.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.2		2.1	0.2		0.3	3.1		1.0	1.3	
Delay (s)	28.7	28.8		32.3	28.6		7.0	15.8		10.3	10.6	
Level of Service	C	C		C	C		A	B		B	B	
Approach Delay (s)		28.8			30.4			15.6			10.6	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			14.5			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			77.6			Sum of lost time (s)				16.0		
Intersection Capacity Utilization			76.1%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Yonge St & Street A/GO Access

2031 Background Conditions

Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	5	78	115	5	103	43	1231	85	49	1168	102
Future Volume (vph)	80	5	78	115	5	103	43	1231	85	49	1168	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	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	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1784	1883	1580	1762	1883	1456	1789	3532		1560	3529	
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.13	1.00		0.12	1.00	
Satd. Flow (perm)	1416	1883	1580	1400	1883	1456	243	3532		191	3529	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	5	82	121	5	108	45	1296	89	52	1229	107
RTOR Reduction (vph)	0	0	68	0	0	90	0	4	0	0	5	0
Lane Group Flow (vph)	84	5	14	121	5	18	45	1381	0	52	1331	0
Confl. Peds. (#/hr)	3		1	5		7	1		5	7		3
Heavy Vehicles (%)	2%	2%	2%	3%	2%	10%	2%	2%	5%	17%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	12.2	12.2	12.2	12.2	12.2	12.2	43.2	39.3		43.2	39.3	
Effective Green, g (s)	12.2	12.2	12.2	12.2	12.2	12.2	43.2	39.3		43.2	39.3	
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.17	0.17	0.61	0.55		0.61	0.55	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	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	3.0	
Lane Grp Cap (vph)	241	321	269	239	321	248	231	1944		190	1942	
v/s Ratio Prot		0.00			0.00		0.01	c0.39		c0.01	0.38	
v/s Ratio Perm	0.06		0.01	c0.09		0.01	0.11			0.15		
v/c Ratio	0.35	0.02	0.05	0.51	0.02	0.07	0.19	0.71		0.27	0.69	
Uniform Delay, d1	26.1	24.6	24.8	26.9	24.6	24.9	7.4	11.8		7.9	11.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.0	0.1	1.7	0.0	0.1	0.4	2.2		0.8	2.0	
Delay (s)	27.0	24.6	24.8	28.6	24.6	25.0	7.8	14.1		8.6	13.6	
Level of Service	C	C	C	C	C	C	A	B		A	B	
Approach Delay (s)		25.9			26.8			13.9			13.4	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			15.2				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			71.4				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			70.2%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Yonge St & Mapleview Dr E

2031 Background Conditions

Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	307	657	124	126	443	251	129	801	84	261	890	231
Future Volume (vph)	307	657	124	126	443	251	129	801	84	261	890	231
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		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1738	3488		1789	3579	1580	1789	3528		1789	3452	
Flt Permitted	0.29	1.00		0.16	1.00	1.00	0.10	1.00		0.14	1.00	
Satd. Flow (perm)	531	3488		303	3579	1580	183	3528		269	3452	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	323	692	131	133	466	264	136	843	88	275	937	243
RTOR Reduction (vph)	0	14	0	0	0	158	0	7	0	0	20	0
Lane Group Flow (vph)	323	809	0	133	466	106	136	924	0	275	1160	0
Confl. Peds. (#/hr)	1					1				1		1
Heavy Vehicles (%)	5%	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	3%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	41.9	30.0		32.8	24.9	24.9	48.9	41.1		57.1	45.3	
Effective Green, g (s)	41.9	30.0		32.8	24.9	24.9	48.9	41.1		57.1	45.3	
Actuated g/C Ratio	0.38	0.27		0.30	0.22	0.22	0.44	0.37		0.51	0.41	
Clearance Time (s)	4.0	6.0		4.0	6.0	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	942		195	802	354	193	1306		302	1408	
v/s Ratio Prot	c0.11	0.23		0.05	0.13		0.05	0.26		c0.10	0.34	
v/s Ratio Perm	c0.25			0.15		0.07	0.26			c0.37		
v/c Ratio	0.95	0.86		0.68	0.58	0.30	0.70	0.71		0.91	0.82	
Uniform Delay, d1	29.6	38.5		30.9	38.4	35.8	22.6	29.8		21.1	29.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	34.8	7.9		9.4	1.1	0.5	11.1	3.3		29.8	5.6	
Delay (s)	64.4	46.4		40.4	39.5	36.3	33.7	33.1		50.9	34.9	
Level of Service	E	D		D	D	D	C	C		D	C	
Approach Delay (s)		51.4			38.6			33.2			37.9	
Approach LOS		D			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			40.4									HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			111.0									Sum of lost time (s) 20.0
Intersection Capacity Utilization			94.1%									ICU Level of Service F
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2031 Background Conditions

4: Moberly Dr/Goodwin Dr & Maplevue Dr E

Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	127	1000	200	30	818	12	135	100	60	43	150	20
Future Volume (vph)	127	1000	200	30	818	12	135	100	60	43	150	20
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	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00		1.00	0.94		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	3489		1789	3502		1789	1769		1786	1847	
Flt Permitted	0.22	1.00		0.15	1.00		0.62	1.00		0.65	1.00	
Satd. Flow (perm)	422	3489		275	3502		1173	1769		1217	1847	
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)	138	1087	217	33	889	13	147	109	65	47	163	22
RTOR Reduction (vph)	0	16	0	0	1	0	0	30	0	0	7	0
Lane Group Flow (vph)	138	1288	0	33	901	0	147	144	0	47	178	0
Confl. Peds. (#/hr)	1			2		3			2	3		1
Heavy Vehicles (%)	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	43.7	37.4		36.1	33.6		14.2	14.2		14.2	14.2	
Effective Green, g (s)	43.7	37.4		36.1	33.6		14.2	14.2		14.2	14.2	
Actuated g/C Ratio	0.62	0.53		0.51	0.48		0.20	0.20		0.20	0.20	
Clearance Time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	385	1861		195	1678		237	358		246	374	
v/s Ratio Prot	c0.03	c0.37		0.01	0.26			0.08			0.10	
v/s Ratio Perm	0.19			0.08			c0.13			0.04		
v/c Ratio	0.36	0.69		0.17	0.54		0.62	0.40		0.19	0.48	
Uniform Delay, d1	6.5	12.1		9.2	12.8		25.5	24.3		23.2	24.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	2.1		0.4	1.2		5.0	0.7		0.4	1.0	
Delay (s)	7.1	14.2		9.6	14.0		30.5	25.0		23.6	25.6	
Level of Service	A	B		A	B		C	C		C	C	
Approach Delay (s)		13.5			13.9			27.5			25.2	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			16.1			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			70.1			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			76.2%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

5: Goodwin Dr & Street A

2031 Background Conditions
Weekday PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	56	0	132	107	0	159
Future Volume (Veh/h)	56	0	132	107	0	159
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	61	0	143	116	0	173
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			86			
pX, platoon unblocked	0.97	0.97			0.97	
vC, conflicting volume	374	201			259	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	335	155			216	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	100			100	
cM capacity (veh/h)	638	860			1309	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	61	259	173			
Volume Left	61	0	0			
Volume Right	0	116	0			
cSH	638	1700	1309			
Volume to Capacity	0.10	0.15	0.00			
Queue Length 95th (m)	2.4	0.0	0.0			
Control Delay (s)	11.2	0.0	0.0			
Lane LOS	B					
Approach Delay (s)	11.2	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		1.4				
Intersection Capacity Utilization		23.5%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis

1: Yonge St & Country Ln/Turnberry Ln

2036 Background Conditions

Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	12	45	98	26	83	25	1094	41	34	1191	12
Future Volume (vph)	24	12	45	98	26	83	25	1094	41	34	1191	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.88		1.00	0.89		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1745	1526		1682	1648		1521	3458		1789	3502	
Flt Permitted	0.67	1.00		0.71	1.00		0.10	1.00		0.09	1.00	
Satd. Flow (perm)	1227	1526		1256	1648		153	3458		174	3502	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	31	15	58	126	33	106	32	1403	53	44	1527	15
RTOR Reduction (vph)	0	46	0	0	84	0	0	3	0	0	0	0
Lane Group Flow (vph)	31	27	0	126	55	0	32	1453	0	44	1542	0
Confl. Peds. (#/hr)	7		8	5		4	8		5	4		7
Heavy Vehicles (%)	4%	2%	11%	8%	2%	2%	20%	5%	2%	2%	4%	8%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.8	15.8		15.8	15.8		44.5	41.8		47.3	43.2	
Effective Green, g (s)	15.8	15.8		15.8	15.8		44.5	41.8		47.3	43.2	
Actuated g/C Ratio	0.20	0.20		0.20	0.20		0.57	0.54		0.61	0.56	
Clearance Time (s)	6.0	6.0		6.0	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	
Lane Grp Cap (vph)	249	310		255	335		135	1860		191	1947	
v/s Ratio Prot		0.02			0.03		0.01	0.42		c0.01	c0.44	
v/s Ratio Perm	0.03			c0.10			0.13			0.13		
v/c Ratio	0.12	0.09		0.49	0.16		0.24	0.78		0.23	0.79	
Uniform Delay, d1	25.3	25.1		27.4	25.5		10.4	14.3		9.7	13.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.1		1.5	0.2		0.9	3.3		0.6	3.4	
Delay (s)	25.5	25.2		28.9	25.7		11.3	17.7		10.3	17.1	
Level of Service	C	C		C	C		B	B		B	B	
Approach Delay (s)		25.3			27.2			17.5			16.9	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			18.2			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			77.7			Sum of lost time (s)				16.0		
Intersection Capacity Utilization			57.4%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Yonge St & Street A/GO Access

2036 Background Conditions
Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	5	40	48	5	47	17	1062	68	43	1317	45
Future Volume (vph)	54	5	40	48	5	47	17	1062	68	43	1317	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	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	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1883	1580	1621	1883	1255	1789	3465		1448	3495	
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.09	1.00		0.12	1.00	
Satd. Flow (perm)	1420	1883	1580	1286	1883	1255	178	3465		178	3495	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	68	6	51	61	6	59	22	1344	86	54	1667	57
RTOR Reduction (vph)	0	0	45	0	0	52	0	4	0	0	2	0
Lane Group Flow (vph)	68	6	6	61	6	7	22	1426	0	54	1722	0
Confl. Peds. (#/hr)			1	5		4	1		5	4		
Heavy Vehicles (%)	2%	2%	2%	12%	2%	28%	2%	4%	8%	26%	4%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	8.2	8.2	8.2	8.2	8.2	8.2	43.6	42.3		48.8	44.9	
Effective Green, g (s)	8.2	8.2	8.2	8.2	8.2	8.2	43.6	42.3		48.8	44.9	
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12	0.12	0.62	0.60		0.69	0.64	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	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	3.0	
Lane Grp Cap (vph)	165	219	184	149	219	146	139	2081		193	2229	
v/s Ratio Prot		0.00			0.00		0.00	0.41		c0.02	c0.49	
v/s Ratio Perm	c0.05		0.00	0.05		0.01	0.09			0.18		
v/c Ratio	0.41	0.03	0.03	0.41	0.03	0.05	0.16	0.69		0.28	0.77	
Uniform Delay, d1	28.9	27.6	27.6	28.9	27.6	27.6	7.5	9.5		5.9	9.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.7	0.1	0.1	1.8	0.1	0.1	0.5	1.9		0.8	2.7	
Delay (s)	30.5	27.6	27.7	30.7	27.6	27.8	8.0	11.4		6.7	11.8	
Level of Service	C	C	C	C	C	C	A	B		A	B	
Approach Delay (s)		29.2			29.2			11.3			11.6	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			12.8				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			70.4				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			69.8%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Yonge St & Mapleview Dr E

2036 Background Conditions

Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	204	482	66	171	612	250	64	693	52	255	739	268
Future Volume (vph)	204	482	66	171	612	250	64	693	52	255	739	268
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		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1659	3336		1722	3579	1506	1706	3491		1738	3365	
Flt Permitted	0.17	1.00		0.25	1.00	1.00	0.18	1.00		0.21	1.00	
Satd. Flow (perm)	304	3336		453	3579	1506	314	3491		380	3365	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	215	507	69	180	644	263	67	729	55	268	778	282
RTOR Reduction (vph)	0	9	0	0	0	125	0	4	0	0	30	0
Lane Group Flow (vph)	215	567	0	180	644	138	67	780	0	268	1030	0
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Heavy Vehicles (%)	10%	8%	2%	6%	2%	7%	7%	3%	8%	5%	3%	6%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	37.5	25.6		36.1	24.9	24.9	46.7	41.2		58.2	48.7	
Effective Green, g (s)	37.5	25.6		36.1	24.9	24.9	46.7	41.2		58.2	48.7	
Actuated g/C Ratio	0.34	0.23		0.33	0.22	0.22	0.42	0.37		0.52	0.44	
Clearance Time (s)	4.0	6.0		4.0	6.0	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)	247	769		275	802	337	201	1295		358	1476	
v/s Ratio Prot	c0.09	0.17		0.07	0.18		0.02	0.22		c0.09	0.31	
v/s Ratio Perm	c0.20			0.15		0.09	0.12			c0.30		
v/c Ratio	0.87	0.74		0.65	0.80	0.41	0.33	0.60		0.75	0.70	
Uniform Delay, d1	29.3	39.6		28.9	40.7	36.8	20.5	28.3		17.5	25.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	26.6	3.7		5.5	5.8	0.8	1.0	2.1		8.3	2.8	
Delay (s)	56.0	43.3		34.4	46.6	37.6	21.5	30.3		25.9	28.0	
Level of Service	E	D		C	D	D	C	C		C	C	
Approach Delay (s)		46.7			42.4			29.6			27.5	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			35.7									D
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			111.0							20.0		
Intersection Capacity Utilization			92.6%								F	
ICU Level of Service												
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2036 Background Conditions

4: Moberly Dr/Goodwin Dr & Maplevue Dr E

Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	716	5	0	954	2	70	50	30	16	75	30
Future Volume (vph)	61	716	5	0	954	2	70	50	30	16	75	30
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		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95			0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00			1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00			1.00		1.00	0.94		1.00	0.96	
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	3408			3577		1788	1770		1784	1796	
Flt Permitted	0.20	1.00			1.00		0.68	1.00		0.70	1.00	
Satd. Flow (perm)	367	3408			3577		1284	1770		1313	1796	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	68	796	6	0	1060	2	78	56	33	18	83	33
RTOR Reduction (vph)	0	0	0	0	0	0	0	29	0	0	23	0
Lane Group Flow (vph)	68	802	0	0	1062	0	78	60	0	18	93	0
Confl. Peds. (#/hr)	3		1	2		4	1		2	4		3
Heavy Vehicles (%)	2%	7%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	43.8	43.8			35.6		8.5	8.5		8.5	8.5	
Effective Green, g (s)	43.8	43.8			35.6		8.5	8.5		8.5	8.5	
Actuated g/C Ratio	0.68	0.68			0.55		0.13	0.13		0.13	0.13	
Clearance Time (s)	4.0	6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	342	2321			1980		169	233		173	237	
v/s Ratio Prot	0.01	c0.24			c0.30			0.03			0.05	
v/s Ratio Perm	0.12						c0.06			0.01		
v/c Ratio	0.20	0.35			0.54		0.46	0.26		0.10	0.39	
Uniform Delay, d1	4.5	4.3			9.1		25.8	25.1		24.5	25.5	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.4			1.0		2.0	0.6		0.3	1.1	
Delay (s)	4.8	4.7			10.2		27.8	25.7		24.8	26.6	
Level of Service	A	A			B		C	C		C	C	
Approach Delay (s)		4.7			10.2			26.7			26.4	
Approach LOS		A			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			10.2				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			64.3				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			56.8%				ICU Level of Service			B		
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 5: Goodwin Dr & Street A

2036 Background Conditions
Weekday AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	30	0	62	51	0	90
Future Volume (Veh/h)	30	0	62	51	0	90
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	0	67	55	0	98
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			86			
pX, platoon unblocked						
vC, conflicting volume	192	94			122	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	192	94			122	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	100			100	
cM capacity (veh/h)	796	962			1465	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	33	122	98			
Volume Left	33	0	0			
Volume Right	0	55	0			
cSH	796	1700	1465			
Volume to Capacity	0.04	0.07	0.00			
Queue Length 95th (m)	1.0	0.0	0.0			
Control Delay (s)	9.7	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.7	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			16.4%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

2036 Background Conditions

1: Yonge St & Country Ln/Turnberry Ln

Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	24	25	75	12	68	27	1541	109	77	1351	31
Future Volume (vph)	19	24	25	75	12	68	27	1541	109	77	1351	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	0.87		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1775	1608		1449	1614		1644	3507		1789	3563	
Flt Permitted	0.70	1.00		0.72	1.00		0.13	1.00		0.08	1.00	
Satd. Flow (perm)	1315	1608		1104	1614		230	3507		159	3563	
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)	20	25	26	77	12	70	28	1589	112	79	1393	32
RTOR Reduction (vph)	0	22	0	0	60	0	0	5	0	0	1	0
Lane Group Flow (vph)	20	29	0	77	22	0	28	1696	0	79	1424	0
Confl. Peds. (#/hr)	9		9	8		8	9		8	8		9
Heavy Vehicles (%)	2%	2%	16%	25%	2%	2%	11%	2%	15%	2%	2%	3%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	11.6	11.6		11.6	11.6		47.3	44.6		52.7	47.3	
Effective Green, g (s)	11.6	11.6		11.6	11.6		47.3	44.6		52.7	47.3	
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.61	0.57		0.68	0.61	
Clearance Time (s)	6.0	6.0		6.0	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	
Lane Grp Cap (vph)	196	240		165	241		189	2015		221	2171	
v/s Ratio Prot		0.02			0.01		0.01	c0.48		c0.02	0.40	
v/s Ratio Perm	0.02			c0.07			0.09			0.22		
v/c Ratio	0.10	0.12		0.47	0.09		0.15	0.84		0.36	0.66	
Uniform Delay, d1	28.5	28.6		30.2	28.5		7.2	13.6		11.0	9.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.2		2.1	0.2		0.4	4.5		1.0	1.6	
Delay (s)	28.7	28.8		32.3	28.6		7.6	18.1		12.0	11.4	
Level of Service	C	C		C	C		A	B		B	B	
Approach Delay (s)		28.8			30.4			17.9			11.5	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay	15.9			HCM 2000 Level of Service			B					
HCM 2000 Volume to Capacity ratio	0.73											
Actuated Cycle Length (s)	77.6			Sum of lost time (s)			16.0					
Intersection Capacity Utilization	79.5%			ICU Level of Service			D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Yonge St & Street A/GO Access

2036 Background Conditions
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	5	75	127	5	114	42	1342	94	54	1280	98
Future Volume (vph)	77	5	75	127	5	114	42	1342	94	54	1280	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	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	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1784	1883	1580	1763	1883	1456	1789	3531		1560	3535	
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.10	1.00		0.10	1.00	
Satd. Flow (perm)	1416	1883	1580	1400	1883	1456	196	3531		171	3535	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	81	5	79	134	5	120	44	1413	99	57	1347	103
RTOR Reduction (vph)	0	0	65	0	0	98	0	5	0	0	5	0
Lane Group Flow (vph)	81	5	14	134	5	22	44	1507	0	57	1445	0
Confl. Peds. (#/hr)	3		1	5		7	1		5	7		3
Heavy Vehicles (%)	2%	2%	2%	3%	2%	10%	2%	2%	5%	17%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	12.8	12.8	12.8	12.8	12.8	12.8	42.4	38.5		42.4	38.5	
Effective Green, g (s)	12.8	12.8	12.8	12.8	12.8	12.8	42.4	38.5		42.4	38.5	
Actuated g/C Ratio	0.18	0.18	0.18	0.18	0.18	0.18	0.60	0.54		0.60	0.54	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	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	3.0	
Lane Grp Cap (vph)	254	338	284	251	338	261	203	1909		177	1911	
v/s Ratio Prot		0.00			0.00		0.01	c0.43		c0.02	0.41	
v/s Ratio Perm	0.06		0.01	c0.10		0.01	0.12			0.17		
v/c Ratio	0.32	0.01	0.05	0.53	0.01	0.08	0.22	0.79		0.32	0.76	
Uniform Delay, d1	25.4	24.0	24.2	26.5	24.0	24.3	8.6	13.1		9.4	12.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.0	0.1	2.2	0.0	0.1	0.5	3.4		1.1	2.8	
Delay (s)	26.1	24.0	24.2	28.7	24.0	24.4	9.1	16.5		10.4	15.5	
Level of Service	C	C	C	C	C	C	A	B		B	B	
Approach Delay (s)		25.2			26.6			16.3			15.4	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			17.1				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			71.2				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			73.5%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Yonge St & Mapleview Dr E

2036 Background Conditions

Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	325	723	136	138	483	275	141	878	92	283	974	248
Future Volume (vph)	325	723	136	138	483	275	141	878	92	283	974	248
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		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1738	3488		1789	3579	1580	1789	3528		1789	3454	
Flt Permitted	0.26	1.00		0.15	1.00	1.00	0.10	1.00		0.09	1.00	
Satd. Flow (perm)	474	3488		276	3579	1580	188	3528		171	3454	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	342	761	143	145	508	289	148	924	97	298	1025	261
RTOR Reduction (vph)	0	13	0	0	0	163	0	7	0	0	19	0
Lane Group Flow (vph)	342	891	0	145	508	126	148	1014	0	298	1267	0
Confl. Peds. (#/hr)	1					1				1		1
Heavy Vehicles (%)	5%	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	3%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	46.3	33.4		36.2	27.3	27.3	47.0	40.0		60.0	49.0	
Effective Green, g (s)	46.3	33.4		36.2	27.3	27.3	47.0	40.0		60.0	49.0	
Actuated g/C Ratio	0.39	0.28		0.31	0.23	0.23	0.40	0.34		0.51	0.41	
Clearance Time (s)	4.0	6.0		4.0	6.0	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)	345	984		198	825	364	169	1192		305	1430	
v/s Ratio Prot	c0.13	0.26		0.06	0.14		0.05	0.29		c0.13	0.37	
v/s Ratio Perm	c0.26			0.17		0.08	0.29			c0.36		
v/c Ratio	0.99	0.91		0.73	0.62	0.35	0.88	0.85		0.98	0.89	
Uniform Delay, d1	31.0	40.9		32.7	40.8	38.0	27.5	36.4		35.4	32.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	45.9	11.6		13.1	1.4	0.6	36.1	7.7		44.8	8.4	
Delay (s)	76.9	52.5		45.8	42.2	38.6	63.6	44.1		80.2	40.5	
Level of Service	E	D		D	D	D	E	D		F	D	
Approach Delay (s)		59.2			41.6			46.6			48.0	
Approach LOS		E			D			D			D	
Intersection Summary												
HCM 2000 Control Delay	49.3			HCM 2000 Level of Service			D					
HCM 2000 Volume to Capacity ratio	1.04											
Actuated Cycle Length (s)	118.3			Sum of lost time (s)			20.0					
Intersection Capacity Utilization	97.6%			ICU Level of Service			F					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2036 Background Conditions

4: Moberly Dr/Goodwin Dr & Mapleview Dr E

Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	123	1090	200	30	887	12	135	100	60	43	150	19
Future Volume (vph)	123	1090	200	30	887	12	135	100	60	43	150	19
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	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00		1.00	0.94		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	3495		1789	3502		1789	1769		1786	1848	
Flt Permitted	0.20	1.00		0.12	1.00		0.63	1.00		0.65	1.00	
Satd. Flow (perm)	371	3495		224	3502		1178	1769		1217	1848	
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	1185	217	33	964	13	147	109	65	47	163	21
RTOR Reduction (vph)	0	15	0	0	1	0	0	30	0	0	6	0
Lane Group Flow (vph)	134	1387	0	33	976	0	147	144	0	47	178	0
Confl. Peds. (#/hr)	1			2		3			2	3		1
Heavy Vehicles (%)	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	43.5	37.3		36.1	33.6		14.2	14.2		14.2	14.2	
Effective Green, g (s)	43.5	37.3		36.1	33.6		14.2	14.2		14.2	14.2	
Actuated g/C Ratio	0.62	0.53		0.52	0.48		0.20	0.20		0.20	0.20	
Clearance Time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	356	1862		171	1680		238	358		246	374	
v/s Ratio Prot	c0.03	c0.40		0.01	0.28			0.08			0.10	
v/s Ratio Perm	0.20			0.09			c0.12			0.04		
v/c Ratio	0.38	0.74		0.19	0.58		0.62	0.40		0.19	0.47	
Uniform Delay, d1	6.8	12.7		9.7	13.1		25.4	24.2		23.1	24.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	2.8		0.6	1.5		4.7	0.7		0.4	1.0	
Delay (s)	7.5	15.4		10.2	14.6		30.1	25.0		23.5	25.6	
Level of Service	A	B		B	B		C	C		C	C	
Approach Delay (s)		14.7			14.5			27.3			25.1	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			16.7			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			70.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			78.7%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

5: Goodwin Dr & Street A

2036 Background Conditions
Weekday PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	55	0	132	103	0	159
Future Volume (Veh/h)	55	0	132	103	0	159
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	0	143	112	0	173
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)			86			
pX, platoon unblocked	0.97	0.97			0.97	
vC, conflicting volume	372	199			255	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	335	156			214	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	91	100			100	
cM capacity (veh/h)	639	861			1313	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	60	255	173			
Volume Left	60	0	0			
Volume Right	0	112	0			
cSH	639	1700	1313			
Volume to Capacity	0.09	0.15	0.00			
Queue Length 95th (m)	2.4	0.0	0.0			
Control Delay (s)	11.2	0.0	0.0			
Lane LOS	B					
Approach Delay (s)	11.2	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		1.4				
Intersection Capacity Utilization		23.2%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis

3: Yonge St & Mapleview Dr E

2036 Background Conditions

Weekday AM Peak Hour + Impv'ts

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	204	482	66	171	612	250	64	693	52	255	739	268
Future Volume (vph)	204	482	66	171	612	250	64	693	52	255	739	268
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	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	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	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	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1659	3380	1580	1721	3579	1506	1706	3544	1493	1738	3544	1521
Flt Permitted	0.16	1.00	1.00	0.32	1.00	1.00	0.32	1.00	1.00	0.24	1.00	1.00
Satd. Flow (perm)	275	3380	1580	583	3579	1506	570	3544	1493	431	3544	1521
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	215	507	69	180	644	263	67	729	55	268	778	282
RTOR Reduction (vph)	0	0	53	0	0	119	0	0	34	0	0	97
Lane Group Flow (vph)	215	507	16	180	644	144	67	729	21	268	778	185
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Heavy Vehicles (%)	10%	8%	2%	6%	2%	7%	7%	3%	8%	5%	3%	6%
Turn Type	pm+pt	NA	Perm	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		4	8		8	2		2	6		6
Actuated Green, G (s)	40.5	27.0	27.0	37.3	25.4	25.4	48.8	43.4	43.4	60.9	51.5	51.5
Effective Green, g (s)	40.5	27.0	27.0	37.3	25.4	25.4	48.8	43.4	43.4	60.9	51.5	51.5
Actuated g/C Ratio	0.35	0.23	0.23	0.32	0.22	0.22	0.42	0.37	0.37	0.53	0.44	0.44
Clearance Time (s)	4.0	6.0	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	3.0
Lane Grp Cap (vph)	257	788	368	304	785	330	293	1328	559	379	1576	676
v/s Ratio Prot	c0.10	0.15		0.06	0.18		0.01	0.21		c0.08	0.22	
v/s Ratio Perm	c0.19		0.01	0.13		0.10	0.09		0.01	c0.29		0.12
v/c Ratio	0.84	0.64	0.04	0.59	0.82	0.44	0.23	0.55	0.04	0.71	0.49	0.27
Uniform Delay, d1	29.8	40.1	34.4	30.1	43.0	39.0	20.3	28.5	22.9	17.6	22.9	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	1.00
Incremental Delay, d2	20.4	1.8	0.0	3.1	6.9	0.9	0.4	1.6	0.1	5.9	1.1	1.0
Delay (s)	50.3	41.9	34.4	33.1	49.9	40.0	20.7	30.1	23.1	23.5	24.0	21.3
Level of Service	D	D	C	C	D	D	C	C	C	C	C	C
Approach Delay (s)		43.5			44.7			28.9			23.3	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			34.2									
HCM 2000 Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			115.8									
Intersection Capacity Utilization			92.6%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Yonge St & Mapleview Dr E

2036 Background Conditions

Weekday PM Peak Hour + Impv'ts

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	325	723	136	138	483	275	141	878	92	283	974	248
Future Volume (vph)	325	723	136	138	483	275	141	878	92	283	974	248
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	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	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	1.00	0.99	1.00	1.00	1.00	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	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1738	3579	1585	1789	3579	1580	1789	3579	1601	1789	3579	1565
Flt Permitted	0.20	1.00	1.00	0.20	1.00	1.00	0.17	1.00	1.00	0.12	1.00	1.00
Satd. Flow (perm)	369	3579	1585	379	3579	1580	317	3579	1601	225	3579	1565
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	342	761	143	145	508	289	148	924	97	298	1025	261
RTOR Reduction (vph)	0	0	92	0	0	155	0	0	64	0	0	74
Lane Group Flow (vph)	342	761	51	145	508	134	148	924	33	298	1025	187
Confl. Peds. (#/hr)	1					1				1		1
Heavy Vehicles (%)	5%	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	3%
Turn Type	pm+pt	NA	Perm	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		4	8		8	2		2	6		6
Actuated Green, G (s)	47.1	32.8	32.8	33.6	23.3	23.3	51.7	41.9	41.9	64.2	50.4	50.4
Effective Green, g (s)	47.1	32.8	32.8	33.6	23.3	23.3	51.7	41.9	41.9	64.2	50.4	50.4
Actuated g/C Ratio	0.38	0.27	0.27	0.27	0.19	0.19	0.42	0.34	0.34	0.52	0.41	0.41
Clearance Time (s)	4.0	6.0	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	3.0
Lane Grp Cap (vph)	360	952	421	221	676	298	249	1216	544	349	1462	639
v/s Ratio Prot	c0.15	0.21		0.05	0.14		0.05	0.26		c0.13	0.29	
v/s Ratio Perm	c0.21		0.03	0.12		0.08	0.20		0.02	c0.32		0.12
v/c Ratio	0.95	0.80	0.12	0.66	0.75	0.45	0.59	0.76	0.06	0.85	0.70	0.29
Uniform Delay, d1	30.9	42.2	34.3	36.1	47.3	44.3	24.2	36.2	27.4	29.6	30.2	24.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	34.1	4.8	0.1	6.8	4.7	1.1	3.8	4.5	0.2	18.0	2.8	1.2
Delay (s)	65.1	46.9	34.4	42.9	52.0	45.4	28.0	40.7	27.6	47.6	33.0	25.6
Level of Service	E	D	C	D	D	D	C	D	C	D	C	C
Approach Delay (s)		50.5			48.6			38.0			34.5	
Approach LOS		D			D			D			C	
Intersection Summary												
HCM 2000 Control Delay			42.1				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			123.3				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			97.4%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: Yonge St & Country Ln/Turnberry Ln

2041 Background Conditions

Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	12	45	98	26	83	25	1195	41	34	1296	12
Future Volume (vph)	24	12	45	98	26	83	25	1195	41	34	1296	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.88		1.00	0.89		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1745	1526		1682	1648		1521	3459		1789	3503	
Flt Permitted	0.67	1.00		0.71	1.00		0.10	1.00		0.09	1.00	
Satd. Flow (perm)	1227	1526		1256	1648		153	3459		174	3503	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	31	15	58	126	33	106	32	1532	53	44	1662	15
RTOR Reduction (vph)	0	46	0	0	84	0	0	2	0	0	0	0
Lane Group Flow (vph)	31	27	0	126	55	0	32	1583	0	44	1677	0
Confl. Peds. (#/hr)	7		8	5		4	8		5	4		7
Heavy Vehicles (%)	4%	2%	11%	8%	2%	2%	20%	5%	2%	2%	4%	8%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.8	15.8		15.8	15.8		44.5	41.8		47.3	43.2	
Effective Green, g (s)	15.8	15.8		15.8	15.8		44.5	41.8		47.3	43.2	
Actuated g/C Ratio	0.20	0.20		0.20	0.20		0.57	0.54		0.61	0.56	
Clearance Time (s)	6.0	6.0		6.0	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	
Lane Grp Cap (vph)	249	310		255	335		135	1860		191	1947	
v/s Ratio Prot		0.02			0.03		0.01	0.46		c0.01	c0.48	
v/s Ratio Perm	0.03			c0.10			0.13			0.13		
v/c Ratio	0.12	0.09		0.49	0.16		0.24	0.85		0.23	0.86	
Uniform Delay, d1	25.3	25.1		27.4	25.5		11.9	15.3		11.1	14.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.1		1.5	0.2		0.9	5.1		0.6	5.3	
Delay (s)	25.5	25.2		28.9	25.7		12.8	20.4		11.7	20.0	
Level of Service	C	C		C	C		B	C		B	B	
Approach Delay (s)		25.3			27.2			20.3			19.8	
Approach LOS		C			C			C			B	
Intersection Summary												
HCM 2000 Control Delay	20.7			HCM 2000 Level of Service			C					
HCM 2000 Volume to Capacity ratio	0.74											
Actuated Cycle Length (s)	77.7			Sum of lost time (s)			16.0					
Intersection Capacity Utilization	60.3%			ICU Level of Service			B					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Yonge St & Street A/GO Access

2041 Background Conditions
Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	5	39	54	5	51	16	1166	75	47	1436	43
Future Volume (vph)	52	5	39	54	5	51	16	1166	75	47	1436	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	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	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1883	1580	1621	1883	1255	1789	3465		1448	3496	
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.09	1.00		0.09	1.00	
Satd. Flow (perm)	1420	1883	1580	1286	1883	1255	178	3465		136	3496	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	66	6	49	68	6	65	20	1476	95	59	1818	54
RTOR Reduction (vph)	0	0	43	0	0	57	0	4	0	0	1	0
Lane Group Flow (vph)	66	6	6	68	6	8	20	1567	0	59	1871	0
Confl. Peds. (#/hr)			1	5		4	1		5	4		
Heavy Vehicles (%)	2%	2%	2%	12%	2%	28%	2%	4%	8%	26%	4%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	8.4	8.4	8.4	8.4	8.4	8.4	43.6	42.3		48.8	44.9	
Effective Green, g (s)	8.4	8.4	8.4	8.4	8.4	8.4	43.6	42.3		48.8	44.9	
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12	0.12	0.62	0.60		0.69	0.64	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	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	3.0	
Lane Grp Cap (vph)	168	224	187	153	224	149	139	2076		166	2223	
v/s Ratio Prot		0.00			0.00		0.00	0.45		c0.02	c0.53	
v/s Ratio Perm	0.05		0.00	c0.05		0.01	0.09			0.23		
v/c Ratio	0.39	0.03	0.03	0.44	0.03	0.05	0.14	0.75		0.36	0.84	
Uniform Delay, d1	28.7	27.5	27.5	28.9	27.5	27.6	9.0	10.4		7.5	10.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	0.0	0.1	2.1	0.0	0.1	0.5	2.6		1.3	4.1	
Delay (s)	30.3	27.5	27.6	31.0	27.5	27.7	9.5	13.0		8.8	14.1	
Level of Service	C	C	C	C	C	C	A	B		A	B	
Approach Delay (s)		29.0			29.3			12.9			14.0	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			14.6									
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			70.6									
Intersection Capacity Utilization			73.0%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Yonge St & Mapleview Dr E

2041 Background Conditions

Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	219	531	72	188	672	275	70	763	58	277	808	284
Future Volume (vph)	219	531	72	188	672	275	70	763	58	277	808	284
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	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	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	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	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1659	3380	1580	1722	3579	1506	1706	3544	1493	1738	3544	1521
Flt Permitted	0.14	1.00	1.00	0.28	1.00	1.00	0.27	1.00	1.00	0.19	1.00	1.00
Satd. Flow (perm)	245	3380	1580	502	3579	1506	493	3544	1493	340	3544	1521
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	231	559	76	198	707	289	74	803	61	292	851	299
RTOR Reduction (vph)	0	0	58	0	0	117	0	0	39	0	0	95
Lane Group Flow (vph)	231	559	18	198	707	172	74	803	22	292	851	204
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Heavy Vehicles (%)	10%	8%	2%	6%	2%	7%	7%	3%	8%	5%	3%	6%
Turn Type	pm+pt	NA	Perm	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		4	8		8	2		2	6		6
Actuated Green, G (s)	43.2	28.5	28.5	40.4	27.1	27.1	47.4	41.9	41.9	60.4	50.9	50.9
Effective Green, g (s)	43.2	28.5	28.5	40.4	27.1	27.1	47.4	41.9	41.9	60.4	50.9	50.9
Actuated g/C Ratio	0.37	0.24	0.24	0.34	0.23	0.23	0.40	0.35	0.35	0.51	0.43	0.43
Clearance Time (s)	4.0	6.0	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	3.0
Lane Grp Cap (vph)	265	814	380	308	820	345	254	1256	529	345	1526	654
v/s Ratio Prot	c0.11	0.17		0.07	0.20		0.01	0.23		c0.10	0.24	
v/s Ratio Perm	c0.21		0.01	0.15		0.11	0.10		0.01	c0.33		0.13
v/c Ratio	0.87	0.69	0.05	0.64	0.86	0.50	0.29	0.64	0.04	0.85	0.56	0.31
Uniform Delay, d1	29.9	40.8	34.4	29.5	43.8	39.6	22.4	31.8	25.0	20.6	25.2	22.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	25.4	2.4	0.1	4.5	9.3	1.1	0.6	2.5	0.1	17.1	1.5	1.2
Delay (s)	55.3	43.2	34.5	34.0	53.0	40.8	23.1	34.3	25.1	37.7	26.7	23.4
Level of Service	E	D	C	C	D	D	C	C	C	D	C	C
Approach Delay (s)		45.7			46.9			32.9			28.2	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			37.6			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			118.2			Sum of lost time (s)				20.0		
Intersection Capacity Utilization			96.2%			ICU Level of Service				F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2041 Background Conditions

4: Moberly Dr/Goodwin Dr & Maplevue Dr E

Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	783	5	0	1032	2	70	50	30	16	75	29
Future Volume (vph)	59	783	5	0	1032	2	70	50	30	16	75	29
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		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95			0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00			1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00			1.00		1.00	0.94		1.00	0.96	
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	3408			3577		1788	1770		1784	1798	
Flt Permitted	0.17	1.00			1.00		0.68	1.00		0.70	1.00	
Satd. Flow (perm)	319	3408			3577		1285	1770		1313	1798	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	66	870	6	0	1147	2	78	56	33	18	83	32
RTOR Reduction (vph)	0	0	0	0	0	0	0	29	0	0	22	0
Lane Group Flow (vph)	66	876	0	0	1149	0	78	60	0	18	93	0
Confl. Peds. (#/hr)	3		1	2		4	1		2	4		3
Heavy Vehicles (%)	2%	7%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	43.7	43.7			35.6		8.5	8.5		8.5	8.5	
Effective Green, g (s)	43.7	43.7			35.6		8.5	8.5		8.5	8.5	
Actuated g/C Ratio	0.68	0.68			0.55		0.13	0.13		0.13	0.13	
Clearance Time (s)	4.0	6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	311	2319			1983		170	234		173	238	
v/s Ratio Prot	0.01	c0.26			c0.32			0.03			0.05	
v/s Ratio Perm	0.13						c0.06			0.01		
v/c Ratio	0.21	0.38			0.58		0.46	0.26		0.10	0.39	
Uniform Delay, d1	4.8	4.4			9.4		25.7	25.0		24.5	25.5	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.5			1.2		2.0	0.6		0.3	1.1	
Delay (s)	5.2	4.9			10.6		27.7	25.6		24.8	26.6	
Level of Service	A	A			B		C	C		C	C	
Approach Delay (s)		4.9			10.6			26.6			26.3	
Approach LOS		A			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			10.4			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			64.2			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			58.9%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

5: Goodwin Dr & Street A

2041 Background Conditions
Weekday AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	29	0	62	49	0	90
Future Volume (Veh/h)	29	0	62	49	0	90
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	32	0	67	53	0	98
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			86			
pX, platoon unblocked						
vC, conflicting volume	192	94			120	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	192	94			120	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	100			100	
cM capacity (veh/h)	797	963			1468	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	32	120	98			
Volume Left	32	0	0			
Volume Right	0	53	0			
cSH	797	1700	1468			
Volume to Capacity	0.04	0.07	0.00			
Queue Length 95th (m)	1.0	0.0	0.0			
Control Delay (s)	9.7	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.7	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		1.2				
Intersection Capacity Utilization		16.3%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis

1: Yonge St & Country Ln/Turnberry Ln

2041 Background Conditions

Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	24	25	75	12	68	27	1679	109	77	1469	31
Future Volume (vph)	19	24	25	75	12	68	27	1679	109	77	1469	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	0.87		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1775	1608		1449	1614		1644	3513		1789	3565	
Flt Permitted	0.70	1.00		0.72	1.00		0.11	1.00		0.08	1.00	
Satd. Flow (perm)	1315	1608		1104	1614		182	3513		159	3565	
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)	20	25	26	77	12	70	28	1731	112	79	1514	32
RTOR Reduction (vph)	0	22	0	0	60	0	0	4	0	0	1	0
Lane Group Flow (vph)	20	29	0	77	22	0	28	1839	0	79	1545	0
Confl. Peds. (#/hr)	9		9	8		8	9		8	8		9
Heavy Vehicles (%)	2%	2%	16%	25%	2%	2%	11%	2%	15%	2%	2%	3%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	11.6	11.6		11.6	11.6		47.3	44.6		52.7	47.3	
Effective Green, g (s)	11.6	11.6		11.6	11.6		47.3	44.6		52.7	47.3	
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.61	0.57		0.68	0.61	
Clearance Time (s)	6.0	6.0		6.0	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	
Lane Grp Cap (vph)	196	240		165	241		161	2019		221	2172	
v/s Ratio Prot		0.02			0.01		0.01	c0.52		c0.02	0.43	
v/s Ratio Perm	0.02			c0.07			0.10			0.22		
v/c Ratio	0.10	0.12		0.47	0.09		0.17	0.91		0.36	0.71	
Uniform Delay, d1	28.5	28.6		30.2	28.5		7.9	14.7		13.4	10.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.2		2.1	0.2		0.5	7.6		1.0	2.0	
Delay (s)	28.7	28.8		32.3	28.6		8.4	22.4		14.3	12.5	
Level of Service	C	C		C	C		A	C		B	B	
Approach Delay (s)		28.8			30.4			22.2			12.5	
Approach LOS		C			C			C			B	
Intersection Summary												
HCM 2000 Control Delay	18.4			HCM 2000 Level of Service			B					
HCM 2000 Volume to Capacity ratio	0.78											
Actuated Cycle Length (s)	77.6			Sum of lost time (s)			16.0					
Intersection Capacity Utilization	83.3%			ICU Level of Service			E					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Yonge St & Street A/GO Access

2041 Background Conditions
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	74	5	73	140	5	126	41	1465	104	60	1402	95
Future Volume (vph)	74	5	73	140	5	126	41	1465	104	60	1402	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	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	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1784	1883	1580	1762	1883	1456	1789	3530		1560	3539	
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.10	1.00		0.10	1.00	
Satd. Flow (perm)	1416	1883	1580	1400	1883	1456	195	3530		170	3539	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	78	5	77	147	5	133	43	1542	109	63	1476	100
RTOR Reduction (vph)	0	0	63	0	0	108	0	5	0	0	4	0
Lane Group Flow (vph)	78	5	14	147	5	25	43	1646	0	63	1572	0
Confl. Peds. (#/hr)	3		1	5		7	1		5	7		3
Heavy Vehicles (%)	2%	2%	2%	3%	2%	10%	2%	2%	5%	17%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	13.4	13.4	13.4	13.4	13.4	13.4	42.4	38.6		42.4	38.6	
Effective Green, g (s)	13.4	13.4	13.4	13.4	13.4	13.4	42.4	38.6		42.4	38.6	
Actuated g/C Ratio	0.19	0.19	0.19	0.19	0.19	0.19	0.59	0.54		0.59	0.54	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	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	3.0	
Lane Grp Cap (vph)	264	351	294	261	351	271	199	1897		173	1902	
v/s Ratio Prot		0.00			0.00		0.01	c0.47		c0.02	0.44	
v/s Ratio Perm	0.06		0.01	c0.11		0.02	0.12			0.19		
v/c Ratio	0.30	0.01	0.05	0.56	0.01	0.09	0.22	0.87		0.36	0.83	
Uniform Delay, d1	25.1	23.8	24.0	26.5	23.8	24.2	10.0	14.4		11.3	13.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.0	0.1	2.8	0.0	0.1	0.5	5.7		1.3	4.3	
Delay (s)	25.8	23.8	24.0	29.3	23.8	24.3	10.6	20.1		12.6	18.1	
Level of Service	C	C	C	C	C	C	B	C		B	B	
Approach Delay (s)		24.9			26.9			19.8			17.9	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			19.7									
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			71.8									
Intersection Capacity Utilization			77.4%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Yonge St & Mapleview Dr E

2041 Background Conditions

Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	344	795	149	151	527	302	155	963	102	307	1067	267
Future Volume (vph)	344	795	149	151	527	302	155	963	102	307	1067	267
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	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	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	1.00	0.99	1.00	1.00	1.00	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	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1738	3579	1585	1789	3579	1580	1789	3579	1601	1789	3579	1565
Flt Permitted	0.18	1.00	1.00	0.16	1.00	1.00	0.11	1.00	1.00	0.09	1.00	1.00
Satd. Flow (perm)	324	3579	1585	299	3579	1580	216	3579	1601	171	3579	1565
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	362	837	157	159	555	318	163	1014	107	323	1123	281
RTOR Reduction (vph)	0	0	91	0	0	154	0	0	73	0	0	76
Lane Group Flow (vph)	362	837	66	159	555	164	163	1014	34	323	1123	205
Confl. Peds. (#/hr)	1					1				1		1
Heavy Vehicles (%)	5%	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	3%
Turn Type	pm+pt	NA	Perm	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		4	8		8	2		2	6		6
Actuated Green, G (s)	50.2	35.1	35.1	36.3	25.2	25.2	50.5	40.1	40.1	64.0	49.6	49.6
Effective Green, g (s)	50.2	35.1	35.1	36.3	25.2	25.2	50.5	40.1	40.1	64.0	49.6	49.6
Actuated g/C Ratio	0.40	0.28	0.28	0.29	0.20	0.20	0.40	0.32	0.32	0.51	0.39	0.39
Clearance Time (s)	4.0	6.0	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	3.0
Lane Grp Cap (vph)	364	995	440	217	714	315	216	1137	508	341	1406	615
v/s Ratio Prot	c0.17	0.23		0.06	0.16		0.06	0.28		c0.15	0.31	
v/s Ratio Perm	c0.23		0.04	0.15		0.10	0.24		0.02	c0.33		0.13
v/c Ratio	0.99	0.84	0.15	0.73	0.78	0.52	0.75	0.89	0.07	0.95	0.80	0.33
Uniform Delay, d1	33.4	42.9	34.3	36.1	47.8	45.1	27.9	41.0	30.0	38.4	33.9	26.7
Progression Factor	1.00	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	45.4	6.5	0.2	12.0	5.3	1.6	13.9	10.7	0.3	34.8	4.8	1.5
Delay (s)	78.9	49.5	34.5	48.1	53.2	46.7	41.8	51.7	30.3	73.1	38.7	28.2
Level of Service	E	D	C	D	D	D	D	D	C	E	D	C
Approach Delay (s)		55.6			50.4			48.6			43.4	
Approach LOS		E			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			49.1	HCM 2000 Level of Service					D			
HCM 2000 Volume to Capacity ratio			1.02									
Actuated Cycle Length (s)			126.2	Sum of lost time (s)					20.0			
Intersection Capacity Utilization			100.9%	ICU Level of Service					G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2041 Background Conditions

4: Moberly Dr/Goodwin Dr & Maplevue Dr E

Weekday PM Peak Hour

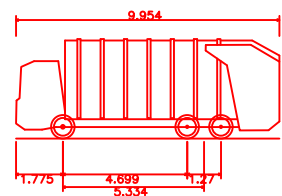
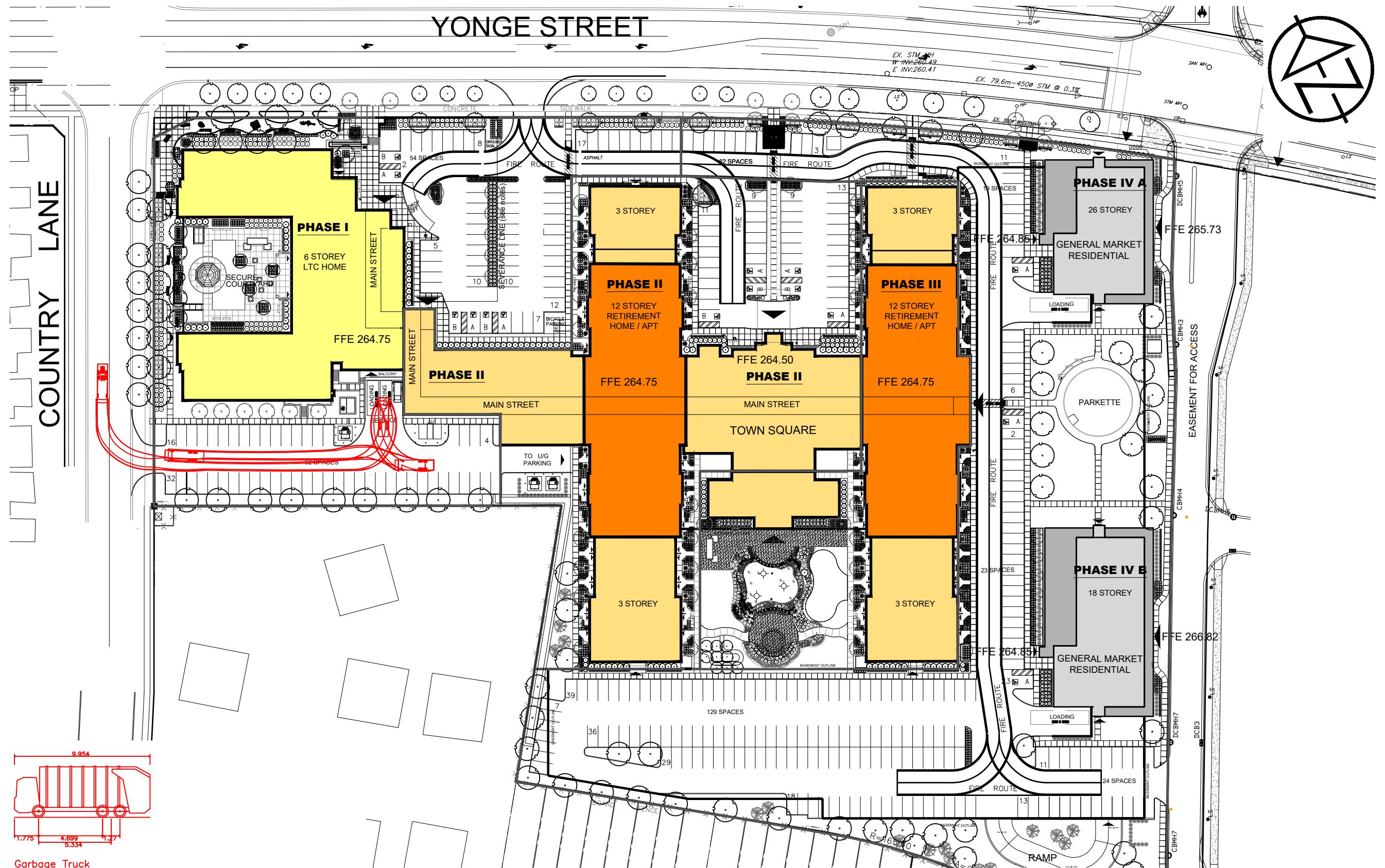
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	119	1189	200	30	963	12	135	100	60	42	150	19
Future Volume (vph)	119	1189	200	30	963	12	135	100	60	42	150	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00		1.00	0.94		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	3501		1789	3503		1789	1769		1786	1848	
Flt Permitted	0.17	1.00		0.12	1.00		0.63	1.00		0.65	1.00	
Satd. Flow (perm)	317	3501		224	3503		1178	1769		1217	1848	
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)	129	1292	217	33	1047	13	147	109	65	46	163	21
RTOR Reduction (vph)	0	14	0	0	1	0	0	30	0	0	6	0
Lane Group Flow (vph)	129	1495	0	33	1059	0	147	144	0	46	178	0
Confl. Peds. (#/hr)	1			2		3			2	3		1
Heavy Vehicles (%)	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	43.5	37.3		36.1	33.6		14.2	14.2		14.2	14.2	
Effective Green, g (s)	43.5	37.3		36.1	33.6		14.2	14.2		14.2	14.2	
Actuated g/C Ratio	0.62	0.53		0.52	0.48		0.20	0.20		0.20	0.20	
Clearance Time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	327	1865		171	1681		238	358		246	374	
v/s Ratio Prot	c0.03	c0.43		0.01	0.30			0.08			0.10	
v/s Ratio Perm	0.21			0.09			c0.12			0.04		
v/c Ratio	0.39	0.80		0.19	0.63		0.62	0.40		0.19	0.47	
Uniform Delay, d1	7.3	13.3		10.4	13.6		25.4	24.2		23.1	24.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	3.7		0.6	1.8		4.7	0.7		0.4	1.0	
Delay (s)	8.1	17.1		10.9	15.4		30.1	25.0		23.5	25.6	
Level of Service	A	B		B	B		C	C		C	C	
Approach Delay (s)		16.4			15.2			27.3			25.1	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			17.7			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			70.0			Sum of lost time (s)				16.0		
Intersection Capacity Utilization			81.5%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 5: Goodwin Dr & Street A

2041 Background Conditions
Weekday PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	53	0	132	99	0	159
Future Volume (Veh/h)	53	0	132	99	0	159
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	58	0	143	108	0	173
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			86			
pX, platoon unblocked	0.97	0.97			0.97	
vC, conflicting volume	370	197			251	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	334	155			211	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	91	100			100	
cM capacity (veh/h)	641	863			1317	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	58	251	173			
Volume Left	58	0	0			
Volume Right	0	108	0			
cSH	641	1700	1317			
Volume to Capacity	0.09	0.15	0.00			
Queue Length 95th (m)	2.3	0.0	0.0			
Control Delay (s)	11.2	0.0	0.0			
Lane LOS	B					
Approach Delay (s)	11.2	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		1.3				
Intersection Capacity Utilization		23.0%		ICU Level of Service		A
Analysis Period (min)		15				

Appendix H: Vehicle Turning Assessment



Garbage Truck
Overall Length
Overall Width
Overall Body Height
Min Body Ground Clearance
Track Width
Lock-to-lock time
Curb to Curb Turning Radius

9.954m
2.553m
3.760m
0.313m
1.775m
6.00s
12.436m



THE VILLAGE OF INNIS LANDING
#800 YONGE STREET
AUTOTURN ASSESSMENT

SCALE: 1:1000

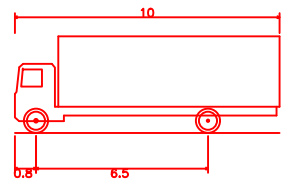
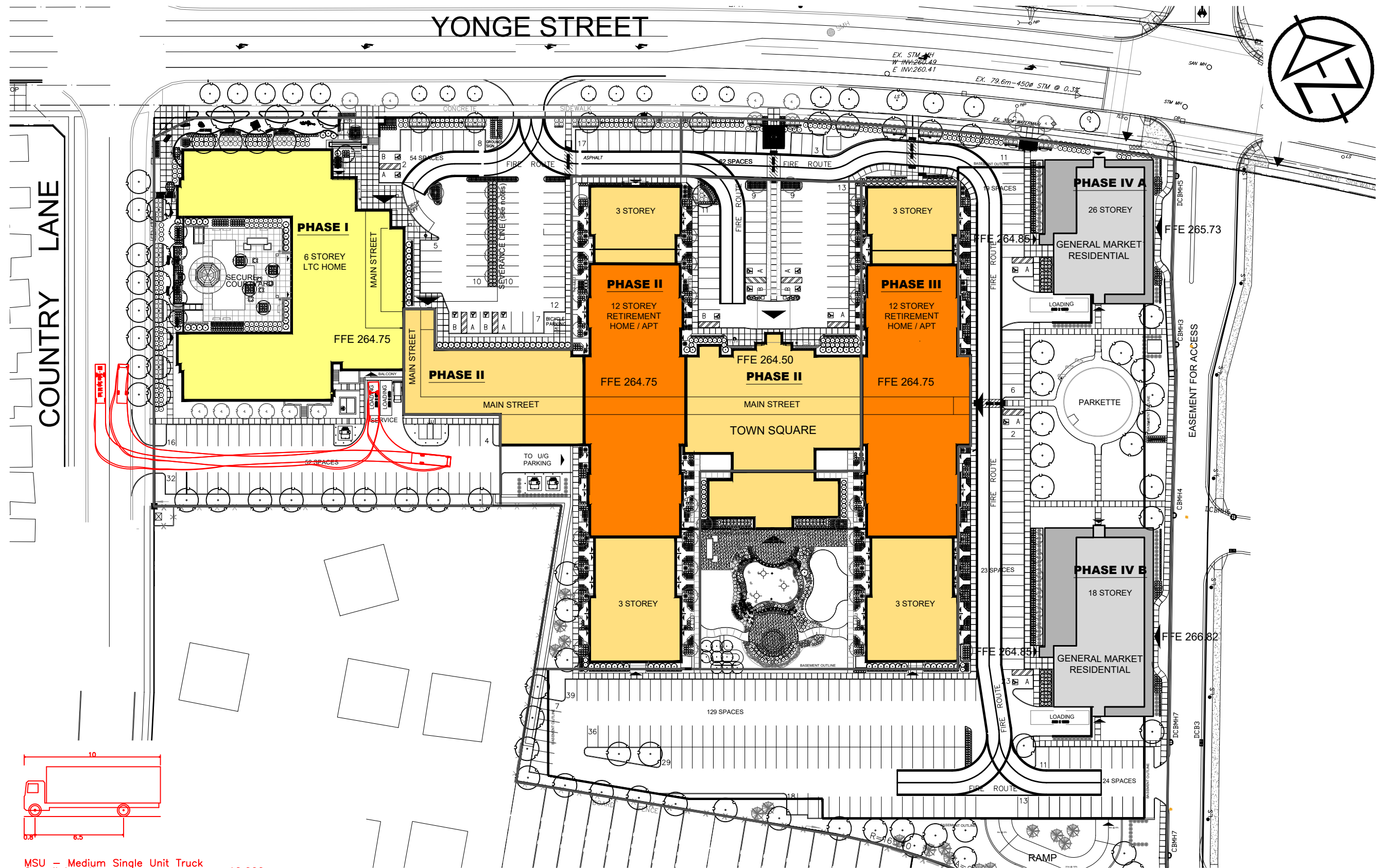
DRAWN: DDOH

DATE: JULY/24

DWG. No.

FIG. H1

JOB NO. 422426



MSU - Medium Single Unit Truck
Overall Length 10.000m
Overall Width 2.600m
Overall Body Height 2.650m
Min Body Ground Clearance 0.445m
Track Width 2.600m
Lock-to-lock time 4.00s
Curb to Curb Turning Radius 11.100m

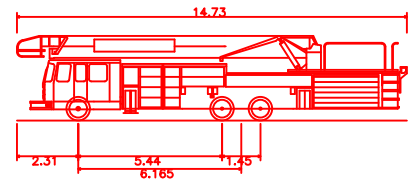
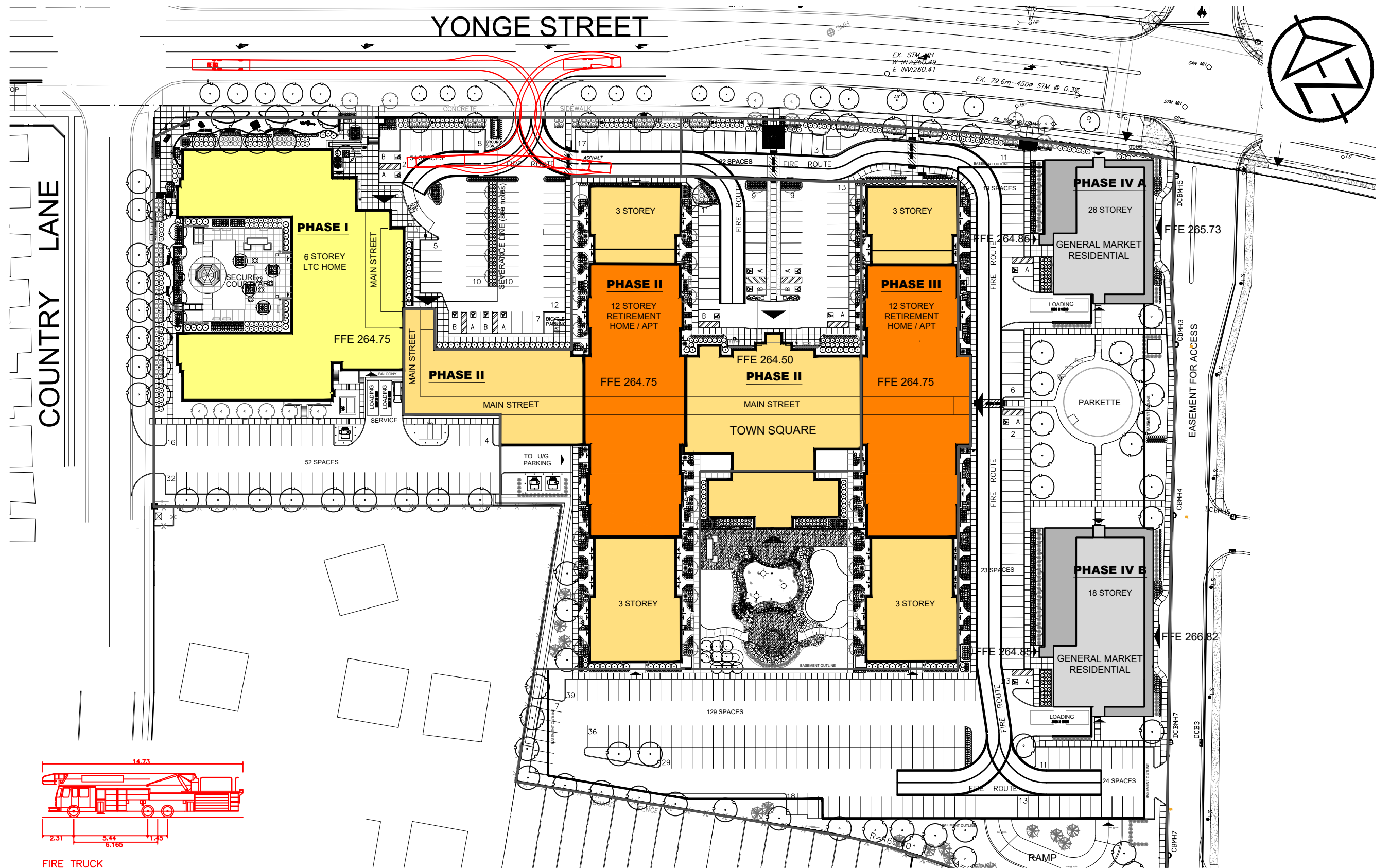


THE VILLAGE OF INNIS LANDING
#800 YONGE STREET
AUTOTURN ASSESSMENT

SCALE: 1:500 DRAWN: DDOH DATE: JULY/24

DWG. No.
FIG. H2

JOB NO. 422426



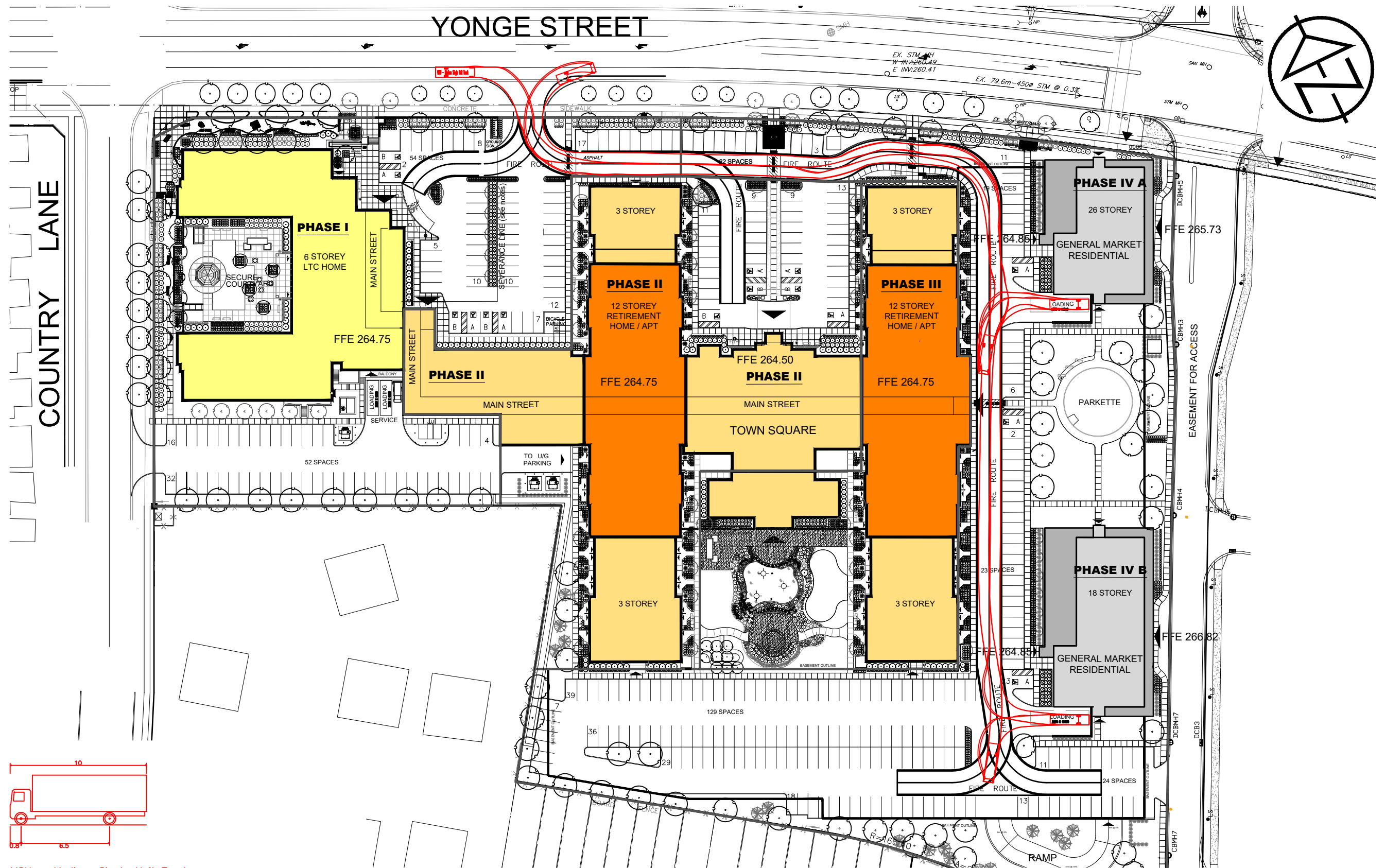
FIRE TRUCK
Overall Length 14.730m
Overall Width 2.600m
Overall Body Height 3.197m
Min Body Ground Clearance 0.291m
Track Width 2.540m
Lock-to-lock time 6.00s
Max Steering Angle (Virtual) 29.20°



THE VILLAGE OF INNIS LANDING
#800 YONGE STREET
AUTOTURN ASSESSMENT

DWG. No.
FIG. H3

SCALE: 1:500 DRAWN: DDOH DATE: JULY/24 JOB NO. 422426



MSU - Medium Single Unit Truck
Overall Length 10.000m
Overall Width 2.600m
Overall Body Height 3.650m
Min Body Ground Clearance 0.445m
Track Width 2.600m
Lock-to-lock time 4.00s
Curb to Curb Turning Radius 11.100m



THE VILLAGE OF INNIS LANDING
#800 YONGE STREET
AUTOTURN ASSESSMENT

SCALE: 1:500

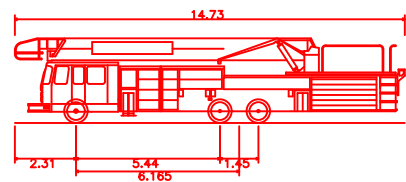
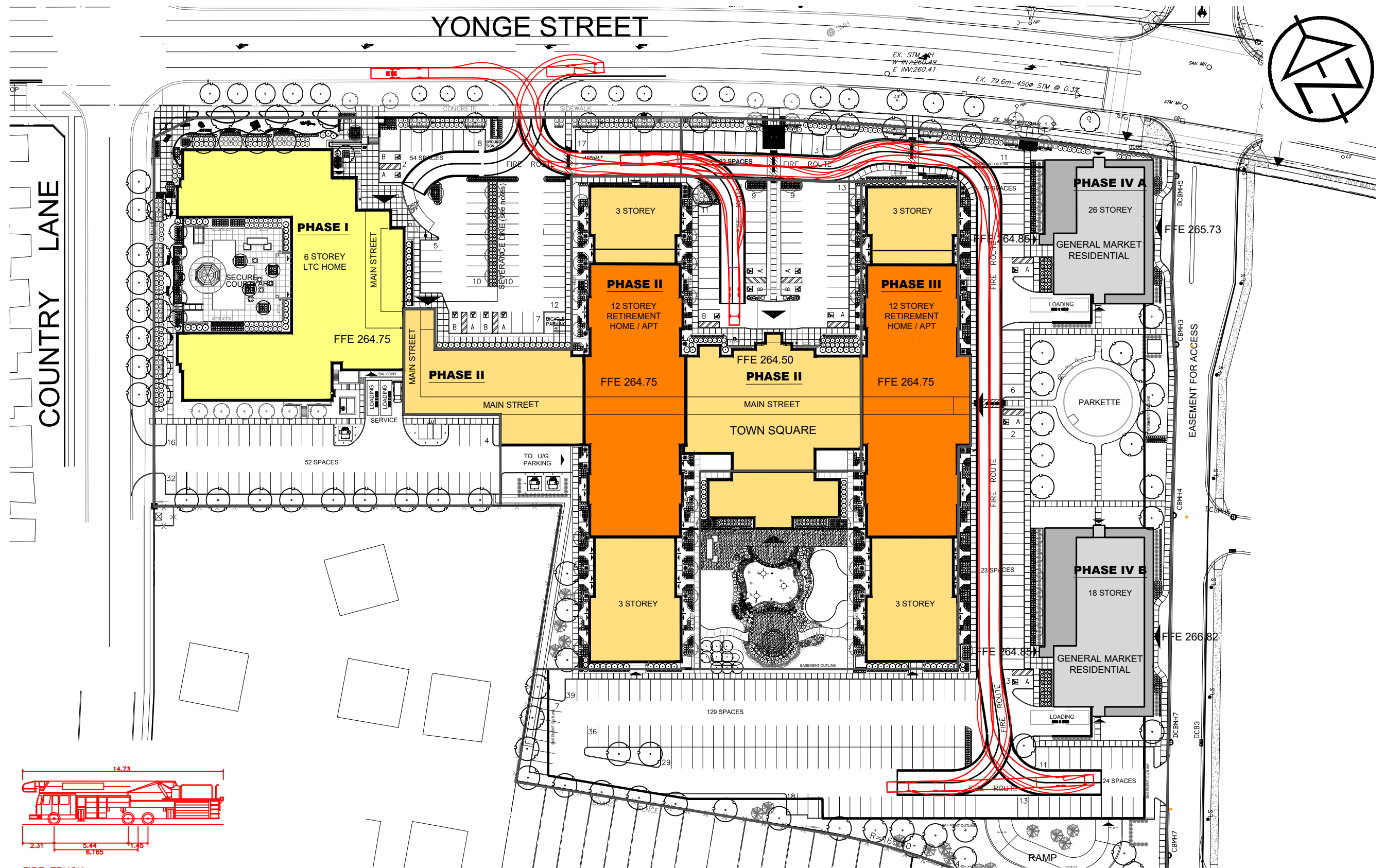
DRAWN: DDOH

DATE: JULY/24

DWG. No.

FIG. H4

JOB NO. 422426



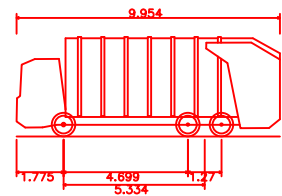
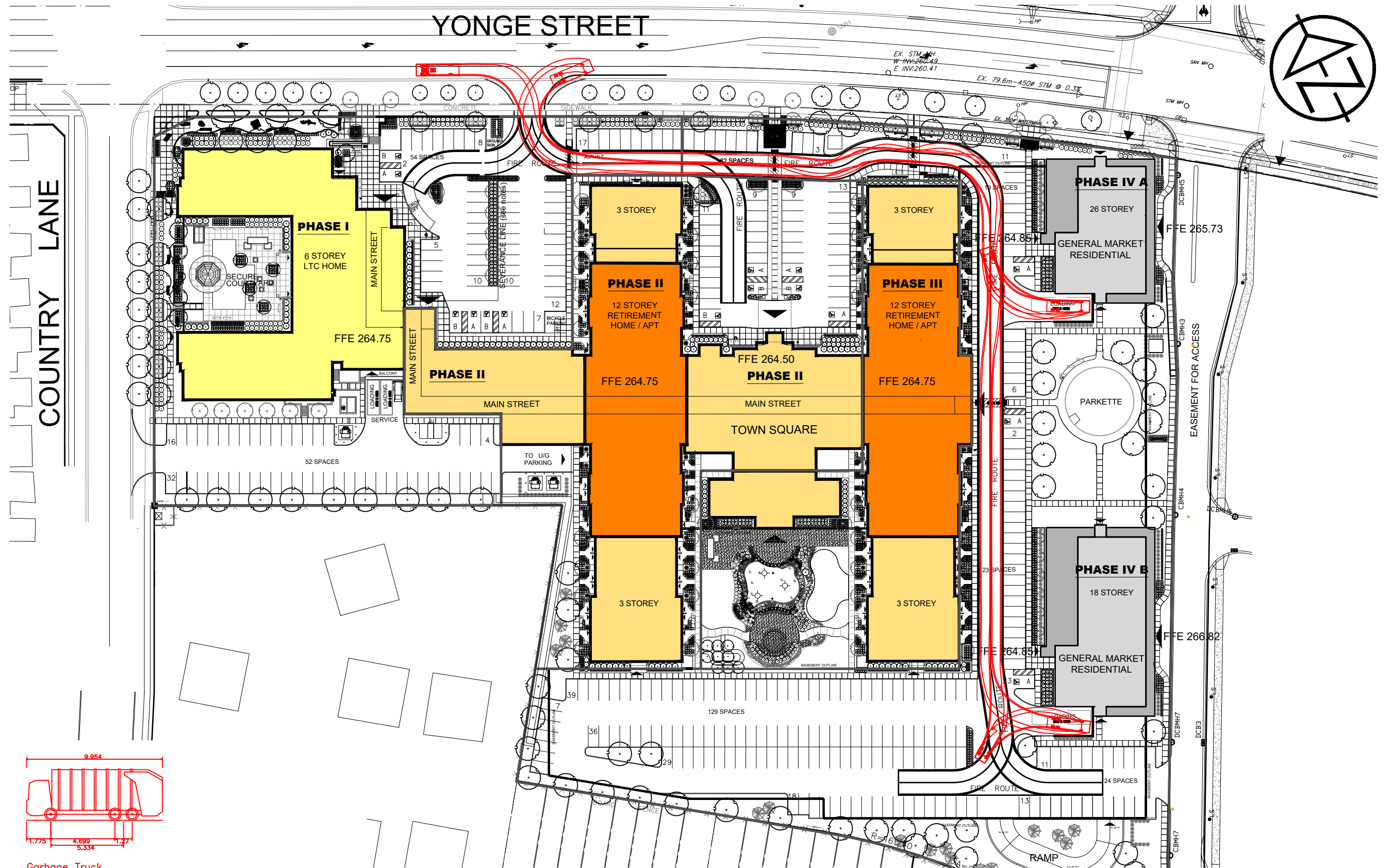
FIRE TRUCK
Overall Length 14.730m
Overall Width 2.600m
Overall Body Height 3.197m
Min Body Ground Clearance 0.281m
Track Width 2.540m
Lock-to-lock time 6.00s
Max Steering Angle (Virtual) 29.20°



THE VILLAGE OF INNIS LANDING
#800 YONGE STREET
AUTOTURN ASSESSMENT

DWG. No.
FIG. H5

SCALE: 1:500 DRAWN: DDOH DATE: JULY/24 JOB NO. 422426



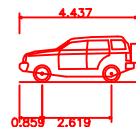
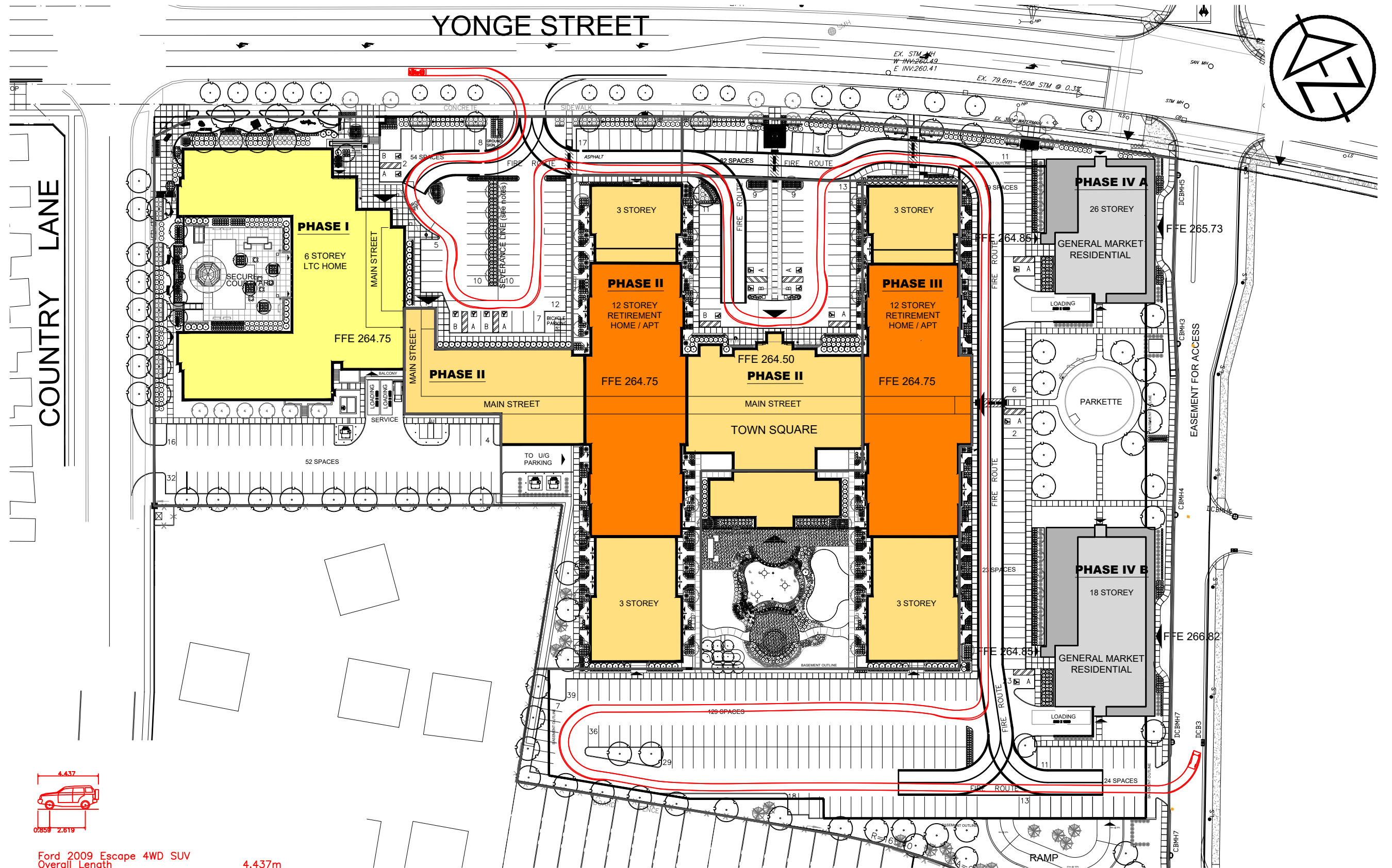
Garbage Truck
Overall Length 9.954m
Overall Width 2.553m
Overall Body Height 3.760m
Min Body Ground Clearance 0.313m
Track Width 2.553m
Lock-to-lock time 6.00s
Curb to Curb Turning Radius 12.436m



THE VILLAGE OF INNIS LANDING
#800 YONGE STREET
AUTOTURN ASSESSMENT

SCALE: 1:500	DRAWN: DDOH	DATE: JULY/24	JOB NO. 422426
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DWG. No.
FIG. H6



Ford 2009 Escape 4WD SUV
Overall Length 4.437m
Overall Width 1.806m
Overall Body Height 1.722m
Min Body Ground Clearance 0.206m
Track Width 1.806m
Lock-to-lock time 4.00s
Curb to Curb Turning Radius 5.593m



THE VILLAGE OF INNIS LANDING
#800 YONGE STREET
AUTOTURN ASSESSMENT

SCALE: 1:500

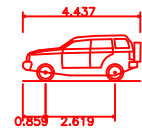
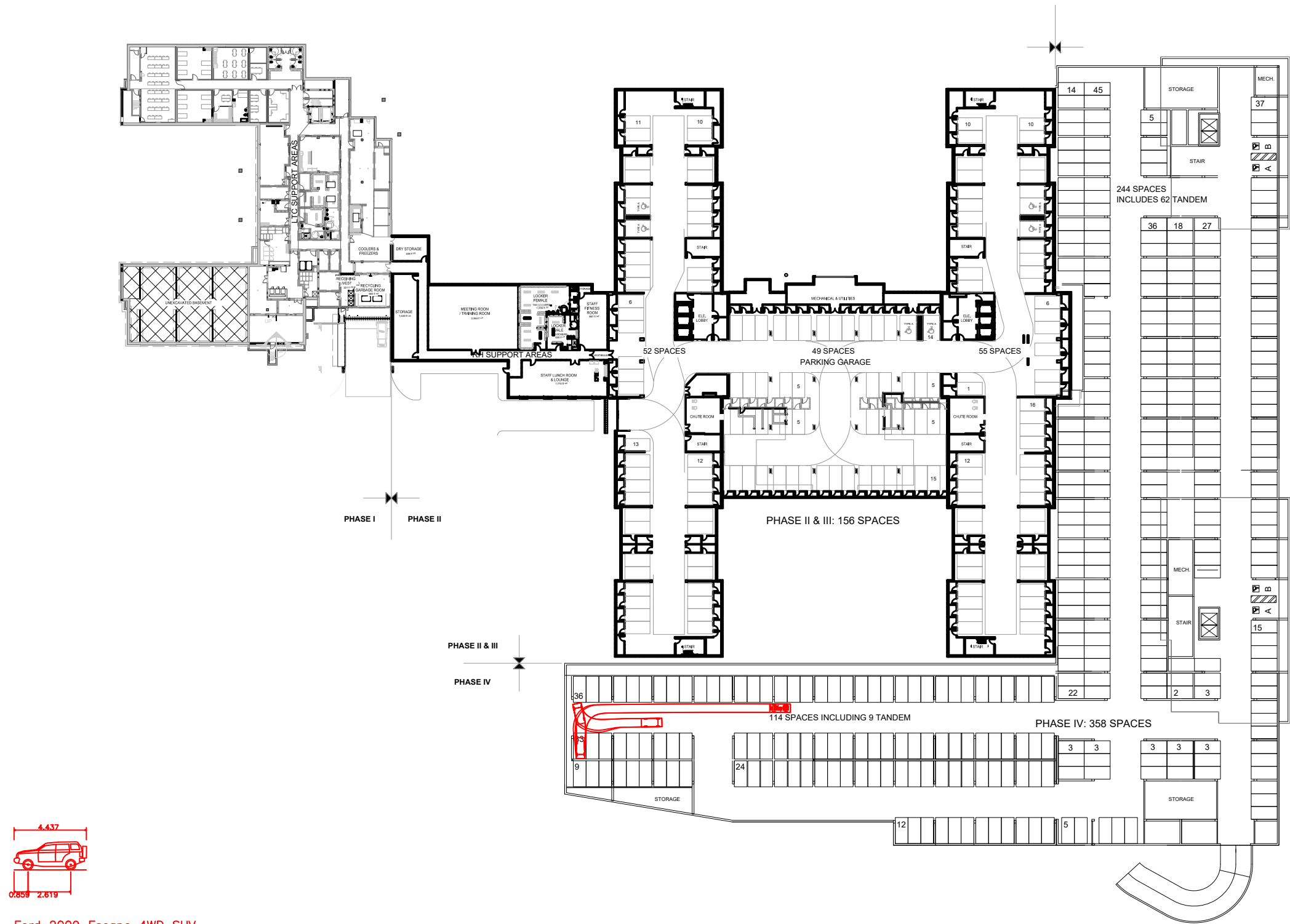
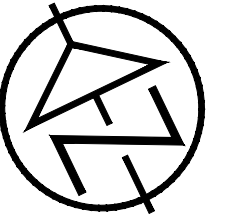
DRAWN: DDOH

DATE: JULY/24

DWG. No.

FIG. H7

JOB NO. 422426



Ford 2009 Escape 4WD SUV
Overall Length 4.437m
Overall Width 1.806m
Overall Body Height 1.722m
Min Body Ground Clearance 0.206m
Track Width 1.806m
Lock-to-lock time 4.00s
Curb to Curb Turning Radius 5.593m



THE VILLAGE OF INNIS LANDING
#800 YONGE STREET
AUTOTURN ASSESSMENT

DWG. No.
FIG. H8

SCALE: 1:500 DRAWN: DDOH DATE: JULY/24 JOB NO. 422426

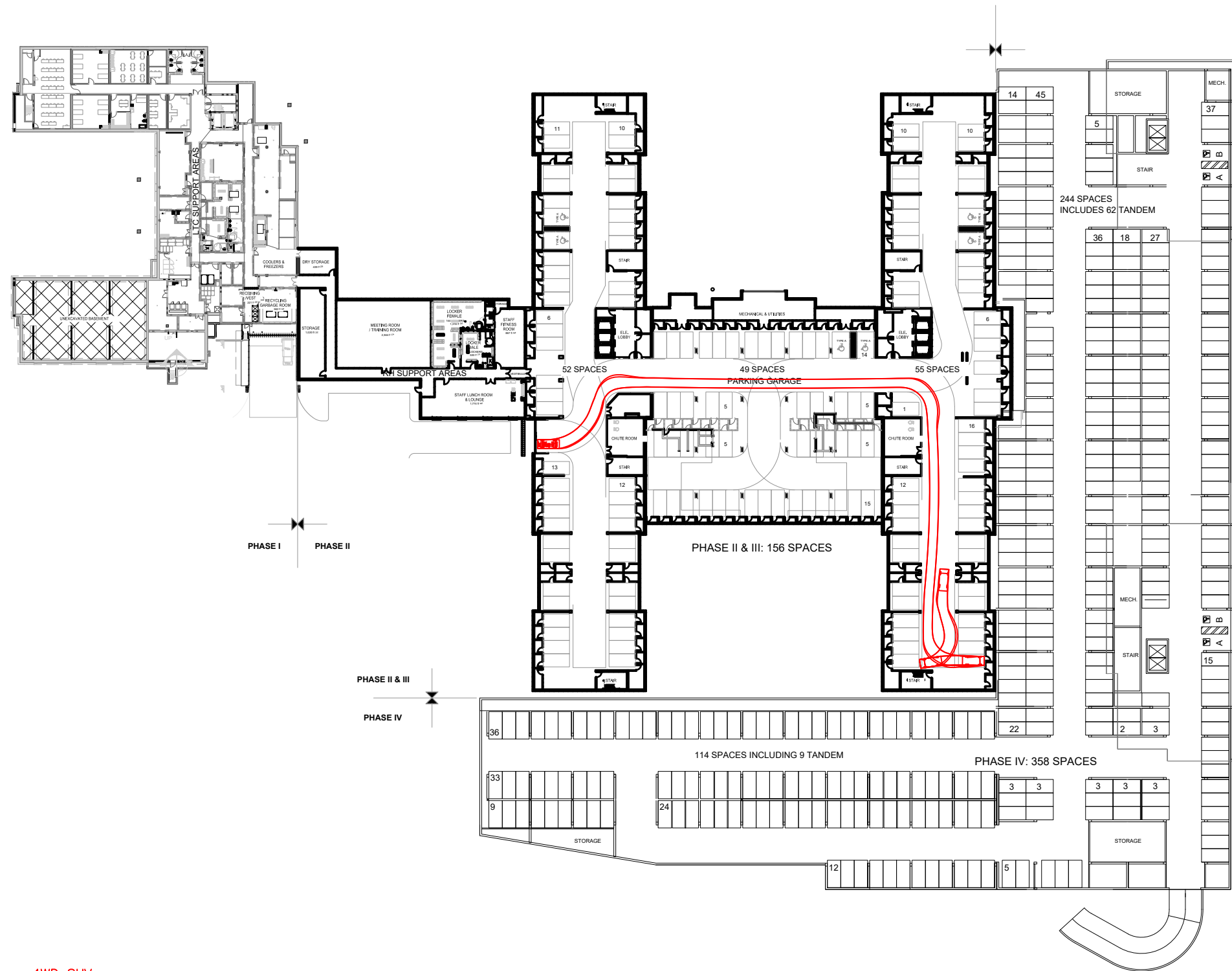
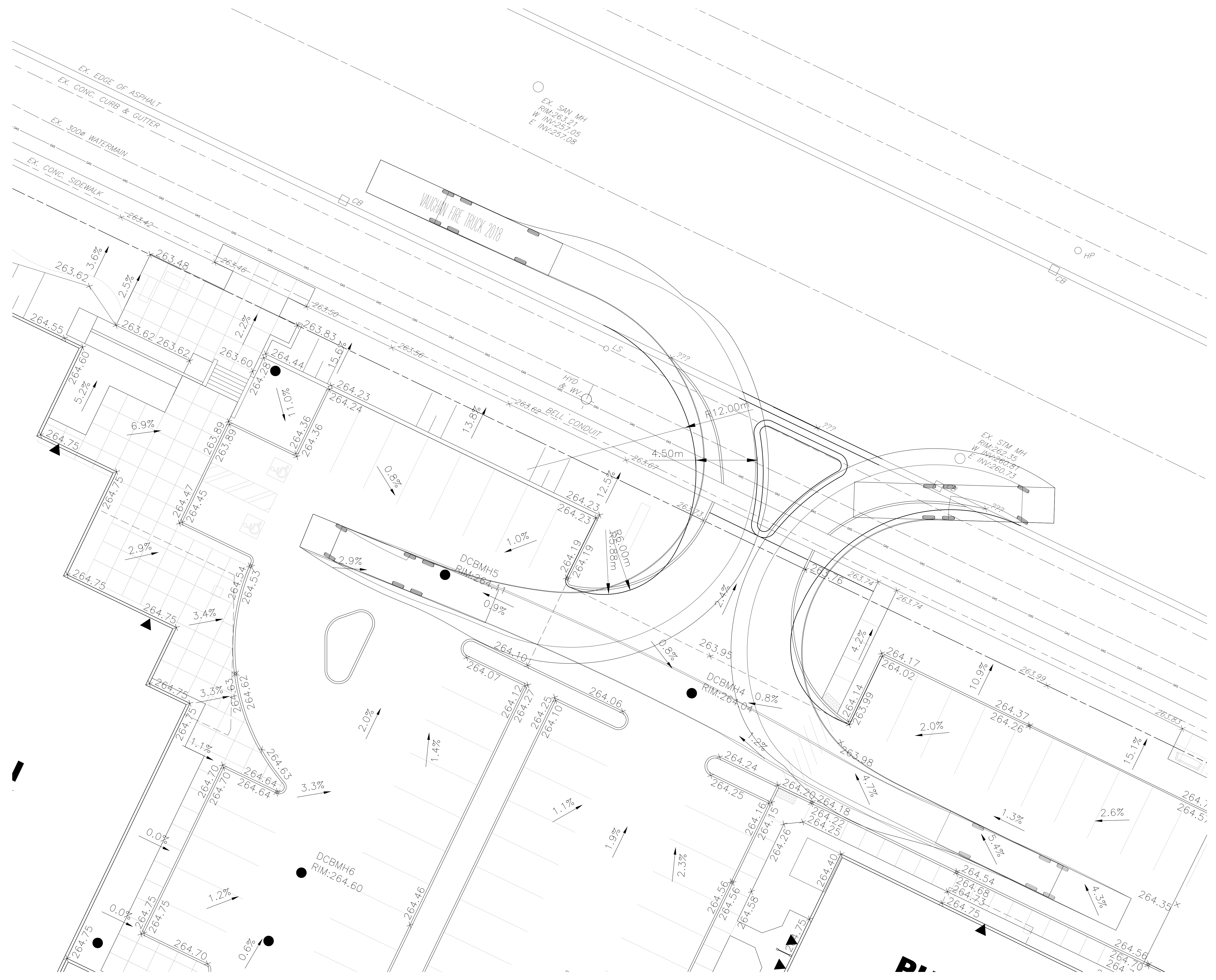


FIG. H9

JOB NO. 422426



Appendix I: Future Total Operations

HCM Signalized Intersection Capacity Analysis

1: Yonge St & Country Ln/Turnberry Ln

2027 Total Conditions
Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	12	51	98	26	83	27	796	41	34	892	14
Future Volume (vph)	26	12	51	98	26	83	27	796	41	34	892	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.88		1.00	0.89		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1745	1518		1682	1648		1521	3451		1789	3498	
Flt Permitted	0.67	1.00		0.70	1.00		0.18	1.00		0.19	1.00	
Satd. Flow (perm)	1227	1518		1248	1648		293	3451		363	3498	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	33	15	65	126	33	106	35	1021	53	44	1144	18
RTOR Reduction (vph)	0	52	0	0	84	0	0	4	0	0	1	0
Lane Group Flow (vph)	33	28	0	126	55	0	35	1070	0	44	1161	0
Confl. Peds. (#/hr)	7		8	5		4	8		5	4		7
Heavy Vehicles (%)	4%	2%	11%	8%	2%	2%	20%	5%	2%	2%	4%	8%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.9	15.9		15.9	15.9		44.5	41.8		47.3	43.2	
Effective Green, g (s)	15.9	15.9		15.9	15.9		44.5	41.8		47.3	43.2	
Actuated g/C Ratio	0.20	0.20		0.20	0.20		0.57	0.54		0.61	0.56	
Clearance Time (s)	6.0	6.0		6.0	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	
Lane Grp Cap (vph)	250	310		255	336		210	1854		295	1942	
v/s Ratio Prot		0.02			0.03		0.01	0.31		c0.01	c0.33	
v/s Ratio Perm	0.03			c0.10			0.09			0.08		
v/c Ratio	0.13	0.09		0.49	0.16		0.17	0.58		0.15	0.60	
Uniform Delay, d1	25.3	25.1		27.4	25.5		8.1	12.1		7.1	11.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.1		1.5	0.2		0.4	1.3		0.2	1.4	
Delay (s)	25.5	25.2		28.9	25.7		8.4	13.4		7.4	12.9	
Level of Service	C	C		C	C		A	B		A	B	
Approach Delay (s)		25.3			27.2			13.2			12.7	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay	14.9			HCM 2000 Level of Service			B					
HCM 2000 Volume to Capacity ratio	0.55											
Actuated Cycle Length (s)	77.8			Sum of lost time (s)			16.0					
Intersection Capacity Utilization	53.2%			ICU Level of Service			A					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Yonge St & Street A/GO Access

2027 Total Conditions
Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	5	27	35	5	33	11	783	48	31	999	34
Future Volume (vph)	35	5	27	35	5	33	11	783	48	31	999	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	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	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	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	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1883	1580	1621	1883	1255	1789	3466		1448	3495	
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.18	1.00		0.24	1.00	
Satd. Flow (perm)	1420	1883	1580	1287	1883	1255	332	3466		359	3495	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	44	6	34	44	6	42	14	991	61	39	1265	43
RTOR Reduction (vph)	0	0	31	0	0	38	0	3	0	0	2	0
Lane Group Flow (vph)	44	6	3	44	6	4	14	1049	0	39	1306	0
Confl. Peds. (#/hr)			1	5		4	1		5	4		
Heavy Vehicles (%)	2%	2%	2%	12%	2%	28%	2%	4%	8%	26%	4%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	5.6	5.6	5.6	5.6	5.6	5.6	43.8	42.6		46.2	43.8	
Effective Green, g (s)	5.6	5.6	5.6	5.6	5.6	5.6	43.8	42.6		46.2	43.8	
Actuated g/C Ratio	0.08	0.08	0.08	0.08	0.08	0.08	0.66	0.64		0.69	0.66	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	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	3.0	
Lane Grp Cap (vph)	119	158	132	108	158	105	244	2216		288	2298	
v/s Ratio Prot		0.00			0.00		0.00	0.30		c0.00	c0.37	
v/s Ratio Perm	0.03		0.00	c0.03		0.00	0.04			0.09		
v/c Ratio	0.37	0.04	0.02	0.41	0.04	0.03	0.06	0.47		0.14	0.57	
Uniform Delay, d1	28.8	28.0	28.0	28.9	28.0	28.0	4.3	6.2		3.5	6.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.9	0.1	0.1	2.5	0.1	0.1	0.1	0.7		0.2	1.0	
Delay (s)	30.8	28.1	28.1	31.4	28.1	28.1	4.4	6.9		3.7	7.3	
Level of Service	C	C	C	C	C	C	A	A		A	A	
Approach Delay (s)		29.5			29.7			6.9			7.2	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			8.6				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			66.6				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			61.0%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Yonge St & Mapleview Dr E

2027 Total Conditions

Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	163	348	47	124	444	182	47	497	38	191	539	227
Future Volume (vph)	163	348	47	124	444	182	47	497	38	191	539	227
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		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1659	3336		1721	3579	1506	1706	3491		1738	3345	
Flt Permitted	0.29	1.00		0.40	1.00	1.00	0.28	1.00		0.36	1.00	
Satd. Flow (perm)	507	3336		719	3579	1506	511	3491		663	3345	
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)	175	374	51	133	477	196	51	534	41	205	580	244
RTOR Reduction (vph)	0	11	0	0	0	148	0	5	0	0	38	0
Lane Group Flow (vph)	175	414	0	133	477	48	51	570	0	205	786	0
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Heavy Vehicles (%)	10%	8%	2%	6%	2%	7%	7%	3%	8%	5%	3%	6%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	27.3	19.3		25.3	18.3	18.3	46.9	42.8		52.7	45.7	
Effective Green, g (s)	27.3	19.3		25.3	18.3	18.3	46.9	42.8		52.7	45.7	
Actuated g/C Ratio	0.28	0.20		0.26	0.19	0.19	0.49	0.45		0.55	0.48	
Clearance Time (s)	4.0	6.0		4.0	6.0	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)	239	669		262	681	286	300	1554		441	1590	
v/s Ratio Prot	c0.06	0.12		0.04	0.13		0.01	0.16		c0.03	c0.24	
v/s Ratio Perm	c0.15			0.10		0.03	0.08			0.22		
v/c Ratio	0.73	0.62		0.51	0.70	0.17	0.17	0.37		0.46	0.49	
Uniform Delay, d1	28.0	35.0		28.4	36.3	32.5	13.3	17.7		11.5	17.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.0	1.7		1.5	3.3	0.3	0.3	0.7		0.8	1.1	
Delay (s)	39.0	36.8		29.9	39.6	32.8	13.5	18.3		12.3	18.4	
Level of Service	D	D		C	D	C	B	B		B	B	
Approach Delay (s)		37.4			36.3			17.9			17.2	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay	26.3			HCM 2000 Level of Service			C					
HCM 2000 Volume to Capacity ratio	0.60											
Actuated Cycle Length (s)	96.1			Sum of lost time (s)			20.0					
Intersection Capacity Utilization	82.3%			ICU Level of Service			E					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Moberly Dr/Goodwin Dr & Mapleview Dr E

2027 Total Conditions

Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	535	5	0	720	5	41	21	13	12	32	25
Future Volume (vph)	16	535	5	0	720	5	41	21	13	12	32	25
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		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95			0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	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		1.00	1.00	
Frt	1.00	1.00			1.00		1.00	0.94		1.00	0.93	
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	3407			3574		1788	1767		1784	1749	
Flt Permitted	0.31	1.00			1.00		0.72	1.00		0.73	1.00	
Satd. Flow (perm)	576	3407			3574		1346	1767		1376	1749	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	18	594	6	0	800	6	46	23	14	13	36	28
RTOR Reduction (vph)	0	0	0	0	0	0	0	13	0	0	25	0
Lane Group Flow (vph)	18	600	0	0	806	0	46	24	0	13	39	0
Confl. Peds. (#/hr)	3		1	2		4	1		2	4		3
Heavy Vehicles (%)	2%	7%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	44.4	44.4			39.2		5.9	5.9		5.9	5.9	
Effective Green, g (s)	44.4	44.4			39.2		5.9	5.9		5.9	5.9	
Actuated g/C Ratio	0.71	0.71			0.63		0.09	0.09		0.09	0.09	
Clearance Time (s)	4.0	6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	433	2428			2248		127	167		130	165	
v/s Ratio Prot	0.00	c0.18			c0.23			0.01			0.02	
v/s Ratio Perm	0.03						c0.03			0.01		
v/c Ratio	0.04	0.25			0.36		0.36	0.15		0.10	0.23	
Uniform Delay, d1	2.8	3.1			5.5		26.4	25.9		25.8	26.1	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.2			0.4		1.8	0.4		0.3	0.7	
Delay (s)	2.9	3.4			6.0		28.2	26.3		26.1	26.8	
Level of Service	A	A			A		C	C		C	C	
Approach Delay (s)		3.3			6.0			27.3			26.7	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			7.1				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.36									
Actuated Cycle Length (s)			62.3				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			39.7%				ICU Level of Service			A		
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

5: Goodwin Dr & Street A

2027 Total Conditions
Weekday AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	19	0	43	36	0	47
Future Volume (Veh/h)	19	0	43	36	0	47
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	0	47	39	0	51
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			86			
pX, platoon unblocked						
vC, conflicting volume	118	66			86	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	118	66			86	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			100	
cM capacity (veh/h)	878	997			1510	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	21	86	51			
Volume Left	21	0	0			
Volume Right	0	39	0			
cSH	878	1700	1510			
Volume to Capacity	0.02	0.05	0.00			
Queue Length 95th (m)	0.6	0.0	0.0			
Control Delay (s)	9.2	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.2	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		1.2				
Intersection Capacity Utilization		14.5%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

7: Access 1 & Country Ln

2027 Total Conditions
Weekday AM Peak Hour

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	87	3	4	63	1	2
Future Volume (Veh/h)	87	3	4	63	1	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.25	0.25	0.92	0.25	0.25	0.92
Hourly flow rate (vph)	348	12	4	252	4	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)				111		
pX, platoon unblocked						
vC, conflicting volume			360		614	354
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			360		614	354
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		99	100
cM capacity (veh/h)			1199		454	690
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	360	256	6			
Volume Left	0	4	4			
Volume Right	12	0	2			
cSH	1700	1199	512			
Volume to Capacity	0.21	0.00	0.01			
Queue Length 95th (m)	0.0	0.1	0.3			
Control Delay (s)	0.0	0.2	12.1			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.2	12.1			
Approach LOS			B			
Intersection Summary						
Average Delay		0.2				
Intersection Capacity Utilization		16.6%	ICU Level of Service	A		
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

8: Yonge St & Access 2

2027 Total Conditions
Weekday AM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	3	0	829	1000	8
Future Volume (Veh/h)	0	3	0	829	1000	8
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	3	0	901	1087	9
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLT	TWLT	
Median storage (veh)				2	2	
Upstream signal (m)				150	126	
pX, platoon unblocked	0.86	0.80	0.80			
vC, conflicting volume	1542	548	1087			
vC1, stage 1 conf vol	1092					
vC2, stage 2 conf vol	450					
vCu, unblocked vol	673	0	607			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	396	867	784			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	3	450	450	725	371	
Volume Left	0	0	0	0	0	
Volume Right	3	0	0	0	9	
cSH	867	1700	1700	1700	1700	
Volume to Capacity	0.00	0.27	0.27	0.43	0.22	
Queue Length 95th (m)	0.1	0.0	0.0	0.0	0.0	
Control Delay (s)	9.2	0.0	0.0	0.0	0.0	
Lane LOS	A					
Approach Delay (s)	9.2	0.0		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			37.9%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

1: Yonge St & Country Ln/Turnberry Ln

2027 Total Conditions
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	24	30	75	12	68	28	1143	109	77	1004	32
Future Volume (vph)	23	24	30	75	12	68	28	1143	109	77	1004	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	0.87		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1775	1586		1449	1614		1644	3485		1789	3558	
Flt Permitted	0.70	1.00		0.72	1.00		0.24	1.00		0.14	1.00	
Satd. Flow (perm)	1315	1586		1099	1614		411	3485		261	3558	
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)	24	25	31	77	12	70	29	1178	112	79	1035	33
RTOR Reduction (vph)	0	26	0	0	60	0	0	6	0	0	2	0
Lane Group Flow (vph)	24	30	0	77	22	0	29	1284	0	79	1066	0
Confl. Peds. (#/hr)	9		9	8		8	9		8	8		9
Heavy Vehicles (%)	2%	2%	16%	25%	2%	2%	11%	2%	15%	2%	2%	3%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	11.6	11.6		11.6	11.6		47.3	44.6		52.7	47.3	
Effective Green, g (s)	11.6	11.6		11.6	11.6		47.3	44.6		52.7	47.3	
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.61	0.57		0.68	0.61	
Clearance Time (s)	6.0	6.0		6.0	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	
Lane Grp Cap (vph)	196	237		164	241		293	2002		283	2168	
v/s Ratio Prot		0.02			0.01		0.00	c0.37		c0.02	0.30	
v/s Ratio Perm	0.02			c0.07			0.06			0.17		
v/c Ratio	0.12	0.13		0.47	0.09		0.10	0.64		0.28	0.49	
Uniform Delay, d1	28.6	28.6		30.2	28.5		6.2	11.1		6.4	8.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2		2.1	0.2		0.1	1.6		0.5	0.8	
Delay (s)	28.9	28.8		32.3	28.6		6.3	12.7		7.0	9.2	
Level of Service	C	C		C	C		A	B		A	A	
Approach Delay (s)		28.8			30.4			12.6			9.1	
Approach LOS		C			C			B			A	
Intersection Summary												
HCM 2000 Control Delay	12.6			HCM 2000 Level of Service			B					
HCM 2000 Volume to Capacity ratio	0.58											
Actuated Cycle Length (s)	77.6			Sum of lost time (s)			16.0					
Intersection Capacity Utilization	68.5%			ICU Level of Service			C					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Yonge St & Street A/GO Access

2027 Total Conditions
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	5	61	91	5	82	30	1011	67	39	960	77
Future Volume (vph)	61	5	61	91	5	82	30	1011	67	39	960	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	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	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1784	1883	1580	1762	1883	1456	1789	3533		1560	3533	
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.23	1.00		0.20	1.00	
Satd. Flow (perm)	1416	1883	1580	1400	1883	1456	427	3533		321	3533	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	64	5	64	96	5	86	32	1064	71	41	1011	81
RTOR Reduction (vph)	0	0	56	0	0	75	0	4	0	0	4	0
Lane Group Flow (vph)	64	5	8	96	5	11	32	1131	0	41	1088	0
Confl. Peds. (#/hr)	3		1	5		7	1		5	7		3
Heavy Vehicles (%)	2%	2%	2%	3%	2%	10%	2%	2%	5%	17%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	9.0	9.0	9.0	9.0	9.0	9.0	45.2	42.6		47.8	43.9	
Effective Green, g (s)	9.0	9.0	9.0	9.0	9.0	9.0	45.2	42.6		47.8	43.9	
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13	0.13	0.63	0.60		0.67	0.61	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	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	3.0	
Lane Grp Cap (vph)	178	237	198	176	237	183	319	2104		282	2169	
v/s Ratio Prot		0.00			0.00		0.00	c0.32		c0.01	0.31	
v/s Ratio Perm	0.05		0.01	c0.07		0.01	0.06			0.09		
v/c Ratio	0.36	0.02	0.04	0.55	0.02	0.06	0.10	0.54		0.15	0.50	
Uniform Delay, d1	28.6	27.4	27.5	29.3	27.4	27.5	5.2	8.6		4.8	7.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	0.0	0.1	3.4	0.0	0.1	0.1	1.0		0.2	0.8	
Delay (s)	29.9	27.4	27.5	32.8	27.4	27.7	5.3	9.6		5.0	8.5	
Level of Service	C	C	C	C	C	C	A	A		A	A	
Approach Delay (s)		28.7			30.3			9.5			8.4	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			11.5				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.51									
Actuated Cycle Length (s)			71.5				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			63.5%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Yonge St & Mapleview Dr E

2027 Total Conditions

Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	271	524	97	102	353	203	102	634	66	213	714	202
Future Volume (vph)	271	524	97	102	353	203	102	634	66	213	714	202
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		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1738	3490		1789	3579	1580	1789	3528		1789	3443	
Flt Permitted	0.42	1.00		0.20	1.00	1.00	0.16	1.00		0.27	1.00	
Satd. Flow (perm)	768	3490		378	3579	1580	309	3528		510	3443	
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)	291	563	104	110	380	218	110	682	71	229	768	217
RTOR Reduction (vph)	0	15	0	0	0	169	0	7	0	0	24	0
Lane Group Flow (vph)	291	652	0	110	380	49	110	746	0	229	961	0
Confl. Peds. (#/hr)	1					1				1		1
Heavy Vehicles (%)	5%	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	3%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	32.3	23.3		29.9	22.1	22.1	47.1	40.1		47.1	40.1	
Effective Green, g (s)	32.3	23.3		29.9	22.1	22.1	47.1	40.1		47.1	40.1	
Actuated g/C Ratio	0.33	0.24		0.30	0.23	0.23	0.48	0.41		0.48	0.41	
Clearance Time (s)	4.0	6.0		4.0	6.0	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	828		227	805	355	253	1440		335	1405	
v/s Ratio Prot	c0.08	0.19		0.04	0.11		0.03	0.21		c0.05	c0.28	
v/s Ratio Perm	c0.20			0.11		0.03	0.18			0.28		
v/c Ratio	0.85	0.79		0.48	0.47	0.14	0.43	0.52		0.68	0.68	
Uniform Delay, d1	28.7	35.1		26.0	33.0	30.4	16.1	21.8		16.6	23.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	18.3	5.0		1.6	0.4	0.2	1.2	1.3		5.7	2.7	
Delay (s)	47.0	40.1		27.7	33.4	30.6	17.3	23.1		22.3	26.6	
Level of Service	D	D		C	C	C	B	C		C	C	
Approach Delay (s)		42.2			31.7			22.4			25.8	
Approach LOS		D			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			30.3			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			98.2			Sum of lost time (s)				20.0		
Intersection Capacity Utilization			87.3%			ICU Level of Service				E		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

4: Moberly Dr/Goodwin Dr & Mapleview Dr E

2027 Total Conditions

Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	842	89	13	659	15	78	43	26	36	64	13
Future Volume (vph)	23	842	89	13	659	15	78	43	26	36	64	13
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	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.94		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	3527		1789	3498		1789	1769		1785	1832	
Flt Permitted	0.35	1.00		0.26	1.00		0.70	1.00		0.71	1.00	
Satd. Flow (perm)	654	3527		482	3498		1323	1769		1331	1832	
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)	25	915	97	14	716	16	85	47	28	39	70	14
RTOR Reduction (vph)	0	7	0	0	1	0	0	24	0	0	11	0
Lane Group Flow (vph)	25	1005	0	14	731	0	85	51	0	39	73	0
Confl. Peds. (#/hr)	1			2		3			2	3		1
Heavy Vehicles (%)	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	41.0	38.5		38.4	37.2		8.7	8.7		8.7	8.7	
Effective Green, g (s)	41.0	38.5		38.4	37.2		8.7	8.7		8.7	8.7	
Actuated g/C Ratio	0.64	0.60		0.60	0.58		0.14	0.14		0.14	0.14	
Clearance Time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	460	2108		311	2020		178	238		179	247	
v/s Ratio Prot	c0.00	c0.28		0.00	0.21			0.03			0.04	
v/s Ratio Perm	0.03			0.03			c0.06			0.03		
v/c Ratio	0.05	0.48		0.05	0.36		0.48	0.21		0.22	0.29	
Uniform Delay, d1	4.4	7.3		5.4	7.3		25.7	24.8		24.8	25.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.8		0.1	0.5		2.0	0.5		0.6	0.7	
Delay (s)	4.4	8.1		5.5	7.8		27.8	25.3		25.4	25.8	
Level of Service	A	A		A	A		C	C		C	C	
Approach Delay (s)		8.0			7.7			26.6			25.7	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay	10.4			HCM 2000 Level of Service			B					
HCM 2000 Volume to Capacity ratio	0.47											
Actuated Cycle Length (s)	64.4			Sum of lost time (s)			16.0					
Intersection Capacity Utilization	47.7%			ICU Level of Service			A					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 5: Goodwin Dr & Street A

2027 Total Conditions
Weekday PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	43	0	81	75	0	73
Future Volume (Veh/h)	43	0	81	75	0	73
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	47	0	88	82	0	79
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			86			
pX, platoon unblocked						
vC, conflicting volume	208	129			170	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	208	129			170	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	100			100	
cM capacity (veh/h)	780	921			1407	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	47	170	79			
Volume Left	47	0	0			
Volume Right	0	82	0			
cSH	780	1700	1407			
Volume to Capacity	0.06	0.10	0.00			
Queue Length 95th (m)	1.5	0.0	0.0			
Control Delay (s)	9.9	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.9	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		1.6				
Intersection Capacity Utilization		18.8%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

7: Access 1 & Country Ln

2027 Total Conditions
Weekday PM Peak Hour

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	73	1	2	70	3	4
Future Volume (Veh/h)	73	1	2	70	3	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.25	0.25	0.92	0.25	0.25	0.92
Hourly flow rate (vph)	292	4	2	280	12	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)				111		
pX, platoon unblocked						
vC, conflicting volume	296			578	294	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	296			578	294	
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			97	99	
cM capacity (veh/h)	1265			477	745	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	296	282	16			
Volume Left	0	2	12			
Volume Right	4	0	4			
cSH	1700	1265	524			
Volume to Capacity	0.17	0.00	0.03			
Queue Length 95th (m)	0.0	0.0	0.7			
Control Delay (s)	0.0	0.1	12.1			
Lane LOS	A		B			
Approach Delay (s)	0.0	0.1	12.1			
Approach LOS	B					
Intersection Summary						
Average Delay	0.4					
Intersection Capacity Utilization	15.3%			ICU Level of Service	A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 8: Yonge St & Access 2

2027 Total Conditions
Weekday PM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	7	0	1232	1052	3
Future Volume (Veh/h)	0	7	0	1232	1052	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	8	0	1339	1143	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLT	TWLT	
Median storage (veh)				2	2	
Upstream signal (m)				150	126	
pX, platoon unblocked	0.90	0.83	0.83			
vC, conflicting volume	1814	573	1143			
vC1, stage 1 conf vol	1144					
vC2, stage 2 conf vol	670					
vCu, unblocked vol	827	80	766			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	342	801	712			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	8	670	670	762	384	
Volume Left	0	0	0	0	0	
Volume Right	8	0	0	0	3	
cSH	801	1700	1700	1700	1700	
Volume to Capacity	0.01	0.39	0.39	0.45	0.23	
Queue Length 95th (m)	0.2	0.0	0.0	0.0	0.0	
Control Delay (s)	9.5	0.0	0.0	0.0	0.0	
Lane LOS	A					
Approach Delay (s)	9.5	0.0		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			39.2%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

1: Yonge St & Country Ln/Turnberry Ln

2031 Total Conditions
Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	12	46	98	26	83	27	1018	41	34	1105	14
Future Volume (vph)	25	12	46	98	26	83	27	1018	41	34	1105	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.88		1.00	0.89		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1745	1525		1682	1648		1521	3456		1789	3500	
Flt Permitted	0.67	1.00		0.71	1.00		0.11	1.00		0.11	1.00	
Satd. Flow (perm)	1227	1525		1255	1648		172	3456		211	3500	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	32	15	59	126	33	106	35	1305	53	44	1417	18
RTOR Reduction (vph)	0	47	0	0	84	0	0	3	0	0	1	0
Lane Group Flow (vph)	32	27	0	126	55	0	35	1355	0	44	1434	0
Confl. Peds. (#/hr)	7		8	5		4	8		5	4		7
Heavy Vehicles (%)	4%	2%	11%	8%	2%	2%	20%	5%	2%	2%	4%	8%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.8	15.8		15.8	15.8		44.5	41.8		47.3	43.2	
Effective Green, g (s)	15.8	15.8		15.8	15.8		44.5	41.8		47.3	43.2	
Actuated g/C Ratio	0.20	0.20		0.20	0.20		0.57	0.54		0.61	0.56	
Clearance Time (s)	6.0	6.0		6.0	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	
Lane Grp Cap (vph)	249	310		255	335		145	1859		211	1945	
v/s Ratio Prot		0.02			0.03		0.01	0.39		c0.01	c0.41	
v/s Ratio Perm	0.03			c0.10			0.13			0.12		
v/c Ratio	0.13	0.09		0.49	0.16		0.24	0.73		0.21	0.74	
Uniform Delay, d1	25.3	25.1		27.4	25.5		9.5	13.6		8.7	13.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.1		1.5	0.2		0.9	2.6		0.5	2.5	
Delay (s)	25.6	25.2		28.9	25.7		10.4	16.2		9.2	15.5	
Level of Service	C	C		C	C		B	B		A	B	
Approach Delay (s)		25.3			27.2			16.0			15.3	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay	16.9			HCM 2000 Level of Service			B					
HCM 2000 Volume to Capacity ratio	0.66											
Actuated Cycle Length (s)	77.7			Sum of lost time (s)			16.0					
Intersection Capacity Utilization	55.1%			ICU Level of Service			B					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Yonge St & Street A/GO Access

2031 Total Conditions
Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	5	56	44	5	42	27	971	61	39	1211	46
Future Volume (vph)	71	5	56	44	5	42	27	971	61	39	1211	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	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	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1883	1580	1621	1883	1255	1789	3466		1448	3493	
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.10	1.00		0.15	1.00	
Satd. Flow (perm)	1420	1883	1580	1286	1883	1255	181	3466		224	3493	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	90	6	71	56	6	53	34	1229	77	49	1533	58
RTOR Reduction (vph)	0	0	62	0	0	46	0	4	0	0	2	0
Lane Group Flow (vph)	90	6	9	56	6	7	34	1302	0	49	1589	0
Confl. Peds. (#/hr)			1	5		4	1		5	4		
Heavy Vehicles (%)	2%	2%	2%	12%	2%	28%	2%	4%	8%	26%	4%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	8.8	8.8	8.8	8.8	8.8	8.8	44.2	41.6		46.8	42.9	
Effective Green, g (s)	8.8	8.8	8.8	8.8	8.8	8.8	44.2	41.6		46.8	42.9	
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13	0.13	0.63	0.59		0.67	0.61	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	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	3.0	
Lane Grp Cap (vph)	177	235	197	160	235	157	173	2051		217	2131	
v/s Ratio Prot		0.00			0.00		0.01	0.38		c0.01	c0.45	
v/s Ratio Perm	c0.06		0.01	0.04		0.01	0.12			0.14		
v/c Ratio	0.51	0.03	0.05	0.35	0.03	0.04	0.20	0.63		0.23	0.75	
Uniform Delay, d1	28.7	27.0	27.1	28.1	27.0	27.0	7.1	9.4		5.5	9.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.3	0.0	0.1	1.3	0.0	0.1	0.6	1.5		0.5	2.4	
Delay (s)	31.0	27.0	27.1	29.5	27.0	27.2	7.7	10.9		6.0	12.2	
Level of Service	C	C	C	C	C	C	A	B		A	B	
Approach Delay (s)		29.2			28.3			10.8			12.0	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			13.0									B
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			70.3								16.0	
Intersection Capacity Utilization			66.9%								C	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Yonge St & Mapleview Dr E

2031 Total Conditions
Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	190	438	61	155	558	231	59	638	47	241	686	254
Future Volume (vph)	190	438	61	155	558	231	59	638	47	241	686	254
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		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1659	3335		1722	3579	1506	1706	3493		1738	3362	
Flt Permitted	0.21	1.00		0.31	1.00	1.00	0.20	1.00		0.25	1.00	
Satd. Flow (perm)	373	3335		561	3579	1506	360	3493		462	3362	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	200	461	64	163	587	243	62	672	49	254	722	267
RTOR Reduction (vph)	0	11	0	0	0	135	0	5	0	0	32	0
Lane Group Flow (vph)	200	514	0	163	587	108	62	716	0	254	957	0
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Heavy Vehicles (%)	10%	8%	2%	6%	2%	7%	7%	3%	8%	5%	3%	6%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	34.0	24.0		31.6	22.8	22.8	46.5	41.0		55.6	46.1	
Effective Green, g (s)	34.0	24.0		31.6	22.8	22.8	46.5	41.0		55.6	46.1	
Actuated g/C Ratio	0.33	0.23		0.30	0.22	0.22	0.45	0.39		0.53	0.44	
Clearance Time (s)	4.0	6.0		4.0	6.0	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)	244	766		267	781	328	231	1371		375	1484	
v/s Ratio Prot	c0.08	0.15		0.05	0.16		0.01	0.21		c0.07	0.28	
v/s Ratio Perm	c0.19			0.13		0.07	0.11			c0.29		
v/c Ratio	0.82	0.67		0.61	0.75	0.33	0.27	0.52		0.68	0.64	
Uniform Delay, d1	27.9	36.6		28.4	38.2	34.4	17.5	24.2		15.0	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	18.9	2.3		4.1	4.1	0.6	0.6	1.4		4.8	2.2	
Delay (s)	46.9	38.9		32.5	42.3	34.9	18.2	25.6		19.8	24.9	
Level of Service	D	D		C	D	C	B	C		B	C	
Approach Delay (s)		41.1			38.9			25.1			23.9	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			31.4			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			104.4			Sum of lost time (s)				20.0		
Intersection Capacity Utilization			89.6%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Moberly Dr/Goodwin Dr & Mapleview Dr E

2031 Total Conditions

Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	78	656	5	0	883	2	70	50	30	17	75	51
Future Volume (vph)	78	656	5	0	883	2	70	50	30	17	75	51
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		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95			0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	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		1.00	1.00	
Frt	1.00	1.00			1.00		1.00	0.94		1.00	0.94	
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	3408			3577		1788	1770		1784	1758	
Flt Permitted	0.21	1.00			1.00		0.67	1.00		0.70	1.00	
Satd. Flow (perm)	405	3408			3577		1257	1770		1313	1758	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	87	729	6	0	981	2	78	56	33	19	83	57
RTOR Reduction (vph)	0	0	0	0	0	0	0	29	0	0	38	0
Lane Group Flow (vph)	87	735	0	0	983	0	78	60	0	19	102	0
Confl. Peds. (#/hr)	3		1	2		4	1		2	4		3
Heavy Vehicles (%)	2%	7%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	45.1	45.1			35.2		8.6	8.6		8.6	8.6	
Effective Green, g (s)	45.1	45.1			35.2		8.6	8.6		8.6	8.6	
Actuated g/C Ratio	0.69	0.69			0.54		0.13	0.13		0.13	0.13	
Clearance Time (s)	4.0	6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	402	2339			1916		164	231		171	230	
v/s Ratio Prot	0.02	c0.22			c0.27			0.03			0.06	
v/s Ratio Perm	0.13						c0.06			0.01		
v/c Ratio	0.22	0.31			0.51		0.48	0.26		0.11	0.44	
Uniform Delay, d1	4.4	4.1			9.8		26.5	25.7		25.2	26.3	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.4			1.0		2.2	0.6		0.3	1.4	
Delay (s)	4.6	4.5			10.7		28.6	26.3		25.5	27.7	
Level of Service	A	A			B		C	C		C	C	
Approach Delay (s)		4.5			10.7			27.4			27.4	
Approach LOS		A			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			10.9				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			65.7				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			66.4%				ICU Level of Service			C		
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 5: Goodwin Dr & Street A

2031 Total Conditions
Weekday AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	51	0	65	65	0	90
Future Volume (Veh/h)	51	0	65	65	0	90
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	55	0	71	71	0	98
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			86			
pX, platoon unblocked						
vC, conflicting volume	204	106			142	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	204	106			142	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	100			100	
cM capacity (veh/h)	784	948			1441	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	55	142	98			
Volume Left	55	0	0			
Volume Right	0	71	0			
cSH	784	1700	1441			
Volume to Capacity	0.07	0.08	0.00			
Queue Length 95th (m)	1.7	0.0	0.0			
Control Delay (s)	9.9	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.9	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			1.9			
Intersection Capacity Utilization			17.4%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

7: Access 1 & Country Ln

2031 Total Conditions
Weekday AM Peak Hour

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	81	3	4	63	1	2
Future Volume (Veh/h)	81	3	4	63	1	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.25	0.25	0.92	0.25	0.25	0.92
Hourly flow rate (vph)	324	12	4	252	4	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)				111		
pX, platoon unblocked						
vC, conflicting volume				336	590	330
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol				336	590	330
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	99	100
cM capacity (veh/h)				1223	469	712
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	336	256	6			
Volume Left	0	4	4			
Volume Right	12	0	2			
cSH	1700	1223	529			
Volume to Capacity	0.20	0.00	0.01			
Queue Length 95th (m)	0.0	0.1	0.3			
Control Delay (s)	0.0	0.2	11.9			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.2	11.9			
Approach LOS			B			
Intersection Summary						
Average Delay				0.2		
Intersection Capacity Utilization				16.6%	ICU Level of Service	A
Analysis Period (min)				15		

HCM Unsignalized Intersection Capacity Analysis 8: Yonge St & Access 2

2031 Total Conditions
Weekday AM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	1	0	1086	1240	10
Future Volume (Veh/h)	0	1	0	1086	1240	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	0	1180	1348	11
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLT	TWLT	
Median storage (veh)				2	2	
Upstream signal (m)				150	126	
pX, platoon unblocked	0.81	0.70	0.70			
vC, conflicting volume	1944	680	1348			
vC1, stage 1 conf vol	1354					
vC2, stage 2 conf vol	590					
vCu, unblocked vol	477	0	651			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	336	762	665			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	1	590	590	899	460	
Volume Left	0	0	0	0	0	
Volume Right	1	0	0	0	11	
cSH	762	1700	1700	1700	1700	
Volume to Capacity	0.00	0.35	0.35	0.53	0.27	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0	
Control Delay (s)	9.7	0.0	0.0	0.0	0.0	
Lane LOS	A					
Approach Delay (s)	9.7	0.0		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			44.6%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

1: Yonge St & Country Ln/Turnberry Ln

2031 Total Conditions

Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	24	27	75	12	68	28	1430	109	77	1260	32
Future Volume (vph)	21	24	27	75	12	68	28	1430	109	77	1260	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	0.87		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1775	1599		1449	1614		1644	3502		1789	3562	
Flt Permitted	0.70	1.00		0.72	1.00		0.16	1.00		0.08	1.00	
Satd. Flow (perm)	1315	1599		1102	1614		271	3502		159	3562	
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)	22	25	28	77	12	70	29	1474	112	79	1299	33
RTOR Reduction (vph)	0	24	0	0	60	0	0	5	0	0	2	0
Lane Group Flow (vph)	22	29	0	77	22	0	29	1581	0	79	1330	0
Confl. Peds. (#/hr)	9		9	8		8	9		8	8		9
Heavy Vehicles (%)	2%	2%	16%	25%	2%	2%	11%	2%	15%	2%	2%	3%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	11.6	11.6		11.6	11.6		47.3	44.6		52.7	47.3	
Effective Green, g (s)	11.6	11.6		11.6	11.6		47.3	44.6		52.7	47.3	
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.61	0.57		0.68	0.61	
Clearance Time (s)	6.0	6.0		6.0	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	
Lane Grp Cap (vph)	196	239		164	241		212	2012		221	2171	
v/s Ratio Prot		0.02			0.01		0.00	c0.45		c0.02	0.37	
v/s Ratio Perm	0.02			c0.07			0.08			0.22		
v/c Ratio	0.11	0.12		0.47	0.09		0.14	0.79		0.36	0.61	
Uniform Delay, d1	28.5	28.6		30.2	28.5		6.8	12.8		9.5	9.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2		2.1	0.2		0.3	3.2		1.0	1.3	
Delay (s)	28.8	28.8		32.3	28.6		7.1	16.0		10.5	10.7	
Level of Service	C	C		C	C		A	B		B	B	
Approach Delay (s)		28.8			30.4			15.8			10.7	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay	14.6			HCM 2000 Level of Service			B					
HCM 2000 Volume to Capacity ratio	0.69											
Actuated Cycle Length (s)	77.6			Sum of lost time (s)			16.0					
Intersection Capacity Utilization	76.5%			ICU Level of Service			D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Yonge St & Street A/GO Access

2031 Total Conditions
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	5	89	115	5	103	59	1232	85	49	1173	102
Future Volume (vph)	94	5	89	115	5	103	59	1232	85	49	1173	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	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	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1784	1883	1580	1763	1883	1456	1789	3532		1560	3529	
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.13	1.00		0.11	1.00	
Satd. Flow (perm)	1417	1883	1580	1400	1883	1456	237	3532		188	3529	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	99	5	94	121	5	108	62	1297	89	52	1235	107
RTOR Reduction (vph)	0	0	78	0	0	89	0	5	0	0	5	0
Lane Group Flow (vph)	99	5	16	121	5	19	62	1381	0	52	1337	0
Confl. Peds. (#/hr)	3		1	5		7	1		5	7		3
Heavy Vehicles (%)	2%	2%	2%	3%	2%	10%	2%	2%	5%	17%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	12.2	12.2	12.2	12.2	12.2	12.2	42.4	38.5		42.4	38.5	
Effective Green, g (s)	12.2	12.2	12.2	12.2	12.2	12.2	42.4	38.5		42.4	38.5	
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.17	0.17	0.60	0.55		0.60	0.55	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	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	3.0	
Lane Grp Cap (vph)	244	325	273	241	325	251	228	1926		188	1924	
v/s Ratio Prot		0.00			0.00		0.02	c0.39		c0.02	0.38	
v/s Ratio Perm	0.07		0.01	c0.09		0.01	0.15			0.15		
v/c Ratio	0.41	0.02	0.06	0.50	0.02	0.07	0.27	0.72		0.28	0.69	
Uniform Delay, d1	26.0	24.2	24.4	26.4	24.2	24.5	7.7	12.0		8.0	11.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.0	0.1	1.6	0.0	0.1	0.6	2.3		0.8	2.1	
Delay (s)	27.1	24.2	24.5	28.1	24.2	24.6	8.3	14.3		8.8	13.8	
Level of Service	C	C	C	C	C	C	A	B		A	B	
Approach Delay (s)		25.8			26.4			14.1			13.7	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			15.5				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			70.6				Sum of lost time (s)				16.0	
Intersection Capacity Utilization			70.2%				ICU Level of Service				C	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Yonge St & Mapleview Dr E

2031 Total Conditions
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	307	657	124	126	443	257	129	812	84	266	900	231
Future Volume (vph)	307	657	124	126	443	257	129	812	84	266	900	231
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		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1738	3488		1789	3579	1580	1789	3528		1789	3453	
Flt Permitted	0.29	1.00		0.16	1.00	1.00	0.10	1.00		0.14	1.00	
Satd. Flow (perm)	531	3488		303	3579	1580	183	3528		260	3453	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	323	692	131	133	466	271	136	855	88	280	947	243
RTOR Reduction (vph)	0	14	0	0	0	157	0	6	0	0	20	0
Lane Group Flow (vph)	323	809	0	133	466	114	136	937	0	280	1170	0
Confl. Peds. (#/hr)	1					1				1		1
Heavy Vehicles (%)	5%	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	3%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	41.9	30.0		32.8	24.9	24.9	48.9	41.1		57.1	45.3	
Effective Green, g (s)	41.9	30.0		32.8	24.9	24.9	48.9	41.1		57.1	45.3	
Actuated g/C Ratio	0.38	0.27		0.30	0.22	0.22	0.44	0.37		0.51	0.41	
Clearance Time (s)	4.0	6.0		4.0	6.0	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	942		195	802	354	193	1306		299	1409	
v/s Ratio Prot	c0.11	0.23		0.05	0.13		0.05	0.27		c0.10	0.34	
v/s Ratio Perm	c0.25			0.15		0.07	0.26			c0.38		
v/c Ratio	0.95	0.86		0.68	0.58	0.32	0.70	0.72		0.94	0.83	
Uniform Delay, d1	29.6	38.5		30.9	38.4	36.0	22.7	30.0		22.7	29.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	34.8	7.9		9.4	1.1	0.5	11.1	3.4		35.3	5.8	
Delay (s)	64.4	46.4		40.4	39.5	36.5	33.8	33.4		58.0	35.2	
Level of Service	E	D		D	D	D	C	C		E	D	
Approach Delay (s)		51.4			38.7			33.4			39.6	
Approach LOS		D			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			40.9									HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			111.0									Sum of lost time (s) 20.0
Intersection Capacity Utilization			94.4%									ICU Level of Service F
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Moberly Dr/Goodwin Dr & Mapleview Dr E

2031 Total Conditions

Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	149	1000	200	30	818	12	135	100	60	43	150	38
Future Volume (vph)	149	1000	200	30	818	12	135	100	60	43	150	38
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	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00		1.00	0.94		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	3489		1789	3502		1789	1769		1785	1822	
Flt Permitted	0.22	1.00		0.16	1.00		0.57	1.00		0.64	1.00	
Satd. Flow (perm)	405	3489		293	3502		1073	1769		1200	1822	
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)	162	1087	217	33	889	13	147	109	65	47	163	41
RTOR Reduction (vph)	0	16	0	0	1	0	0	30	0	0	13	0
Lane Group Flow (vph)	162	1288	0	33	901	0	147	144	0	47	191	0
Confl. Peds. (#/hr)	1			2		3			2	3		1
Heavy Vehicles (%)	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	46.0	39.4		36.3	33.7		14.8	14.8		14.8	14.8	
Effective Green, g (s)	46.0	39.4		36.3	33.7		14.8	14.8		14.8	14.8	
Actuated g/C Ratio	0.63	0.54		0.50	0.46		0.20	0.20		0.20	0.20	
Clearance Time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	413	1888		199	1621		218	359		243	370	
v/s Ratio Prot	c0.04	c0.37		0.01	0.26			0.08			0.10	
v/s Ratio Perm	0.20			0.08			c0.14			0.04		
v/c Ratio	0.39	0.68		0.17	0.56		0.67	0.40		0.19	0.52	
Uniform Delay, d1	6.8	12.1		9.9	14.1		26.8	25.2		24.1	25.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	2.0		0.4	1.4		8.0	0.7		0.4	1.2	
Delay (s)	7.4	14.2		10.3	15.5		34.8	25.9		24.4	27.0	
Level of Service	A	B		B	B		C	C		C	C	
Approach Delay (s)		13.4			15.3			29.9			26.6	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			16.9			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			72.8			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			77.1%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 5: Goodwin Dr & Street A

2031 Total Conditions
Weekday PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	74	0	133	128	0	159
Future Volume (Veh/h)	74	0	133	128	0	159
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	80	0	145	139	0	173
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)			86			
pX, platoon unblocked	0.95	0.95			0.95	
vC, conflicting volume	388	214			284	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	330	148			221	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	87	100			100	
cM capacity (veh/h)	632	855			1282	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	80	284	173			
Volume Left	80	0	0			
Volume Right	0	139	0			
cSH	632	1700	1282			
Volume to Capacity	0.13	0.17	0.00			
Queue Length 95th (m)	3.3	0.0	0.0			
Control Delay (s)	11.5	0.0	0.0			
Lane LOS	B					
Approach Delay (s)	11.5	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		1.7				
Intersection Capacity Utilization		25.6%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

7: Access 1 & Country Ln

2031 Total Conditions
Weekday PM Peak Hour

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	68	1	2	70	3	4
Future Volume (Veh/h)	68	1	2	70	3	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.25	0.25	0.92	0.25	0.25	0.92
Hourly flow rate (vph)	272	4	2	280	12	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)				111		
pX, platoon unblocked						
vC, conflicting volume			276		558	274
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			276		558	274
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		98	99
cM capacity (veh/h)			1287		490	765
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	276	282	16			
Volume Left	0	2	12			
Volume Right	4	0	4			
cSH	1700	1287	538			
Volume to Capacity	0.16	0.00	0.03			
Queue Length 95th (m)	0.0	0.0	0.7			
Control Delay (s)	0.0	0.1	11.9			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.1	11.9			
Approach LOS			B			
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			15.3%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 8: Yonge St & Access 2

2031 Total Conditions
Weekday PM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	2	0	1567	1346	16
Future Volume (Veh/h)	0	2	0	1567	1346	16
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2	0	1703	1463	17
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLT	TWLT	
Median storage veh				2	2	
Upstream signal (m)				150	126	
pX, platoon unblocked	0.82	0.76	0.76			
vC, conflicting volume	2323	740	1463			
vC1, stage 1 conf vol	1472					
vC2, stage 2 conf vol	852					
vCu, unblocked vol	853	19	973			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	242	800	544			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	2	852	852	975	505	
Volume Left	0	0	0	0	0	
Volume Right	2	0	0	0	17	
cSH	800	1700	1700	1700	1700	
Volume to Capacity	0.00	0.50	0.50	0.57	0.30	
Queue Length 95th (m)	0.1	0.0	0.0	0.0	0.0	
Control Delay (s)	9.5	0.0	0.0	0.0	0.0	
Lane LOS	A					
Approach Delay (s)	9.5	0.0		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			47.7%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

1: Yonge St & Country Ln/Turnberry Ln

2036 Total Conditions
Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	12	46	98	26	83	29	1122	41	34	1212	16
Future Volume (vph)	25	12	46	98	26	83	29	1122	41	34	1212	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.88		1.00	0.89		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1745	1525		1682	1648		1521	3458		1789	3500	
Flt Permitted	0.67	1.00		0.71	1.00		0.10	1.00		0.10	1.00	
Satd. Flow (perm)	1227	1525		1255	1648		156	3458		184	3500	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	32	15	59	126	33	106	37	1438	53	44	1554	21
RTOR Reduction (vph)	0	47	0	0	84	0	0	3	0	0	1	0
Lane Group Flow (vph)	32	27	0	126	55	0	37	1488	0	44	1574	0
Confl. Peds. (#/hr)	7		8	5		4	8		5	4		7
Heavy Vehicles (%)	4%	2%	11%	8%	2%	2%	20%	5%	2%	2%	4%	8%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.8	15.8		15.8	15.8		45.1	41.0		45.1	41.0	
Effective Green, g (s)	15.8	15.8		15.8	15.8		45.1	41.0		45.1	41.0	
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.59	0.53		0.59	0.53	
Clearance Time (s)	6.0	6.0		6.0	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	
Lane Grp Cap (vph)	252	313		257	338		164	1843		193	1866	
v/s Ratio Prot		0.02			0.03		0.01	0.43		c0.01	c0.45	
v/s Ratio Perm	0.03			c0.10			0.12			0.12		
v/c Ratio	0.13	0.09		0.49	0.16		0.23	0.81		0.23	0.84	
Uniform Delay, d1	24.9	24.7		27.0	25.1		11.1	14.7		10.2	15.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.1		1.5	0.2		0.7	3.9		0.6	4.9	
Delay (s)	25.2	24.8		28.5	25.3		11.8	18.6		10.8	20.1	
Level of Service	C	C		C	C		B	B		B	C	
Approach Delay (s)		24.9			26.8			18.5			19.8	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay	19.9			HCM 2000 Level of Service			B					
HCM 2000 Volume to Capacity ratio	0.71											
Actuated Cycle Length (s)	76.9			Sum of lost time (s)			16.0					
Intersection Capacity Utilization	58.1%			ICU Level of Service			B					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Yonge St & Street A/GO Access

2036 Total Conditions
Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	5	67	48	5	47	38	1066	68	43	1320	45
Future Volume (vph)	82	5	67	48	5	47	38	1066	68	43	1320	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	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	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1883	1580	1621	1883	1255	1789	3465		1448	3495	
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.10	1.00		0.12	1.00	
Satd. Flow (perm)	1420	1883	1580	1286	1883	1255	184	3465		179	3495	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	104	6	85	61	6	59	48	1349	86	54	1671	57
RTOR Reduction (vph)	0	0	74	0	0	51	0	4	0	0	2	0
Lane Group Flow (vph)	104	6	11	61	6	8	48	1431	0	54	1726	0
Confl. Peds. (#/hr)			1	5		4	1		5	4		
Heavy Vehicles (%)	2%	2%	2%	12%	2%	28%	2%	4%	8%	26%	4%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	9.2	9.2	9.2	9.2	9.2	9.2	44.8	40.9		44.8	40.9	
Effective Green, g (s)	9.2	9.2	9.2	9.2	9.2	9.2	44.8	40.9		44.8	40.9	
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13	0.13	0.64	0.58		0.64	0.58	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	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	3.0	
Lane Grp Cap (vph)	186	247	207	169	247	164	207	2024		185	2042	
v/s Ratio Prot		0.00			0.00		0.01	0.41		c0.02	c0.49	
v/s Ratio Perm	c0.07		0.01	0.05		0.01	0.14			0.17		
v/c Ratio	0.56	0.02	0.05	0.36	0.02	0.05	0.23	0.71		0.29	0.85	
Uniform Delay, d1	28.5	26.5	26.6	27.7	26.5	26.6	9.2	10.3		6.7	12.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.6	0.0	0.1	1.3	0.0	0.1	0.6	2.1		0.9	4.5	
Delay (s)	32.1	26.5	26.7	29.0	26.5	26.7	9.8	12.4		7.6	16.5	
Level of Service	C	C	C	C	C	C	A	B		A	B	
Approach Delay (s)		29.6			27.8			12.3			16.2	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			15.7				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			70.0				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			69.9%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Yonge St & Mapleview Dr E

2036 Total Conditions
Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	204	482	66	171	612	258	64	710	52	265	758	268
Future Volume (vph)	204	482	66	171	612	258	64	710	52	265	758	268
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	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	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	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	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1659	3380	1580	1721	3579	1506	1706	3544	1493	1738	3544	1521
Flt Permitted	0.16	1.00	1.00	0.32	1.00	1.00	0.31	1.00	1.00	0.23	1.00	1.00
Satd. Flow (perm)	273	3380	1580	581	3579	1506	552	3544	1493	413	3544	1521
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	215	507	69	180	644	272	67	747	55	279	798	282
RTOR Reduction (vph)	0	0	53	0	0	123	0	0	34	0	0	95
Lane Group Flow (vph)	215	507	16	180	644	149	67	747	21	279	798	187
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Heavy Vehicles (%)	10%	8%	2%	6%	2%	7%	7%	3%	8%	5%	3%	6%
Turn Type	pm+pt	NA	Perm	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		4	8		8	2		2	6		6
Actuated Green, G (s)	40.5	27.0	27.0	37.3	25.4	25.4	48.8	43.3	43.3	61.1	51.6	51.6
Effective Green, g (s)	40.5	27.0	27.0	37.3	25.4	25.4	48.8	43.3	43.3	61.1	51.6	51.6
Actuated g/C Ratio	0.35	0.23	0.23	0.32	0.22	0.22	0.42	0.37	0.37	0.53	0.44	0.44
Clearance Time (s)	4.0	6.0	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	3.0
Lane Grp Cap (vph)	256	786	367	303	783	329	286	1322	557	375	1576	676
v/s Ratio Prot	c0.10	0.15		0.06	0.18		0.01	0.21		c0.09	0.23	
v/s Ratio Perm	c0.19		0.01	0.13		0.10	0.09		0.01	c0.30		0.12
v/c Ratio	0.84	0.65	0.04	0.59	0.82	0.45	0.23	0.57	0.04	0.74	0.51	0.28
Uniform Delay, d1	29.9	40.2	34.5	30.2	43.2	39.3	20.4	28.9	23.1	17.9	23.1	20.4
Progression Factor	1.00	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	20.8	1.8	0.0	3.1	7.0	1.0	0.4	1.8	0.1	7.8	1.2	1.0
Delay (s)	50.8	42.0	34.5	33.3	50.1	40.3	20.8	30.6	23.2	25.7	24.2	21.4
Level of Service	D	D	C	C	D	D	C	C	C	C	C	C
Approach Delay (s)		43.7			44.9			29.4			24.0	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			34.5									C
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			116.0							20.0		
Intersection Capacity Utilization			93.1%							F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Moberly Dr/Goodwin Dr & Mapleview Dr E

2036 Total Conditions

Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	716	5	0	954	2	70	50	30	16	75	67
Future Volume (vph)	94	716	5	0	954	2	70	50	30	16	75	67
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		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95			0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	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		1.00	1.00	
Frt	1.00	1.00			1.00		1.00	0.94		1.00	0.93	
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	3408			3577		1788	1770		1784	1738	
Flt Permitted	0.18	1.00			1.00		0.66	1.00		0.70	1.00	
Satd. Flow (perm)	336	3408			3577		1237	1770		1313	1738	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	104	796	6	0	1060	2	78	56	33	18	83	74
RTOR Reduction (vph)	0	0	0	0	0	0	0	28	0	0	48	0
Lane Group Flow (vph)	104	802	0	0	1062	0	78	61	0	18	109	0
Confl. Peds. (#/hr)	3		1	2		4	1		2	4		3
Heavy Vehicles (%)	2%	7%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	44.6	44.6			34.3		10.9	10.9		10.9	10.9	
Effective Green, g (s)	44.6	44.6			34.3		10.9	10.9		10.9	10.9	
Actuated g/C Ratio	0.66	0.66			0.51		0.16	0.16		0.16	0.16	
Clearance Time (s)	4.0	6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	357	2251			1817		199	285		212	280	
v/s Ratio Prot	0.03	c0.24			c0.30			0.03			0.06	
v/s Ratio Perm	0.17						c0.06			0.01		
v/c Ratio	0.29	0.36			0.58		0.39	0.22		0.08	0.39	
Uniform Delay, d1	5.7	5.1			11.6		25.3	24.6		24.1	25.3	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.4			1.4		1.3	0.4		0.2	0.9	
Delay (s)	6.1	5.5			13.0		26.6	25.0		24.2	26.2	
Level of Service	A	A			B		C	C		C	C	
Approach Delay (s)		5.6			13.0			25.7			26.0	
Approach LOS		A			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			12.0				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			67.5				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			68.4%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

5: Goodwin Dr & Street A

2036 Total Conditions
Weekday AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	67	0	67	79	0	90
Future Volume (Veh/h)	67	0	67	79	0	90
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	73	0	73	86	0	98
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			86			
pX, platoon unblocked						
vC, conflicting volume	214	116			159	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	214	116			159	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	91	100			100	
cM capacity (veh/h)	774	936			1420	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	73	159	98			
Volume Left	73	0	0			
Volume Right	0	86	0			
cSH	774	1700	1420			
Volume to Capacity	0.09	0.09	0.00			
Queue Length 95th (m)	2.4	0.0	0.0			
Control Delay (s)	10.1	0.0	0.0			
Lane LOS	B					
Approach Delay (s)	10.1	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		2.2				
Intersection Capacity Utilization		18.7%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

7: Access 1 & Country Ln

2036 Total Conditions
Weekday AM Peak Hour

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	81	5	8	63	2	3
Future Volume (Veh/h)	81	5	8	63	2	3
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.25	0.25	0.92	0.25	0.25	0.92
Hourly flow rate (vph)	324	20	9	252	8	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume			344		604	334
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			344		604	334
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		98	100
cM capacity (veh/h)			1215		458	708
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	344	261	11			
Volume Left	0	9	8			
Volume Right	20	0	3			
cSH	1700	1215	507			
Volume to Capacity	0.20	0.01	0.02			
Queue Length 95th (m)	0.0	0.2	0.5			
Control Delay (s)	0.0	0.3	12.3			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.3	12.3			
Approach LOS			B			
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			20.0%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

8: Yonge St & Access 2

2036 Total Conditions
Weekday AM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	2	0	1192	1335	21
Future Volume (Veh/h)	0	2	0	1192	1335	21
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2	0	1296	1451	23
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh				2	2	
Upstream signal (m)				150	126	
pX, platoon unblocked	0.76	0.63	0.63			
vC, conflicting volume	2110	737	1451			
vC1, stage 1 conf vol	1462					
vC2, stage 2 conf vol	648					
vCu, unblocked vol	240	0	531			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	568	680	657			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	2	648	648	967	507	
Volume Left	0	0	0	0	0	
Volume Right	2	0	0	0	23	
cSH	680	1700	1700	1700	1700	
Volume to Capacity	0.00	0.38	0.38	0.57	0.30	
Queue Length 95th (m)	0.1	0.0	0.0	0.0	0.0	
Control Delay (s)	10.3	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	10.3	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			47.6%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

1: Yonge St & Country Ln/Turnberry Ln

2036 Total Conditions

Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	24	29	75	12	68	29	1574	109	77	1382	33
Future Volume (vph)	23	24	29	75	12	68	29	1574	109	77	1382	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	0.87		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1775	1591		1449	1614		1644	3508		1789	3563	
Flt Permitted	0.70	1.00		0.72	1.00		0.12	1.00		0.08	1.00	
Satd. Flow (perm)	1315	1591		1100	1614		216	3508		159	3563	
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)	24	25	30	77	12	70	30	1623	112	79	1425	34
RTOR Reduction (vph)	0	26	0	0	60	0	0	5	0	0	2	0
Lane Group Flow (vph)	24	29	0	77	22	0	30	1730	0	79	1457	0
Confl. Peds. (#/hr)	9		9	8		8	9		8	8		9
Heavy Vehicles (%)	2%	2%	16%	25%	2%	2%	11%	2%	15%	2%	2%	3%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	11.6	11.6		11.6	11.6		47.3	44.6		52.7	47.3	
Effective Green, g (s)	11.6	11.6		11.6	11.6		47.3	44.6		52.7	47.3	
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.61	0.57		0.68	0.61	
Clearance Time (s)	6.0	6.0		6.0	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	
Lane Grp Cap (vph)	196	237		164	241		181	2016		221	2171	
v/s Ratio Prot		0.02			0.01		0.01	c0.49		c0.02	0.41	
v/s Ratio Perm	0.02			c0.07			0.10			0.22		
v/c Ratio	0.12	0.12		0.47	0.09		0.17	0.86		0.36	0.67	
Uniform Delay, d1	28.6	28.6		30.2	28.5		7.4	13.8		11.5	10.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2		2.1	0.2		0.4	5.0		1.0	1.7	
Delay (s)	28.9	28.8		32.3	28.6		7.8	18.9		12.5	11.7	
Level of Service	C	C		C	C		A	B		B	B	
Approach Delay (s)		28.8			30.4			18.7			11.7	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay	16.4			HCM 2000 Level of Service			B					
HCM 2000 Volume to Capacity ratio	0.74											
Actuated Cycle Length (s)	77.6			Sum of lost time (s)			16.0					
Intersection Capacity Utilization	80.4%			ICU Level of Service			D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Yonge St & Street A/GO Access

2036 Total Conditions
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	5	103	127	5	114	73	1344	94	54	1290	98
Future Volume (vph)	110	5	103	127	5	114	73	1344	94	54	1290	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	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	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1783	1883	1580	1762	1883	1455	1789	3531		1560	3535	
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.10	1.00		0.10	1.00	
Satd. Flow (perm)	1416	1883	1580	1400	1883	1455	186	3531		168	3535	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	116	5	108	134	5	120	77	1415	99	57	1358	103
RTOR Reduction (vph)	0	0	89	0	0	99	0	4	0	0	5	0
Lane Group Flow (vph)	116	5	19	134	5	21	77	1510	0	57	1456	0
Confl. Peds. (#/hr)	3		1	5		7	1		5	7		3
Heavy Vehicles (%)	2%	2%	2%	3%	2%	10%	2%	2%	5%	17%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	12.8	12.8	12.8	12.8	12.8	12.8	46.0	40.6		43.2	39.2	
Effective Green, g (s)	12.8	12.8	12.8	12.8	12.8	12.8	46.0	40.6		43.2	39.2	
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.17	0.17	0.63	0.55		0.59	0.53	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	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	3.0	
Lane Grp Cap (vph)	246	328	275	244	328	253	234	1953		174	1887	
v/s Ratio Prot		0.00			0.00		c0.02	c0.43		0.02	0.41	
v/s Ratio Perm	0.08		0.01	c0.10		0.01	0.18			0.17		
v/c Ratio	0.47	0.02	0.07	0.55	0.02	0.08	0.33	0.77		0.33	0.77	
Uniform Delay, d1	27.3	25.1	25.3	27.7	25.1	25.4	9.1	12.8		9.3	13.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.4	0.0	0.1	2.5	0.0	0.1	0.8	3.0		1.1	3.1	
Delay (s)	28.7	25.1	25.4	30.2	25.1	25.5	9.9	15.8		10.4	16.7	
Level of Service	C	C	C	C	C	C	A	B		B	B	
Approach Delay (s)		27.1			27.9			15.6			16.4	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			17.6				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			73.4				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			73.7%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Yonge St & Mapleview Dr E

2036 Total Conditions

Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	325	723	136	138	483	286	141	900	92	295	999	248
Future Volume (vph)	325	723	136	138	483	286	141	900	92	295	999	248
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	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	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	1.00	0.99	1.00	1.00	1.00	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	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1738	3579	1585	1789	3579	1580	1789	3579	1601	1789	3579	1565
Flt Permitted	0.20	1.00	1.00	0.20	1.00	1.00	0.16	1.00	1.00	0.10	1.00	1.00
Satd. Flow (perm)	370	3579	1585	378	3579	1580	301	3579	1601	197	3579	1565
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	342	761	143	145	508	301	148	947	97	311	1052	261
RTOR Reduction (vph)	0	0	92	0	0	161	0	0	65	0	0	74
Lane Group Flow (vph)	342	761	51	145	508	140	148	947	32	311	1052	187
Confl. Peds. (#/hr)	1					1				1		1
Heavy Vehicles (%)	5%	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	3%
Turn Type	pm+pt	NA	Perm	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		4	8		8	2		2	6		6
Actuated Green, G (s)	47.2	32.9	32.9	33.7	23.4	23.4	51.0	41.2	41.2	64.4	50.6	50.6
Effective Green, g (s)	47.2	32.9	32.9	33.7	23.4	23.4	51.0	41.2	41.2	64.4	50.6	50.6
Actuated g/C Ratio	0.38	0.27	0.27	0.27	0.19	0.19	0.41	0.33	0.33	0.52	0.41	0.41
Clearance Time (s)	4.0	6.0	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	3.0
Lane Grp Cap (vph)	360	952	421	220	677	299	242	1193	533	349	1465	640
v/s Ratio Prot	c0.15	0.21		0.05	0.14		0.05	0.26		c0.14	0.29	
v/s Ratio Perm	c0.21		0.03	0.12		0.09	0.20		0.02	c0.33		0.12
v/c Ratio	0.95	0.80	0.12	0.66	0.75	0.47	0.61	0.79	0.06	0.89	0.72	0.29
Uniform Delay, d1	31.0	42.3	34.4	36.1	47.3	44.6	24.9	37.3	28.0	33.5	30.5	24.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	34.1	4.8	0.1	7.0	4.7	1.2	4.5	5.5	0.2	23.5	3.1	1.2
Delay (s)	65.1	47.0	34.5	43.1	52.0	45.7	29.4	42.8	28.3	57.0	33.6	25.6
Level of Service	E	D	C	D	D	D	C	D	C	E	C	C
Approach Delay (s)		50.6			48.7			40.0			36.8	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			43.2				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.96									
Actuated Cycle Length (s)			123.6				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			98.1%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Moberly Dr/Goodwin Dr & Mapleview Dr E

2036 Total Conditions

Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	167	1090	200	30	887	12	135	100	60	43	150	64
Future Volume (vph)	167	1090	200	30	887	12	135	100	60	43	150	64
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	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00		1.00	0.94		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	3495		1789	3502		1789	1769		1785	1792	
Flt Permitted	0.18	1.00		0.12	1.00		0.51	1.00		0.64	1.00	
Satd. Flow (perm)	348	3495		233	3502		959	1769		1199	1792	
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	1185	217	33	964	13	147	109	65	47	163	70
RTOR Reduction (vph)	0	15	0	0	1	0	0	30	0	0	22	0
Lane Group Flow (vph)	182	1387	0	33	976	0	147	144	0	47	211	0
Confl. Peds. (#/hr)	1			2		3			2	3		1
Heavy Vehicles (%)	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	46.2	39.6		36.4	33.8		15.6	15.6		15.6	15.6	
Effective Green, g (s)	46.2	39.6		36.4	33.8		15.6	15.6		15.6	15.6	
Actuated g/C Ratio	0.63	0.54		0.49	0.46		0.21	0.21		0.21	0.21	
Clearance Time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	381	1875		169	1603		202	373		253	378	
v/s Ratio Prot	c0.05	c0.40		0.01	0.28			0.08			0.12	
v/s Ratio Perm	0.24			0.09			c0.15			0.04		
v/c Ratio	0.48	0.74		0.20	0.61		0.73	0.39		0.19	0.56	
Uniform Delay, d1	7.7	13.1		10.7	15.0		27.1	25.0		23.9	26.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	2.7		0.6	1.7		12.3	0.7		0.4	1.8	
Delay (s)	8.7	15.8		11.3	16.8		39.4	25.7		24.2	27.8	
Level of Service	A	B		B	B		D	C		C	C	
Approach Delay (s)		15.0			16.6			32.0			27.2	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			18.3			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			73.8			Sum of lost time (s)				16.0		
Intersection Capacity Utilization			81.1%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 5: Goodwin Dr & Street A

2036 Total Conditions
Weekday PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	99	0	134	144	0	159
Future Volume (Veh/h)	99	0	134	144	0	159
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	108	0	146	157	0	173
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			86			
pX, platoon unblocked	0.94	0.94			0.94	
vC, conflicting volume	398	224			303	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	330	147			230	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	83	100			100	
cM capacity (veh/h)	626	848			1261	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	108	303	173			
Volume Left	108	0	0			
Volume Right	0	157	0			
cSH	626	1700	1261			
Volume to Capacity	0.17	0.18	0.00			
Queue Length 95th (m)	4.7	0.0	0.0			
Control Delay (s)	11.9	0.0	0.0			
Lane LOS	B					
Approach Delay (s)	11.9	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		2.2				
Intersection Capacity Utilization		28.0%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

7: Access 1 & Country Ln

2036 Total Conditions
Weekday PM Peak Hour

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	68	2	4	70	6	9
Future Volume (Veh/h)	68	2	4	70	6	9
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.25	0.25	0.92	0.25	0.25	0.92
Hourly flow rate (vph)	272	8	4	280	24	10
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume			280		564	276
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			280		564	276
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		95	99
cM capacity (veh/h)			1283		485	763
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	280	284	34			
Volume Left	0	4	24			
Volume Right	8	0	10			
cSH	1700	1283	543			
Volume to Capacity	0.16	0.00	0.06			
Queue Length 95th (m)	0.0	0.1	1.5			
Control Delay (s)	0.0	0.1	12.1			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.1	12.1			
Approach LOS			B			
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			17.0%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

8: Yonge St & Access 2

2036 Total Conditions
Weekday PM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	6	0	1712	1455	31
Future Volume (Veh/h)	0	6	0	1712	1455	31
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	7	0	1861	1582	34
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLT	TWLT	
Median storage veh				2	2	
Upstream signal (m)				150	126	
pX, platoon unblocked	0.80	0.72	0.72			
vC, conflicting volume	2530	808	1582			
vC1, stage 1 conf vol	1599					
vC2, stage 2 conf vol	930					
vCu, unblocked vol	808	0	1020			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	213	777	493			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	7	930	930	1055	561	
Volume Left	0	0	0	0	0	
Volume Right	7	0	0	0	34	
cSH	777	1700	1700	1700	1700	
Volume to Capacity	0.01	0.55	0.55	0.62	0.33	
Queue Length 95th (m)	0.2	0.0	0.0	0.0	0.0	
Control Delay (s)	9.7	0.0	0.0	0.0	0.0	
Lane LOS	A					
Approach Delay (s)	9.7	0.0		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			51.2%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

1: Yonge St & Country Ln/Turnberry Ln

2041 Total Conditions

Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	12	46	98	26	83	29	1222	41	34	1316	16
Future Volume (vph)	25	12	46	98	26	83	29	1222	41	34	1316	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.88		1.00	0.89		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1745	1525		1682	1648		1521	3460		1789	3500	
Flt Permitted	0.67	1.00		0.71	1.00		0.10	1.00		0.10	1.00	
Satd. Flow (perm)	1227	1525		1255	1648		156	3460		184	3500	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	32	15	59	126	33	106	37	1567	53	44	1687	21
RTOR Reduction (vph)	0	47	0	0	84	0	0	2	0	0	1	0
Lane Group Flow (vph)	32	27	0	126	55	0	37	1618	0	44	1707	0
Confl. Peds. (#/hr)	7		8	5		4	8		5	4		7
Heavy Vehicles (%)	4%	2%	11%	8%	2%	2%	20%	5%	2%	2%	4%	8%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.8	15.8		15.8	15.8		45.1	41.0		45.1	41.0	
Effective Green, g (s)	15.8	15.8		15.8	15.8		45.1	41.0		45.1	41.0	
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.59	0.53		0.59	0.53	
Clearance Time (s)	6.0	6.0		6.0	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	
Lane Grp Cap (vph)	252	313		257	338		164	1844		193	1866	
v/s Ratio Prot		0.02			0.03		0.01	0.47		c0.01	c0.49	
v/s Ratio Perm	0.03			c0.10			0.12			0.12		
v/c Ratio	0.13	0.09		0.49	0.16		0.23	0.88		0.23	0.91	
Uniform Delay, d1	24.9	24.7		27.0	25.1		12.9	15.7		11.7	16.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.1		1.5	0.2		0.7	6.3		0.6	8.5	
Delay (s)	25.2	24.8		28.5	25.3		13.6	22.0		12.3	24.8	
Level of Service	C	C		C	C		B	C		B	C	
Approach Delay (s)		24.9			26.8			21.8			24.5	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay	23.5			HCM 2000 Level of Service			C					
HCM 2000 Volume to Capacity ratio	0.76											
Actuated Cycle Length (s)	76.9			Sum of lost time (s)			16.0					
Intersection Capacity Utilization	61.0%			ICU Level of Service			B					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Yonge St & Street A/GO Access

2041 Total Conditions
Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	5	65	54	5	51	37	1170	75	47	1439	43
Future Volume (vph)	79	5	65	54	5	51	37	1170	75	47	1439	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	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	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1883	1580	1621	1883	1255	1789	3465		1448	3497	
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.10	1.00		0.10	1.00	
Satd. Flow (perm)	1420	1883	1580	1286	1883	1255	184	3465		149	3497	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	100	6	82	68	6	65	47	1481	95	59	1822	54
RTOR Reduction (vph)	0	0	71	0	0	57	0	4	0	0	2	0
Lane Group Flow (vph)	100	6	11	68	6	8	47	1572	0	59	1874	0
Confl. Peds. (#/hr)			1	5		4	1		5	4		
Heavy Vehicles (%)	2%	2%	2%	12%	2%	28%	2%	4%	8%	26%	4%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	9.1	9.1	9.1	9.1	9.1	9.1	44.8	40.9		44.8	40.9	
Effective Green, g (s)	9.1	9.1	9.1	9.1	9.1	9.1	44.8	40.9		44.8	40.9	
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13	0.13	0.64	0.59		0.64	0.59	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	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	3.0	
Lane Grp Cap (vph)	184	245	205	167	245	163	207	2027		167	2046	
v/s Ratio Prot		0.00			0.00		0.01	0.45		c0.02	c0.54	
v/s Ratio Perm	c0.07		0.01	0.05		0.01	0.13			0.21		
v/c Ratio	0.54	0.02	0.05	0.41	0.02	0.05	0.23	0.78		0.35	0.92	
Uniform Delay, d1	28.5	26.5	26.6	27.9	26.5	26.6	11.2	11.0		7.9	13.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.3	0.0	0.1	1.6	0.0	0.1	0.6	3.0		1.3	7.9	
Delay (s)	31.7	26.6	26.7	29.5	26.6	26.8	11.8	14.0		9.2	20.9	
Level of Service	C	C	C	C	C	C	B	B		A	C	
Approach Delay (s)		29.4			28.1			13.9			20.5	
Approach LOS		C			C			B			C	
Intersection Summary												
HCM 2000 Control Delay			18.5				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			69.9				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			73.1%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Yonge St & Mapleview Dr E

2041 Total Conditions
Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	219	531	72	188	672	283	70	779	58	286	828	284
Future Volume (vph)	219	531	72	188	672	283	70	779	58	286	828	284
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	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	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	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	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1659	3380	1580	1722	3579	1506	1706	3544	1493	1738	3544	1521
Flt Permitted	0.14	1.00	1.00	0.28	1.00	1.00	0.26	1.00	1.00	0.18	1.00	1.00
Satd. Flow (perm)	244	3380	1580	502	3579	1506	475	3544	1493	324	3544	1521
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	231	559	76	198	707	298	74	820	61	301	872	299
RTOR Reduction (vph)	0	0	58	0	0	121	0	0	39	0	0	93
Lane Group Flow (vph)	231	559	18	198	707	177	74	820	22	301	872	206
Confl. Peds. (#/hr)	1		1	1		1	1		1	1		1
Heavy Vehicles (%)	10%	8%	2%	6%	2%	7%	7%	3%	8%	5%	3%	6%
Turn Type	pm+pt	NA	Perm	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		4	8		8	2		2	6		6
Actuated Green, G (s)	43.3	28.6	28.6	40.5	27.2	27.2	47.4	41.9	41.9	60.6	51.1	51.1
Effective Green, g (s)	43.3	28.6	28.6	40.5	27.2	27.2	47.4	41.9	41.9	60.6	51.1	51.1
Actuated g/C Ratio	0.37	0.24	0.24	0.34	0.23	0.23	0.40	0.35	0.35	0.51	0.43	0.43
Clearance Time (s)	4.0	6.0	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	3.0
Lane Grp Cap (vph)	264	815	381	308	821	345	247	1253	527	341	1528	655
v/s Ratio Prot	c0.11	0.17		0.07	0.20		0.01	0.23		c0.11	0.25	
v/s Ratio Perm	c0.21		0.01	0.15		0.12	0.11		0.01	c0.34		0.14
v/c Ratio	0.88	0.69	0.05	0.64	0.86	0.51	0.30	0.65	0.04	0.88	0.57	0.31
Uniform Delay, d1	30.0	40.9	34.5	29.6	43.8	39.9	22.6	32.2	25.1	21.1	25.4	22.2
Progression Factor	1.00	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	25.9	2.4	0.1	4.5	9.2	1.3	0.7	2.7	0.1	22.5	1.6	1.3
Delay (s)	55.9	43.3	34.6	34.1	53.0	41.2	23.3	34.9	25.3	43.6	27.0	23.4
Level of Service	E	D	C	C	D	D	C	C	C	D	C	C
Approach Delay (s)		45.9			47.0			33.4			29.7	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			38.2									
HCM 2000 Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			118.5									
Intersection Capacity Utilization			96.7%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Moberly Dr/Goodwin Dr & Mapleview Dr E

2041 Total Conditions

Weekday AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	783	5	0	1032	2	70	50	30	16	75	66
Future Volume (vph)	91	783	5	0	1032	2	70	50	30	16	75	66
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		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95			0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	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		1.00	1.00	
Frt	1.00	1.00			1.00		1.00	0.94		1.00	0.93	
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	3408			3577		1788	1770		1784	1739	
Flt Permitted	0.15	1.00			1.00		0.66	1.00		0.70	1.00	
Satd. Flow (perm)	285	3408			3577		1238	1770		1313	1739	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	101	870	6	0	1147	2	78	56	33	18	83	73
RTOR Reduction (vph)	0	0	0	0	0	0	0	28	0	0	48	0
Lane Group Flow (vph)	101	876	0	0	1149	0	78	61	0	18	108	0
Confl. Peds. (#/hr)	3		1	2		4	1		2	4		3
Heavy Vehicles (%)	2%	7%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	44.6	44.6			34.3		10.9	10.9		10.9	10.9	
Effective Green, g (s)	44.6	44.6			34.3		10.9	10.9		10.9	10.9	
Actuated g/C Ratio	0.66	0.66			0.51		0.16	0.16		0.16	0.16	
Clearance Time (s)	4.0	6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	328	2251			1817		199	285		212	280	
v/s Ratio Prot	0.03	c0.26			c0.32			0.03			0.06	
v/s Ratio Perm	0.17						c0.06			0.01		
v/c Ratio	0.31	0.39			0.63		0.39	0.22		0.08	0.39	
Uniform Delay, d1	6.2	5.2			12.0		25.3	24.6		24.1	25.3	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.5			1.7		1.3	0.4		0.2	0.9	
Delay (s)	6.7	5.7			13.7		26.6	25.0		24.2	26.2	
Level of Service	A	A			B		C	C		C	C	
Approach Delay (s)		5.8			13.7			25.7			26.0	
Approach LOS		A			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			12.3				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			67.5				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			70.5%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 5: Goodwin Dr & Street A

2041 Total Conditions
Weekday AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	65	0	67	76	0	90
Future Volume (Veh/h)	65	0	67	76	0	90
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	71	0	73	83	0	98
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			86			
pX, platoon unblocked						
vC, conflicting volume	212	114			156	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	212	114			156	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	91	100			100	
cM capacity (veh/h)	776	938			1424	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	71	156	98			
Volume Left	71	0	0			
Volume Right	0	83	0			
cSH	776	1700	1424			
Volume to Capacity	0.09	0.09	0.00			
Queue Length 95th (m)	2.3	0.0	0.0			
Control Delay (s)	10.1	0.0	0.0			
Lane LOS	B					
Approach Delay (s)	10.1	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		2.2				
Intersection Capacity Utilization		18.4%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

7: Access 1 & Country Ln

2041 Total Conditions
Weekday AM Peak Hour

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	81	5	8	63	2	3
Future Volume (Veh/h)	81	5	8	63	2	3
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.25	0.25	0.92	0.25	0.25	0.92
Hourly flow rate (vph)	324	20	9	252	8	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume			344		604	334
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			344		604	334
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		98	100
cM capacity (veh/h)			1215		458	708
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	344	261	11			
Volume Left	0	9	8			
Volume Right	20	0	3			
cSH	1700	1215	507			
Volume to Capacity	0.20	0.01	0.02			
Queue Length 95th (m)	0.0	0.2	0.5			
Control Delay (s)	0.0	0.3	12.3			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.3	12.3			
Approach LOS			B			
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			20.0%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 8: Yonge St & Access 2

2041 Total Conditions
Weekday AM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	2	0	1292	1441	20
Future Volume (Veh/h)	0	2	0	1292	1441	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2	0	1404	1566	22
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLT	TWLT	
Median storage veh				2	2	
Upstream signal (m)				150	126	
pX, platoon unblocked	0.72	0.56	0.56			
vC, conflicting volume	2279	794	1566			
vC1, stage 1 conf vol	1577					
vC2, stage 2 conf vol	702					
vCu, unblocked vol	0	0	442			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	743	608	633			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	2	702	702	1044	544	
Volume Left	0	0	0	0	0	
Volume Right	2	0	0	0	22	
cSH	608	1700	1700	1700	1700	
Volume to Capacity	0.00	0.41	0.41	0.61	0.32	
Queue Length 95th (m)	0.1	0.0	0.0	0.0	0.0	
Control Delay (s)	10.9	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	10.9	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			50.5%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

1: Yonge St & Country Ln/Turnberry Ln

2041 Total Conditions

Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	24	29	75	12	68	29	1712	109	77	1500	33
Future Volume (vph)	23	24	29	75	12	68	29	1712	109	77	1500	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	0.87		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1775	1591		1449	1614		1644	3514		1789	3564	
Flt Permitted	0.70	1.00		0.72	1.00		0.10	1.00		0.08	1.00	
Satd. Flow (perm)	1315	1591		1100	1614		169	3514		159	3564	
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)	24	25	30	77	12	70	30	1765	112	79	1546	34
RTOR Reduction (vph)	0	26	0	0	60	0	0	4	0	0	1	0
Lane Group Flow (vph)	24	29	0	77	22	0	30	1873	0	79	1579	0
Confl. Peds. (#/hr)	9		9	8		8	9		8	8		9
Heavy Vehicles (%)	2%	2%	16%	25%	2%	2%	11%	2%	15%	2%	2%	3%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	11.6	11.6		11.6	11.6		47.3	44.6		52.7	47.3	
Effective Green, g (s)	11.6	11.6		11.6	11.6		47.3	44.6		52.7	47.3	
Actuated g/C Ratio	0.15	0.15		0.15	0.15		0.61	0.57		0.68	0.61	
Clearance Time (s)	6.0	6.0		6.0	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	
Lane Grp Cap (vph)	196	237		164	241		154	2019		221	2172	
v/s Ratio Prot		0.02			0.01		0.01	c0.53		c0.02	0.44	
v/s Ratio Perm	0.02			c0.07			0.11			0.22		
v/c Ratio	0.12	0.12		0.47	0.09		0.19	0.93		0.36	0.73	
Uniform Delay, d1	28.6	28.6		30.2	28.5		8.2	15.0		14.0	10.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2		2.1	0.2		0.6	9.0		1.0	2.2	
Delay (s)	28.9	28.8		32.3	28.6		8.8	24.0		15.0	12.8	
Level of Service	C	C		C	C		A	C		B	B	
Approach Delay (s)		28.8			30.4			23.7			12.9	
Approach LOS		C			C			C			B	
Intersection Summary												
HCM 2000 Control Delay	19.4			HCM 2000 Level of Service			B					
HCM 2000 Volume to Capacity ratio	0.79											
Actuated Cycle Length (s)	77.6			Sum of lost time (s)			16.0					
Intersection Capacity Utilization	84.2%			ICU Level of Service			E					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Yonge St & Street A/GO Access

2041 Total Conditions
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	5	100	140	5	126	71	1466	104	60	1412	95
Future Volume (vph)	107	5	100	140	5	126	71	1466	104	60	1412	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	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	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1783	1883	1580	1762	1883	1455	1789	3530		1560	3540	
Flt Permitted	0.75	1.00	1.00	0.75	1.00	1.00	0.10	1.00		0.10	1.00	
Satd. Flow (perm)	1416	1883	1580	1399	1883	1455	186	3530		168	3540	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	113	5	105	147	5	133	75	1543	109	63	1486	100
RTOR Reduction (vph)	0	0	86	0	0	109	0	5	0	0	4	0
Lane Group Flow (vph)	113	5	19	147	5	24	75	1647	0	63	1582	0
Confl. Peds. (#/hr)	3		1	5		7	1		5	7		3
Heavy Vehicles (%)	2%	2%	2%	3%	2%	10%	2%	2%	5%	17%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	13.4	13.4	13.4	13.4	13.4	13.4	46.0	40.6		43.2	39.2	
Effective Green, g (s)	13.4	13.4	13.4	13.4	13.4	13.4	46.0	40.6		43.2	39.2	
Actuated g/C Ratio	0.18	0.18	0.18	0.18	0.18	0.18	0.62	0.55		0.58	0.53	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	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	3.0	
Lane Grp Cap (vph)	256	340	286	253	340	263	232	1936		173	1875	
v/s Ratio Prot		0.00			0.00		c0.02	c0.47		0.02	0.45	
v/s Ratio Perm	0.08		0.01	c0.11		0.02	0.18			0.19		
v/c Ratio	0.44	0.01	0.07	0.58	0.01	0.09	0.32	0.85		0.36	0.84	
Uniform Delay, d1	27.0	24.9	25.1	27.7	24.9	25.2	10.7	14.1		11.2	14.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	0.0	0.1	3.4	0.0	0.2	0.8	4.9		1.3	4.8	
Delay (s)	28.2	24.9	25.2	31.1	24.9	25.4	11.5	19.1		12.5	19.6	
Level of Service	C	C	C	C	C	C	B	B		B	B	
Approach Delay (s)		26.7			28.3			18.8			19.4	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			20.2				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			74.0				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			77.9%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

3: Yonge St & Mapleview Dr E

2041 Total Conditions
Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	344	795	149	151	527	313	155	985	102	319	1092	267
Future Volume (vph)	344	795	149	151	527	313	155	985	102	319	1092	267
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	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	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	1.00	0.99	1.00	1.00	1.00	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	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1738	3579	1585	1789	3579	1580	1789	3579	1601	1789	3579	1565
Flt Permitted	0.18	1.00	1.00	0.16	1.00	1.00	0.10	1.00	1.00	0.09	1.00	1.00
Satd. Flow (perm)	323	3579	1585	299	3579	1580	197	3579	1601	171	3579	1565
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	362	837	157	159	555	329	163	1037	107	336	1149	281
RTOR Reduction (vph)	0	0	91	0	0	159	0	0	73	0	0	76
Lane Group Flow (vph)	362	837	66	159	555	170	163	1037	34	336	1149	205
Confl. Peds. (#/hr)	1					1				1		1
Heavy Vehicles (%)	5%	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	3%
Turn Type	pm+pt	NA	Perm	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		4	8		8	2		2	6		6
Actuated Green, G (s)	50.2	35.1	35.1	36.3	25.2	25.2	50.5	40.1	40.1	64.1	49.7	49.7
Effective Green, g (s)	50.2	35.1	35.1	36.3	25.2	25.2	50.5	40.1	40.1	64.1	49.7	49.7
Actuated g/C Ratio	0.40	0.28	0.28	0.29	0.20	0.20	0.40	0.32	0.32	0.51	0.39	0.39
Clearance Time (s)	4.0	6.0	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	3.0
Lane Grp Cap (vph)	363	994	440	216	714	315	209	1136	508	343	1408	615
v/s Ratio Prot	c0.17	0.23		0.06	0.16		0.06	0.29		c0.16	0.32	
v/s Ratio Perm	c0.23		0.04	0.15		0.11	0.25		0.02	c0.34		0.13
v/c Ratio	1.00	0.84	0.15	0.74	0.78	0.54	0.78	0.91	0.07	0.98	0.82	0.33
Uniform Delay, d1	33.5	43.0	34.4	36.2	47.9	45.3	28.3	41.4	30.1	39.4	34.2	26.7
Progression Factor	1.00	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	46.2	6.6	0.2	12.3	5.3	1.8	16.7	12.6	0.3	42.6	5.3	1.5
Delay (s)	79.7	49.6	34.5	48.4	53.2	47.1	45.0	54.0	30.3	81.9	39.5	28.2
Level of Service	E	D	C	D	D	D	D	D	C	F	D	C
Approach Delay (s)		55.9			50.6			50.9			45.8	
Approach LOS		E			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			50.4		HCM 2000 Level of Service					D		
HCM 2000 Volume to Capacity ratio			1.04									
Actuated Cycle Length (s)			126.3		Sum of lost time (s)					20.0		
Intersection Capacity Utilization			101.6%		ICU Level of Service					G		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Moberly Dr/Goodwin Dr & Maplevue Dr E

2041 Total Conditions

Weekday PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	162	1189	200	30	963	12	135	100	60	42	150	63
Future Volume (vph)	162	1189	200	30	963	12	135	100	60	42	150	63
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	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00		1.00	0.94		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	3501		1789	3503		1789	1769		1785	1793	
Flt Permitted	0.16	1.00		0.12	1.00		0.51	1.00		0.64	1.00	
Satd. Flow (perm)	294	3501		224	3503		967	1769		1200	1793	
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)	176	1292	217	33	1047	13	147	109	65	46	163	68
RTOR Reduction (vph)	0	13	0	0	1	0	0	30	0	0	21	0
Lane Group Flow (vph)	176	1496	0	33	1059	0	147	144	0	46	210	0
Confl. Peds. (#/hr)	1			2		3			2	3		1
Heavy Vehicles (%)	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	46.1	39.5		36.3	33.7		15.5	15.5		15.5	15.5	
Effective Green, g (s)	46.1	39.5		36.3	33.7		15.5	15.5		15.5	15.5	
Actuated g/C Ratio	0.63	0.54		0.49	0.46		0.21	0.21		0.21	0.21	
Clearance Time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	354	1878		165	1603		203	372		252	377	
v/s Ratio Prot	c0.06	c0.43		0.01	0.30			0.08			0.12	
v/s Ratio Perm	0.25			0.09			c0.15			0.04		
v/c Ratio	0.50	0.80		0.20	0.66		0.72	0.39		0.18	0.56	
Uniform Delay, d1	8.3	13.8		11.3	15.5		27.1	25.0		23.8	26.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	3.6		0.6	2.2		12.1	0.7		0.4	1.8	
Delay (s)	9.4	17.4		11.9	17.7		39.1	25.6		24.2	27.8	
Level of Service	A	B		B	B		D	C		C	C	
Approach Delay (s)		16.6			17.5			31.8			27.2	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			19.2			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			73.6			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			83.8%			ICU Level of Service			E			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

5: Goodwin Dr & Street A

2041 Total Conditions
Weekday PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	97	0	134	140	0	159
Future Volume (Veh/h)	97	0	134	140	0	159
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	105	0	146	152	0	173
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			86			
pX, platoon unblocked	0.94	0.94			0.94	
vC, conflicting volume	395	222			298	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	330	146			227	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	83	100			100	
cM capacity (veh/h)	628	850			1267	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	105	298	173			
Volume Left	105	0	0			
Volume Right	0	152	0			
cSH	628	1700	1267			
Volume to Capacity	0.17	0.18	0.00			
Queue Length 95th (m)	4.5	0.0	0.0			
Control Delay (s)	11.9	0.0	0.0			
Lane LOS	B					
Approach Delay (s)	11.9	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		2.2				
Intersection Capacity Utilization		27.7%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

7: Access 1 & Country Ln

2041 Total Conditions
Weekday PM Peak Hour

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	68	2	3	70	6	9
Future Volume (Veh/h)	68	2	3	70	6	9
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.25	0.25	0.92	0.25	0.25	0.92
Hourly flow rate (vph)	272	8	3	280	24	10
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume			280		562	276
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			280		562	276
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		95	99
cM capacity (veh/h)			1283		487	763
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	280	283	34			
Volume Left	0	3	24			
Volume Right	8	0	10			
cSH	1700	1283	545			
Volume to Capacity	0.16	0.00	0.06			
Queue Length 95th (m)	0.0	0.1	1.5			
Control Delay (s)	0.0	0.1	12.0			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.1	12.0			
Approach LOS			B			
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			16.1%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 8: Yonge St & Access 2

2041 Total Conditions
Weekday PM Peak Hour

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	5	0	1850	1573	31
Future Volume (Veh/h)	0	5	0	1850	1573	31
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	5	0	2011	1710	34
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh				2	2	
Upstream signal (m)				150	126	
pX, platoon unblocked	0.75	0.67	0.67			
vC, conflicting volume	2732	872	1710			
vC1, stage 1 conf vol	1727					
vC2, stage 2 conf vol	1006					
vCu, unblocked vol	672	0	1076			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	202	727	440			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	5	1006	1006	1140	604	
Volume Left	0	0	0	0	0	
Volume Right	5	0	0	0	34	
cSH	727	1700	1700	1700	1700	
Volume to Capacity	0.01	0.59	0.59	0.67	0.36	
Queue Length 95th (m)	0.2	0.0	0.0	0.0	0.0	
Control Delay (s)	10.0	0.0	0.0	0.0	0.0	
Lane LOS	A					
Approach Delay (s)	10.0	0.0		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			54.5%	ICU Level of Service		A
Analysis Period (min)			15			