

673 MAPLEVIEW DRIVE EAST PROPOSED COMMERCIAL DEVELOPMENT

Urban Transportation Considerations
City of Barrie

Prepared For: Sobeys Canada

April 12, 2022



**MOVEMENT
IN URBAN
ENVIRONMENTS**
BAGROUP.COM

TABLE OF CONTENTS

1.0	INTRODUCTION	1
1.1	Background	1
1.2	Report Overview	1
1.3	The Existing Site	1
2.0	PROPOSED DEVELOPMENT	3
2.1	Development Program	3
2.2	Site Access and Vehicle Circulation	4
2.3	Pedestrian Access and Circulation	4
2.4	Vehicular Parking	4
2.5	Loading and Servicing	4
3.0	TRANSPORTATION CONTEXT	6
3.1	Area Road Network	6
3.2	Planned Road Improvements	7
3.3	Area Transit Services	11
3.4	Area Bicycle Network	14
3.5	Area Pedestrian Context.....	16
4.0	TRANSPORTATION DEMAND MANAGEMENT	17
4.1	Proposed TDM Plan	17
4.2	Implementation Plan / TDM Checklist	19
5.0	VEHICLE TRAFFIC ASSESSMENT	20
5.1	Scope.....	20
5.2	Horizon Years	20
5.3	Analysis Scenarios	20
5.4	Analysis Assumptions.....	21
5.5	Existing Traffic Volumes	22
5.6	Future Background Traffic Volumes.....	24
5.7	Site Traffic	27
5.8	Future Total Traffic Volumes.....	28
6.0	SYNCHRO CAPACITY ANALYSIS REVIEW	32
6.1	Signalized Intersections Analysis	32
6.2	Unsignalized Intersection Analysis	35
6.3	Site Driveway Signal Justification Analysis	37
7.0	PROPOSED DRIVE-THRU OPERATIONS REVIEW	39



7.1	Traffic Demand	39
7.2	Operations Review Methodology	40
7.3	Operations Assessment.....	40
8.0	VEHICULAR PARKING CONSIDERATIONS.....	41
8.1	Zoning By-law 054-04 Requirements	41
8.2	Zoning By-law 2009- 141 Requirements	41
8.3	Proposed Parking Supply	42
9.0	BICYCLE PARKING CONSIDERATIONS.....	43
9.1	Zoning By-law 2009-141 Requirements	43
9.2	Proposed Bicycle Parking Supply.....	43
10.0	LOADING CONSIDERATIONS.....	44
10.1	Zoning By-law 054-04 Requirements	44
10.2	Proposed Loading Supply and Arrangements.....	44
11.0	SUMMARY AND CONCLUSIONS.....	45



LIST OF TABLES

Table 1	Development Concept Plan	3
Table 2	Area Road Network.....	6
Table 3	Transit Services: Bus and Train Services	12
Table 4	Proposed TDM Implementation Plan / TDM Checklist	19
Table 5	Turning Movement Count Summary	22
Table 6	Site Trip Generation	27
Table 7	Site Traffic Distribution	28
Table 8	Signalized Intersection Analysis Summary	33
Table 9	Unsignalized Intersection Analysis Summary	36
Table 10	Justification 7 Free Flow Signal Warrant Analysis – Mapleview Drive	37
Table 11	Justification 7 Free Flow Signal Warrant Analysis – Yonge Street.....	38
Table 12	Proposed Site Drive Through Trip Generation	39
Table 13	Average Queue and System Time by Peak Period	40
Table 14	Zoning By-law 054-04 Parking Requirements	41
Table 15	Zoning By-law 2009-141 Parking Requirements	41
Table 16	Zoning By-law 054-04 Loading Requirements.....	44



LIST OF FIGURES

Figure 1:	Site Location	2
Figure 2:	Site Plan.....	5
Figure 3:	Existing Area Road Network	8
Figure 4:	Existing Road Network Lane Configuration and Traffic Control	9
Figure 5:	Future Road Network Lane Configuration and Traffic Control	10
Figure 6:	Existing Transit Service	13
Figure 7:	Existing & Planned Bicycle Network	15
Figure 8:	Baseline Existing Traffic Volumes.....	23
Figure 9:	2026 Future Background Traffic Volumes	25
Figure 10:	2031 Future Background Traffic Volumes	26
Figure 11:	New Site Traffic Volumes.....	29
Figure 12:	2026 Future Total Traffic Volumes.....	30
Figure 13:	2031 Future Total Traffic Volumes.....	31

TABLE OF APPENDICES

APPENDIX A:	Reduced Scale Architectural Plans
APPENDIX B:	Plans for Yonge Street and Mapleview Drive East
APPENDIX C:	Vehicle Manoeuvring Diagrams
APPENDIX D:	Signal Timing Plan Details
APPENDIX E:	Turning Movement Count Data
APPENDIX F:	Transportation Tomorrow Survey (TTS) 2016 Data
APPENDIX G:	Synchro 11 Capacity Analysis Results
APPENDIX H:	OTM Book 12 - Signal Warrant Justification 7 Details
APPENDIX I:	Detailed Drive Through Simulation Summary



1.0 INTRODUCTION

BA Group has been retained by Sobeys Canada to provide urban transportation consideration services in relation to the proposed development of 673 Mapleview Drive East in the City of Barrie (herein referred to as the 'site'). The site is located at the south west corner of the Yonge Street and Mapleview Drive East intersection, just south of the Barrie South GO station. The site encompasses the area bounded by Yonge Street to the north and Mapleview Drive East to the west. The site location is illustrated in **Figure 1**.

This transportation report forms part of the proposed Zoning By-law Amendment (ZBA to permit the development of the site as a retail shopping centre that includes a grocery store and several retail outparcels.

1.1 BACKGROUND

A Conformity Review / Pre-Consultation application was made in May 2021. The application was to permit the development of 8,933 square meters of retail gross floor area. As part of the submission, comments were received from the City of Barrie in a memorandum dated June 2021.

Since the May 2021 submission and receipt of City comments, refinements to the site plan, building design, and building program have been incorporated. The new site includes a reduction in retail gross floor area.

1.2 REPORT OVERVIEW

This report provides an assessment of the transportation related aspects of the site. It includes:

- a summary of the existing site land uses and proposed development programme;
- a review of the area transportation context;
- a review of traffic operations on the area road system following development of the proposed building and other upcoming developments and the ability of the future area road network to acceptably accommodate forecast traffic levels across all modes; and
- an overview of key transportation related design elements of the development site plan.

1.2.1 Study Area

The subject site is bounded by existing residential developments lot to the west and south, Yonge Street to the east and Mapleview Drive East to the north.

1.3 THE EXISTING SITE

The site located in the City of Barrie at the intersection of Yonge Street and Mapleview Drive East.

The site is primarily composed of an undeveloped area and two semi-detached residential properties.

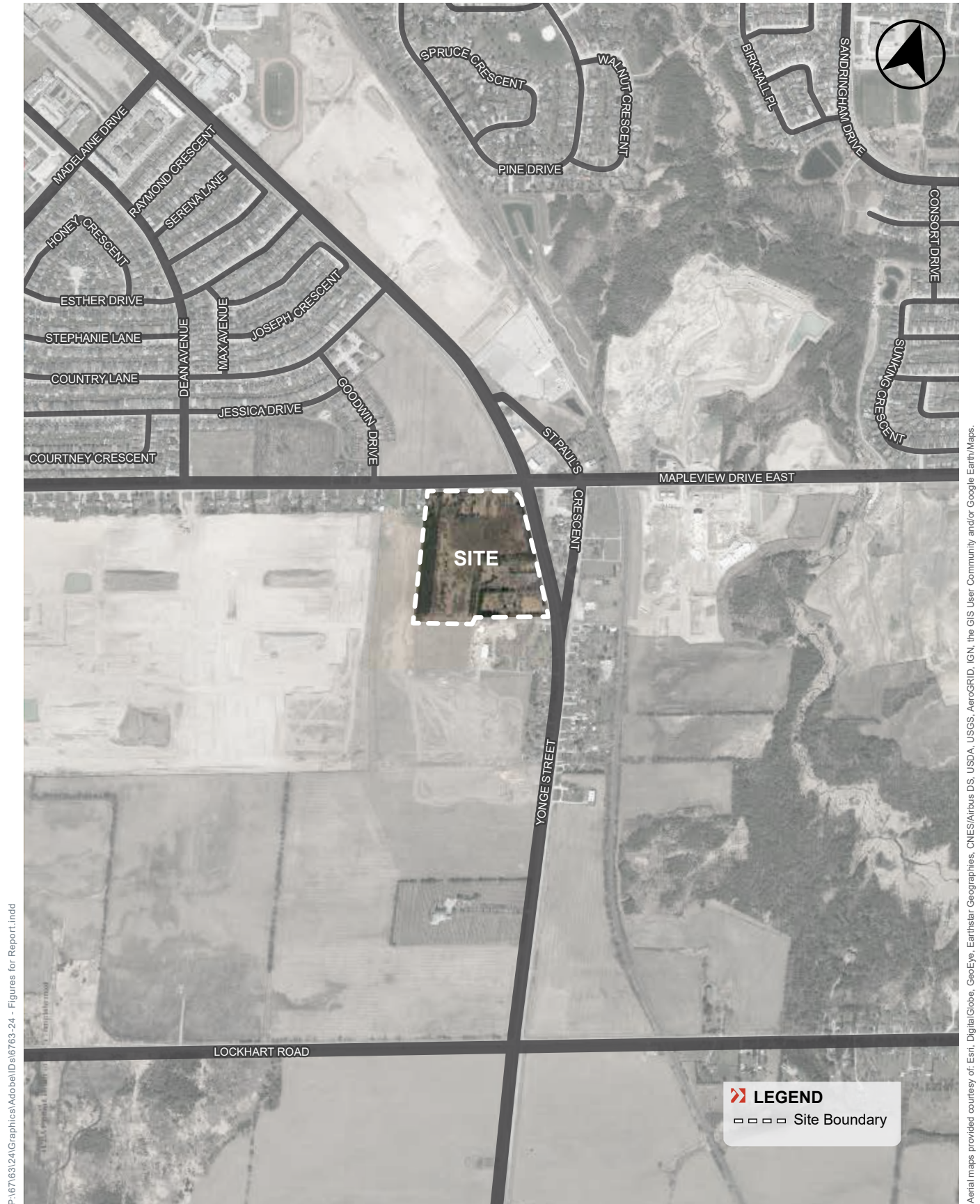


FIGURE 1 SITE LOCATION

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 Maplevue 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

3.0 TRANSPORTATION CONTEXT

3.1 AREA ROAD NETWORK

The site's surrounding road network provides a relatively high level of access between the site and the rest of the City of Barrie. Its proximity to Highway 400 and the Mapleview Drive East Interchange is beneficial for those travelling farther north/south of the site.

The existing area road network, as described below, is illustrated in **Figure 3**, while the area intersection lane configurations, turn restrictions, and intersection traffic controls are illustrated in **Figure 4**.

Table 2 provides a summary of the existing and proposed road network.

TABLE 2 AREA ROAD NETWORK

		Street Name	Description
Existing	Arterial	Mapleview Drive East	Mapleview Drive East is a two-lane arterial road with a rural cross section, no sidewalk and gravel shoulders within the study area. Additional left turn lanes are provided at signalized intersections, including its intersection with Yonge Street. Mapleview Drive East is aligned in the East-West direction and connects the site to the Highway 400. Mapleview Drive East has a posted speed limit of 50km/h and is under the jurisdiction of the City, in the study area.
		Yonge Street /	Yonge Street is a two-lane road with a rural cross-section, no sidewalk and gravel shoulders within the study area. Additional left turn lanes are provided at signalized intersections, including its intersection with Mapleview Drive East. Yonge Street is aligned in the North-South direction and connects the site to the Barrie South GO station and downtown Barrie. North of the Mapleview Drive East, Yonge Street has a 5 lane cross section, with 2 lanes operating in both directions. Yonge Street has a posted speed limit of 60km/h and is under the jurisdiction of the City, in the study area.
	Local	St Paul's Crescent	St Paul's Crescent is a two-lane rural cross-section, no sidewalk and gravel shoulders within the study area. St Paul's Crescents is generally aligned in the North-South Direction. St Paul's Crescent has a posted speed limit is 50km/h.
Proposed	Local	Street 'V' (Deckawoo Gate)	The Street 'V' Road Extension is a proposed 'L' spaced road that connects between Mapleview Drive East and the adjacent development's Street 'V'. The road is proposed to accommodate a two-lane cross-section with sidewalks on both sides.

3.2 PLANNED ROAD IMPROVEMENTS

3.2.1 Improvements to Yonge Street

In accordance with the City of Barrie Official Plan Map 5 (dated January 2022), an ultimate right of way width of 38 metres has been identified for Yonge Street on the approach to Mapleview Drive East. South of the intersection, Yonge Street is proposed to be widened to 34 metres.

The proposed design of Yonge Street is a 4-lane cross-section between Mapleview Drive East and St Paul's Crescent. At the approach to Mapleview Drive, a 6-lane cross-section is proposed with dedicated right and left turn lanes. The City's design for Yonge Street is attached in **APPENDIX B**.

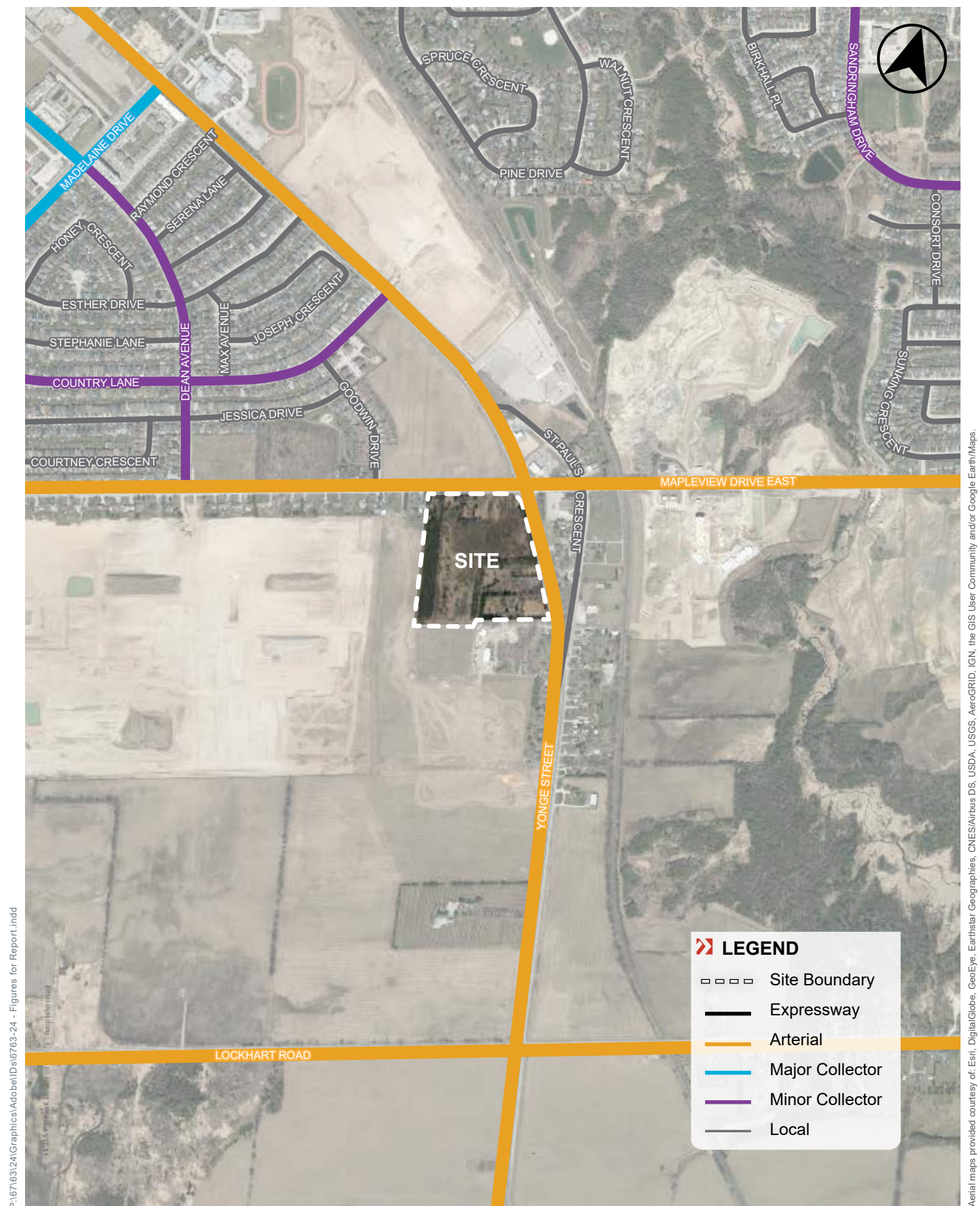
The future lane configurations for Yonge Street are illustrated in **Figure 5**.

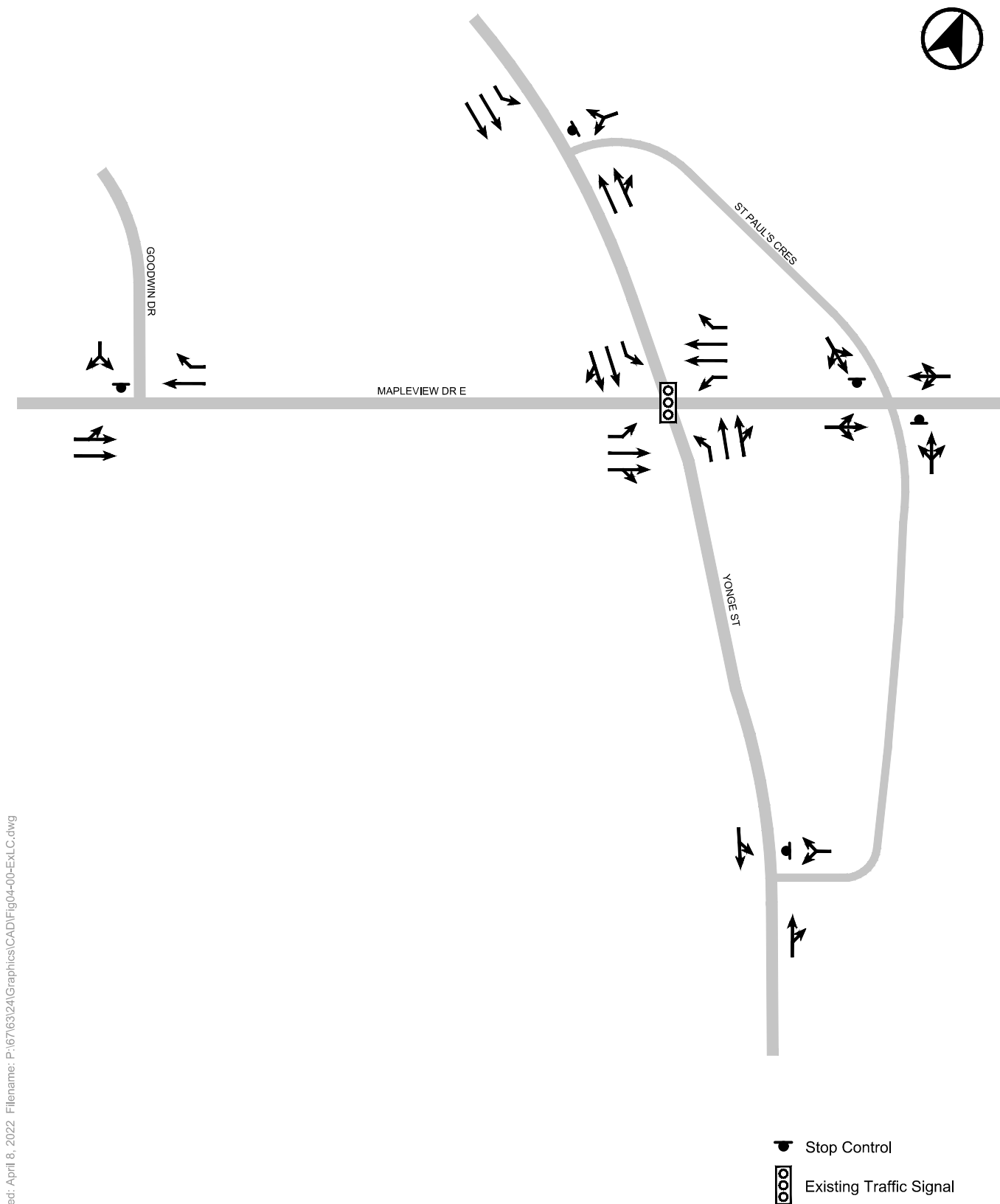
3.2.2 Improvements to Mapleview Drive East

In accordance with the City of Barrie Official Plan Map 5 (dated January 2022), an ultimate right of way width of 45 metres has been identified for Mapleview Drive East on the approach to Yonge Street. West of the intersection, Mapleview Drive East is proposed to be widened to 41 metres.

The proposed design of Mapleview Drive East is a 5-lane cross-section between Goodwin Drive and Yonge Street. The road cross-section accommodates 2-lanes in each direction plus a centre turn lane. At the approach to Yonge Street, a 5-lane cross-section is proposed with dedicated right and left turn lanes. The City's design for Mapleview Drive East are attached in **APPENDIX B**.

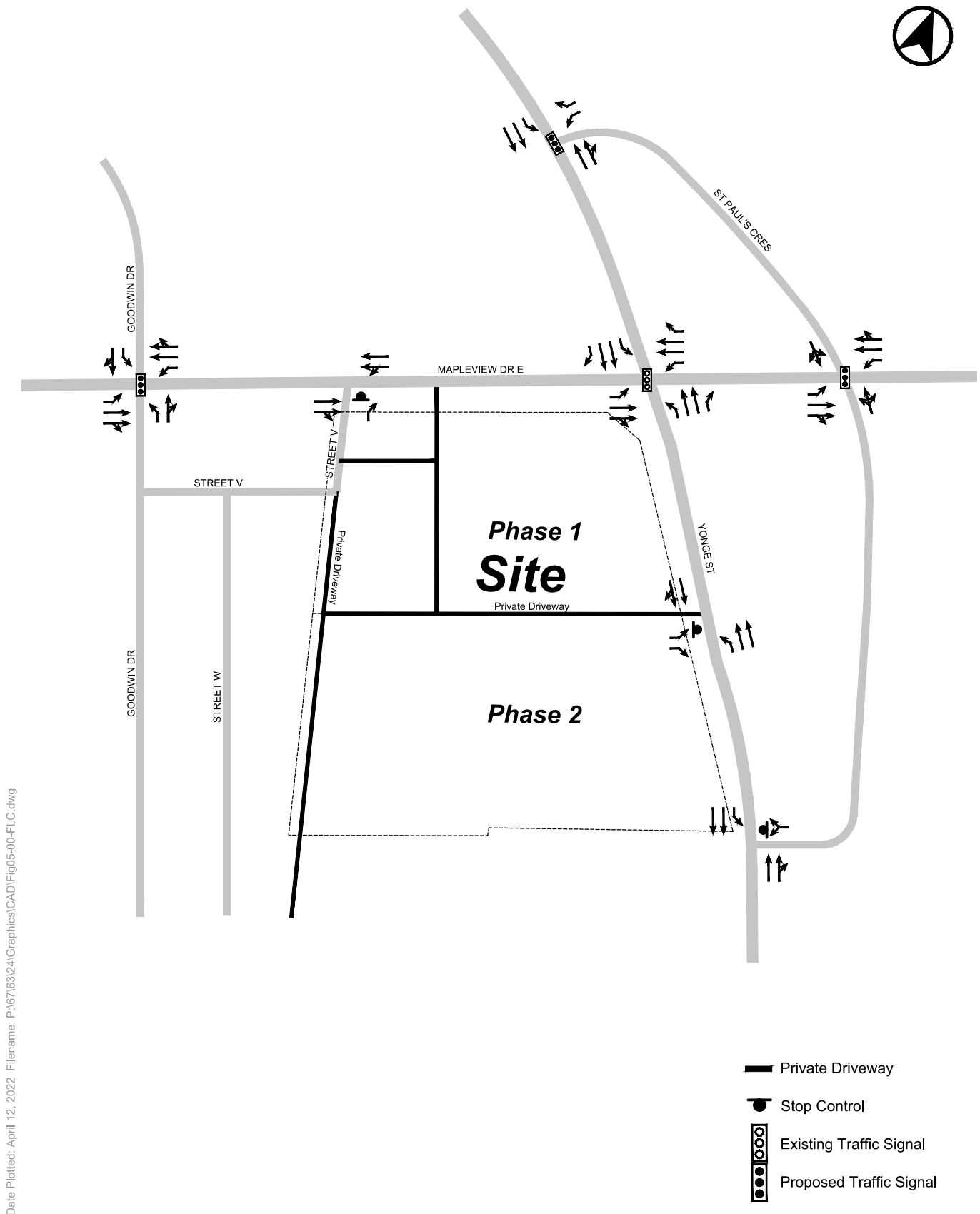
The future lane configurations of Mapleview Drive East and Yonge Street are illustrated in **Figure 5**.





Date Plotted: April 8, 2022 Filename: P:\67\63\24\Graphics\CAD\Fig04-00-ExLC.dwg

FIGURE 4 EXISTING ROAD NETWORK LANE CONFIGURATION AND TRAFFIC CONTROL



Date Plotted: April 12, 2022 Filename: P:\67\63\24\Graphics\CAD\Fig05-00-FLC.dwg

FIGURE 5 FUTURE ROAD NETWORK LANE CONFIGURATION AND TRAFFIC CONTROL

3.3 AREA TRANSIT SERVICES

The City of Barrie is well connected by local transit operating within the City and the growing regional transit options that provide service between Barrie and others parts of Ontario. The site is well situated to take advantage of these services, with multiple Barrie Transit bus stops located near the site its proximity to Barrie South GO station. Having access to a wide range of transit routes allows for visitors and employees to opt for travel that is not auto-dependent.

The site is positioned near 2 Barrie Transit bus routes, with stop located along the site boundary or within a 10-minute walk from the edge of the site. Barrie South GO station is a transit hub in the City of Barrie and is located about 700 metres from the edge of the site or an 8 minute walk. It provides major stops for multiple local bus routes as well as the Barrie GO transit train and GO transit bus lines.

Barrie Transit bus routes operating near the site include the 3B Painswick and 4A East Bayfield. Utilizing only these routes, most parts of the city can be accessed easily. The City has multiple transit hubs that allow riders to easily transfer between routes. These hubs include Allendale Waterfront GO, the downtown Barrie terminal, Barrie South GO, Park Place, and Georgian Mall, all of which can be reached through at least one of the 2 site-accessible routes.

Transit service for the site is quite favourable in terms of proximity, but frequency could be improved. While most Barrie Transit buses run consistently throughout the day, the headway between buses usually ranges from 30 to 45 minutes on weekdays and up to 65 min on weekends. The GO Transit train service is limited to certain peak times for commuters on weekdays, with 5 southbound trains in the morning and 5 northbound trains in the afternoon/evening. The GO Transit bus offers more frequent service with buses running each day approximately every 60 minutes. It is expected, however, that as the area develops, transit service along Maplevue Drive East and Yonge Street will improve.

An overview of the area transit context is shown in **Figure 6**. A summary of the routes operating within the vicinity of the site, including transit lines, service frequencies and a brief description of each route, are provided in **Table 3**.

TABLE 3 TRANSIT SERVICES: BUS AND TRAIN SERVICES

Transit Service	Service Line	Headway	Closest Stop Location	Description
Barrie Transit	4A – East Bayfield	1 hr	Barrie South GO Station 700m 7 minute walk	The 4A bus has 42 stops departing from Georgian Mall and ending in Barrie South GO station. The bus route makes a stop at the Allandale GO station and the Barrie Transit Terminal. The route operates at approximately once hour, from 6am to 11pm.
	3B - Painswick	30 mn – 1hr	Yonge St / Mapleview Drive E 700m 7 minute walk	The 3B Bus has 43 stops departing from Barrie Transit Terminal and ending in Barrie South GO station. The route operates at approximately once hour, from 6am to 11pm.
GO Bus	68 – Barrie / Newmarket	1 hr	Yonge St / Mapleview Drive E >50m 1 minute walk	The 68 has 40 stops departing from Barrie Transit Terminal and ending at the Aurora GO Bus terminal. The service operates once per hour from 7am to midnight.
GO Train	Barrie Line	1 hr	Barrie South Go Station 700m 7 minute walk	The Barrie Line has ten stops departing from Allendale GO station to Union Station in Toronto. Service to Union station operates once per hour from 6am – 9 am whilst service out of Union station operates approximately once every hour during afternoon peak periods.

3.3.1 Future Transit Network

3.3.1.1 Provincial Initiatives

The Province of Ontario has a planned expansion to the Barrie GO transit line which will improve the transit options for future residents and visitors to the site. The planned service upgrades to the GO Transit system are planned as part of the Metrolinx Regional Express Rail (RER) program, including increased peak hour service along the Barrie GO line. The Barrie GO line expansion will offer a reduction in headways to 15 - 30 minute intervals or better, as well as all day services.

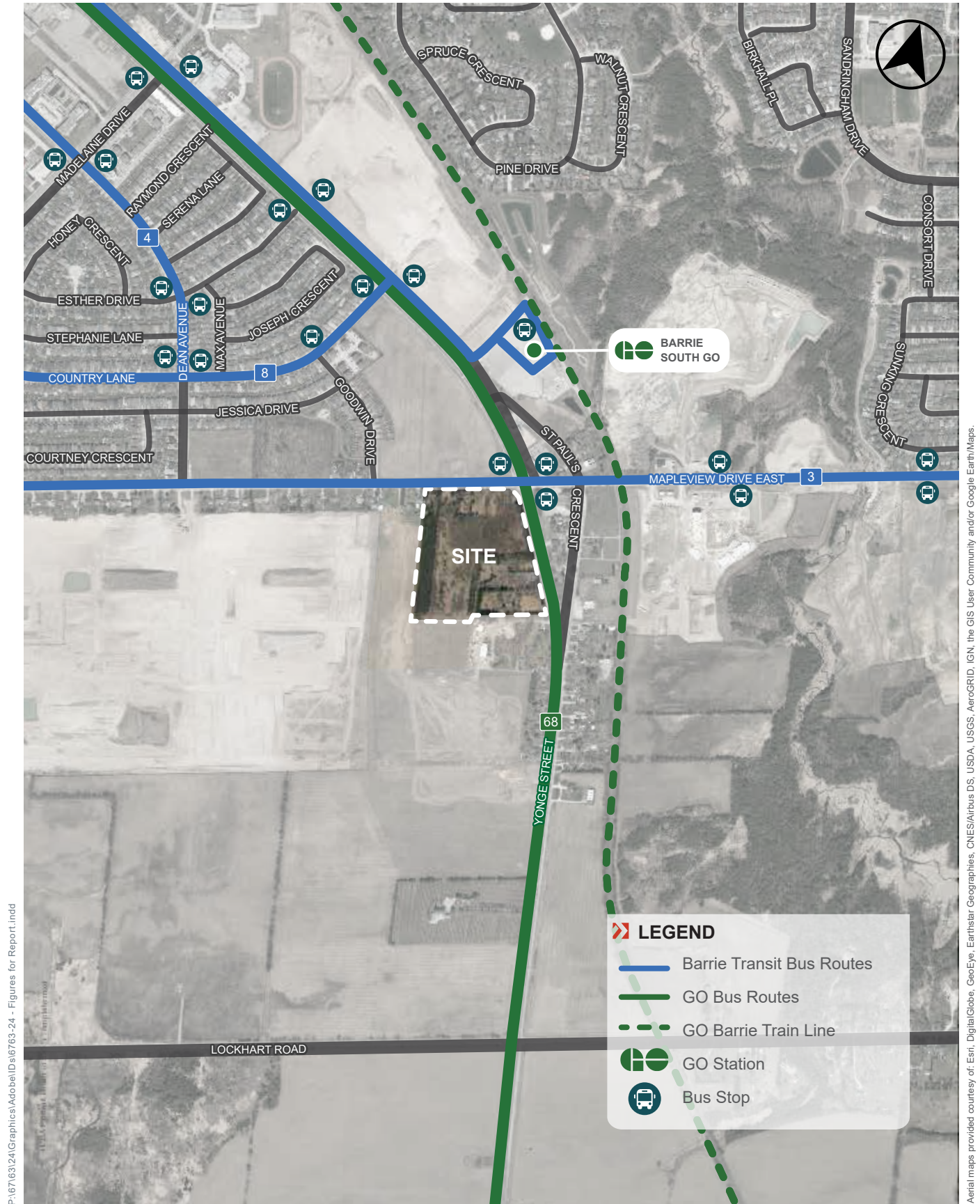


FIGURE 6 EXISTING TRANSIT SERVICES

3.4 AREA BICYCLE NETWORK

3.4.1 Existing Network

The City of Barrie offers some existing bicycle facilities within the vicinity of the site, although many of these existing routes tend to be short. The existing area bicycle network is illustrated in **Figure 7**.

The site is located in close proximity to an existing on-street bicycle lane on both sides of Maplevue Drive, East of Yonge Street. This facility provides an east-west cycling connection between the site and residential developments east of the site.

3.4.2 Planned Future Cycling Network

The City of Barrie has proposed to expand cycling infrastructure throughout the City as a part of their TMP. The new cycling plan will expand the existing bicycle network around the site through new in-boulevard pathways, cycle tracks, cycle tracks and buffered bike lanes.

According to the TMP, the new routes that are likely to have the greatest impact on the site are those proposed along Maplevue Drive East and Yonge Street. The expansion of dedicated cycle on Yonge Street would provide easy access from downtown Barrie to the site. The planned expansion of the Maplevue Drive East in-boulevard pathway would provide site access with residential and commercial developments along the Maplevue Drive corridor. The planned cycling improvements from the new Transportation Master Plan are illustrated in **Figure 7**.

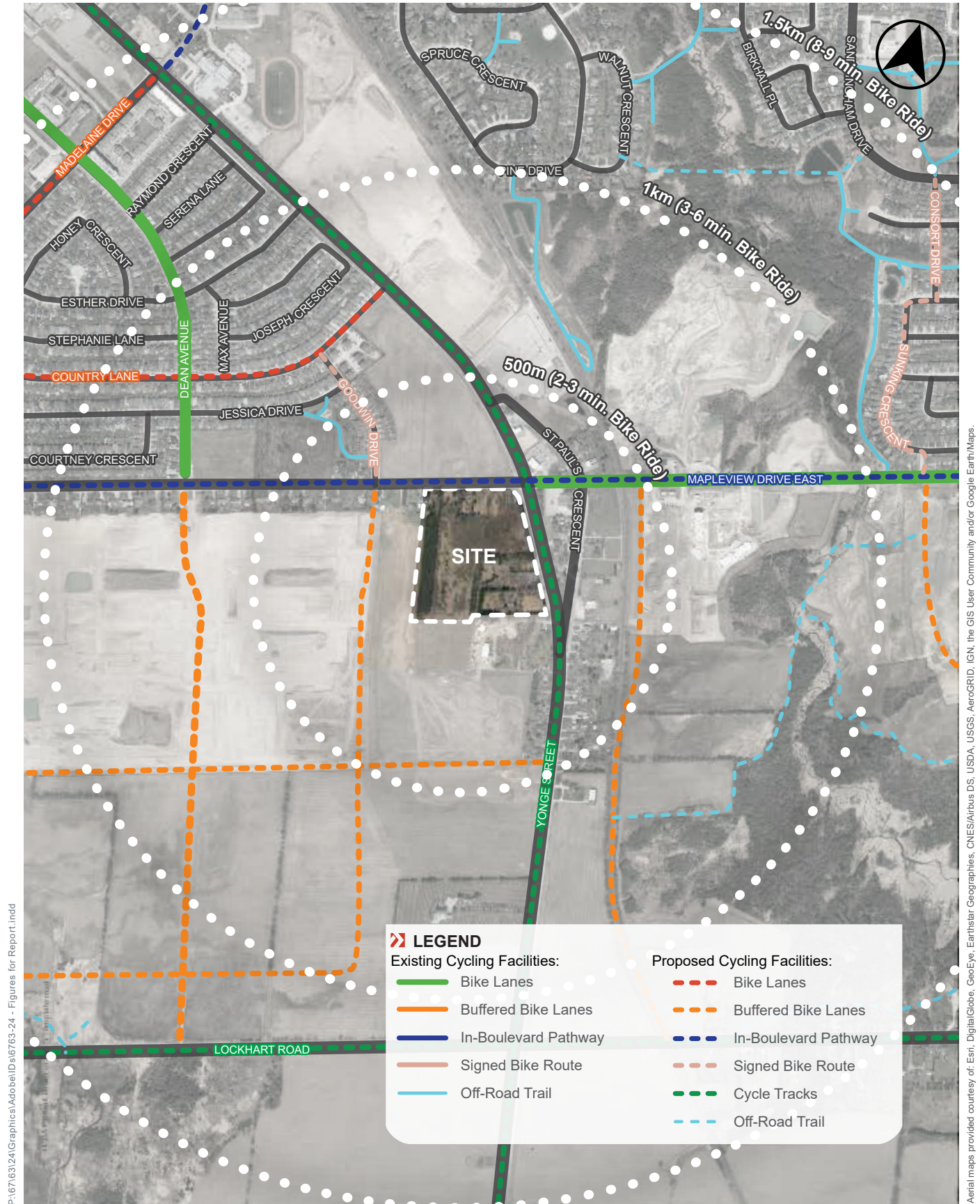


FIGURE 7 EXISTING & PLANNED BICYCLE NETWORK

3.5 AREA PEDESTRIAN CONTEXT

The area within the vicinity of the site is mixed and inconsistent in terms of pedestrian infrastructure. At the signalized intersection of Mapleview Drive East and Yonge Street, there are sidewalks at the corners to enable the pedestrian crosswalks. However, the sidewalks only extend on both sides of Yonge Street north of Mapleview Drive, and on the north side of Mapleview Drive east of Yonge Street. The width of the sidewalks at the aforementioned locations generally range between 1.3 to 1.5 metres.

The area surrounding the site is primarily agricultural to the north, west and south, and residential to the east. The Barrie South GO station is within an 8-minute walk from the edge of the site.

3.5.1 Planned Pedestrian Infrastructure

The City of Barrie has proposed to expand pedestrian infrastructure throughout the City as a part of their TMP through the in-boulevard pathways and multi-use trails proposed to serve both pedestrians and cyclists, and through new sidewalk facilities. As a part of the TMP, sidewalks are proposed on both sides of Mapleview Drive East and Yonge Street. For the local roads, sidewalks are proposed to be added to one side of St Paul's Crescent and sidewalks are proposed on both sides of Street 'V'.

4.0 TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management (TDM) strategies encompass a range of policies, tools, and programs designed to promote and facilitate the use of walking, cycling, public transit, telecommuting and carpooling as an alternative to single passenger vehicle travel. TDM strategies aim to reduce vehicle travel with the primary objective of:

- reducing demand on road infrastructure, thereby minimizing road and parking capital expenditures;
- increasing travel efficiency;
- reducing climate change emissions;
- improving air quality; and,
- improving overall health.

TDM Plans for new development consist of various “hard” (infrastructure based) strategies (such as the provision of infrastructure), and “soft” (program based) strategies that are operational or programmatic in nature which are implemented once a use is occupied.

The site is within close proximity of GO Transit (bus and train), which is accessed at the Barrie South GO Station approximately 700 metres north-east of the site. The site is within walking / cycling distance from 2 local bus routes and cycling routes as well. The proposed TDM plan, which is outlined below, will support and encourage the use of the existing and planned sustainable transportation infrastructure in the vicinity of the site in order to reduce the overall dependence on private automobiles. The proximity to transit and other walking / cycling facilities makes the development site a candidate for a TDM Plan that has the aim of increasing the non-auto mode share of the future development plan. The following section sets out the details of the proposed TDM Plan that will be implemented as part of the development approvals process.

4.1 PROPOSED TDM PLAN

The proposed application is for a Zoning By-law Amendment, Site Plan and Plan of Subdivision. As such a TDM plan has been crafted to tailor to the future retail tenants and visitors that will be created through the plan.

4.1.1 Access to Transit

The improvement of existing transit waiting areas and access to the bus stops is aimed at making the use of transit more attractive and comfortable for transit users. This can help support and encourage transit use.

Proposed Strategy:

The City of Barrie will be making improvements to the existing signalized intersection at Yonge Street and Mapleview Drive East. This provides an opportunity to improve the quality of the waiting area around the bus stops on Mapleview Drive East and Yonge Street.

Through the proposed development and the planned expansion of the intersection, new transit stop shelters are recommended to be provided by the City of Barrie. The proposed development will complement access to the transit stops through the following site measures:

- provision of internal walking routes through the parking lots to connect to the corner of Yonge / Mapleview

- provision of a landscaped pedestrian area near the corner of Yonge / Mapleview to improve the quality of pedestrian environment near the corner as people wait for buses.

Additionally, the proposed development will include bicycle parking adjacent to the food store in order to accommodate any residents, employees or visitors that choose to cycle to site from other surrounding areas in order to be in close proximity to the transit services. This extends the reach of the transit service by making the use of transit feasible for more riders.

4.1.2 Pedestrian & Cycling Infrastructure

The provision of cycling and pedestrian connections is a TDM Strategy aimed at making neighbourhoods more walkable and safe for pedestrians. Pedestrian infrastructure can also help improve connections to other transportation infrastructure such as bus routes, cycling facilities (e.g. bike lanes) or other community amenities (e.g. schools, community centres, etc.)

Proposed Strategy:

The development includes provisions of sidewalks along the East-West and North-South private driveways. Sidewalks will also be provided on both sides of the Street 'V' extension, as well as sidewalks on the west side of Yonge Street. These components of the development will accommodate pedestrian circulation and support walking to and from the proposed uses and the existing and proposed surrounding neighbourhood.

The sidewalks will be designed and provided in accordance with the municipal standard and will connect to the proposed sidewalks within the public right-of-way.

4.1.3 Distribution of Pre-loaded Ride Cards

As part of the City of Barrie's 2019 Transportation Master Plan (TMP), transit mode share targets that have been set for 2041 translate to an increase from 9,625 to 76,900 daily transit ridership. In order to achieve this target, the TMP outlines various transit initiatives that target specific uses and areas. These strategies include:

- market and working with large employers;
- new developments reducing parking and/or charging for employee parking; and
- new developments providing transit passes as part of their TDM package.

According to the TMP's Appendix A – Transit Technical Memorandum, Barrie Transit should work with large employers to provide transit incentives to employees such as discounted transit passes in order to encourage commuter transit trips during peak periods.

Proposed Strategy:

To encourage new retail tenants to try transit and meet the City's mode split targets, the developer is proposing to provide a pre-loaded Presto Transit card with an equivalent value of a monthly pass (value of \$88), at the time of occupancy for each commercial unit.

4.2 IMPLEMENTATION PLAN / TDM CHECKLIST

This section provides a summary for how each proposed TDM Strategy will be implemented, outlining who is responsible for each component of the strategy. The TDM Implementation Plan also includes an estimate of the cost of each TDM strategy that is not otherwise included as part of the development costs. As detailed above, the main elements of the TDM Strategy are:

- the improvement of the transit service along Yonge Street at the intersection of Yonge Street and Mapleview Drive East;
- the provision of sidewalks and pedestrian connection within and around the site to improve walkability; and
- the provision of a pre-loaded adult monthly pass to new tenants to encourage transit use

The proposed implementation plan / TDM Checklist is attached to this TDM Plan as **Table 1**.

TABLE 4 PROPOSED TDM IMPLEMENTATION PLAN / TDM CHECKLIST

Proposed TDM Strategy	Responsibility	Cost Estimate	Approx. Timing
Improvement to Transit			
Bus shelters and bicycle parking will be provided at the corner of Mapleview Drive East and Yonge Street to enhance the waiting area and access to the new bus stops at this intersection in order to make transit use more attractive and accessible.	Developer coordination with Barrie Transit	N/A ¹	Construction
New transit routes connecting the site with downtown Barrie	Barrie Transit	N/A	N/A
Pedestrian & Cycling Infrastructure			
Provide internal sidewalks within the site	Developer	N/A ¹	Construction
Provide external sidewalks and cycling amenities in area street network	City of Barrie	N/A	2023 ²
Pre-loaded and Discounted Ride Cards			
The developer will provide a monthly adult transit pass for the first full month of occupancy for retail tenants.	Developer	~\$650	At Occupancy

Notes:

1. Alterations to the bus stop / intersection and sidewalks to be constructed as part of the site construction budget.
2. Outlined completion by the City of Barrie TMP

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.

5.4 ANALYSIS ASSUMPTIONS

5.4.1 Intersection Capacity Analysis

Synchro Version 11 and the Highway Capacity Manual 2000 (HCM 2000) methodology were used to analyze the study area intersections and site access points. The City of Barrie's Transportation Impact Study guidelines (dated December 1, 2021) were followed for this analysis.

For the capacity analysis undertaken herein, the volume-to-capacity ratio (v/c) has been utilized as an indicator of the capacity utilization for the key movements in the intersection. A v/c of 1.00 indicates that a traffic movement through an intersection is operating at or near-maximum capacity. Another performance metric assessed in this study is the Level of Service (LOS). The LOS characterizes operational conditions for key movements in terms of average delay experienced by vehicles attempting to complete a manoeuvre through the intersection. LOS 'A' represents a good level of service with short delays, while LOS 'F' represents a poor level of service with extended delays. For signalized intersection analyses, both v/c and LOS are reported, whereas LOS and control delay (in seconds) is reported for unsignalized intersections.

5.4.2 Signal Timings

5.4.2.1 Existing Signal Timings

Existing signal timings were obtained for all of the signalized intersections within the study area from the City of Barrie. Existing signal timing data are included in **APPENDIX D**. The weekday morning and afternoon plans were used for the morning and afternoon peak hours, respectively, where provided. The free plans were used for the Saturday peak hour.

5.4.3 Peak Hour Factor

Peak hour factors (PHF) were calculated based on existing traffic volume data extracted from the traffic counts utilized in this study. An average PHF for the total volumes travelling through the intersection were adopted and applied to all movements. As the Yonge Street / Mapleview Drive East intersection is constrained in the afternoon peak hour under future conditions, a higher PHF of 0.99 was adopted to represent the 'peak spreading' effect at the intersection.

5.4.4 Lane Widths

Lane widths of 3.7m for through lanes and 3.5m for turn lanes were adopted. These values were deemed appropriate, as they are comparable to the typical lane widths for this context.

5.4.5 Heavy Vehicle Percentages

Heavy and vehicle percentages incorporated into the analysis were based upon information provided in the existing intersection turning movement counts.

5.4.6 Conflicting Pedestrian Movements

Pedestrian movements that conflict with right and left turns at the intersections that were included in the study were obtained from the existing intersection turning movement counts.

5.5 EXISTING TRAFFIC VOLUMES

Existing traffic volumes for vehicles, cyclists and pedestrians were established for the weekday morning, afternoon, and Saturday peak hour periods on the area street network based upon intersection traffic count information collected by Spectrum Traffic Data Inc. on behalf of BA Group.

The counted peak period is 7:00 to 9:00 am and 4:00 to 6:00 pm on weekdays and 12:00 to 3:00 pm on Saturdays.

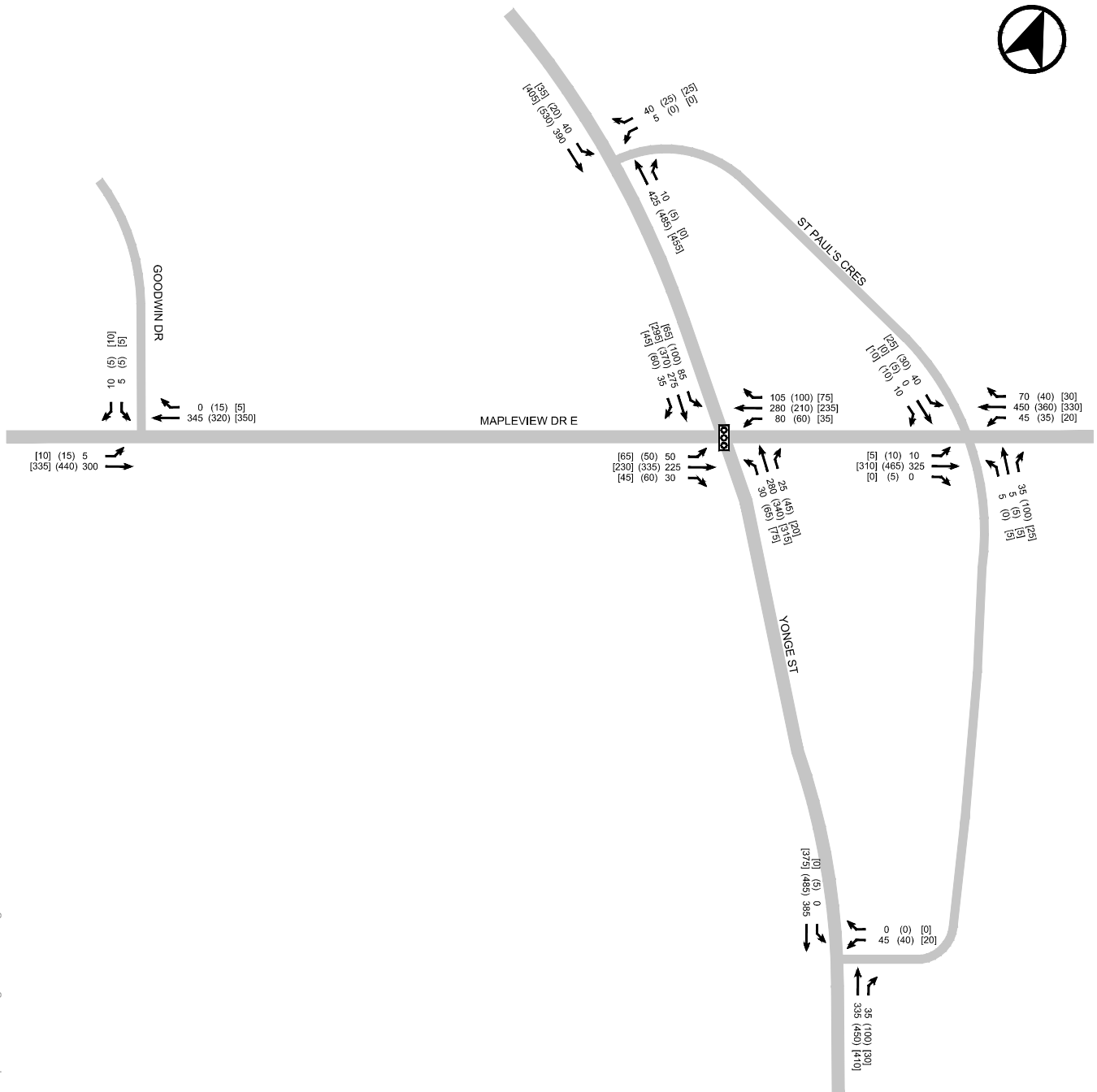
A summary of the turning movement count dates and sources is provided in **Table 5**. Existing traffic counts used as a basis for this analysis are attached in **APPENDIX E**.

TABLE 5 TURNING MOVEMENT COUNT SUMMARY

Intersection	Count Date	Source
Yonge Street / Mapleview Drive East	Thursday, February 10, 2022 Saturday, February 12, 2022	Spectrum Traffic Data Inc.
Goodwin Drive / Mapleview Drive East		
St Paul's Crescent / Mapleview Drive East		
St Paul's Crescent North / Yonge Street		
St Paul's Crescent South / Yonge Street		

The existing turning movement counts were reviewed in detail to ensure general consistency in the traffic volumes on roadways between intersections. Where necessary, minor volume adjustments were made to balance traffic volumes between intersections to provide a balanced and representative traffic volume base for the purposes of the traffic operations analyses undertaken as part of this study.

The adopted baseline existing area traffic volumes for the weekday morning and afternoon peak hours are illustrated in **Figure 8**.



00 AM Peak Hour

(00) PM Peak Hour

[00] SAT Peak Hour

 Existing Traffic Signal

FIGURE 8 BASELINE EXISTING TRAFFIC VOLUMES

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**.

Date Plotted: April 8, 2022 Filename: P:\67\63\24\Graphics\CAD\Fig09-00-FB 2026.dwg

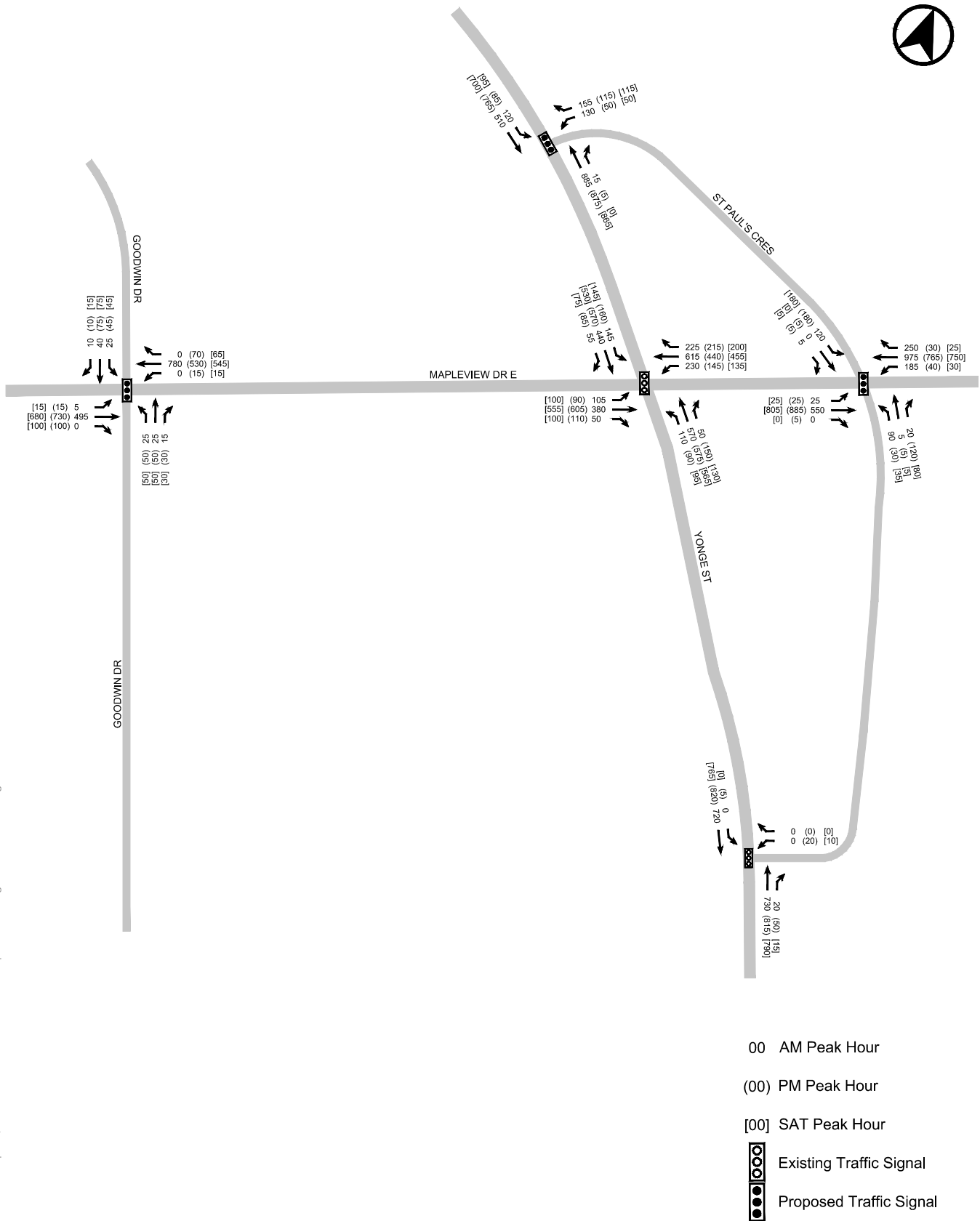


FIGURE 9 FUTURE BACKGROUND 2026 TRAFFIC VOLUMES

Date Plotted: April 8, 2022 Filename: P:\67\63\24\Graphics\CAD\Fig10-00-FB 2031.dwg



00 AM Peak Hour

(00) PM Peak Hour

[00] SAT Peak Hour



Existing Traffic Signal

Proposed Traffic Signal

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**.

Date Plotted: April 12, 2022 Filename: P:\67\63\24\Graphics\CAD\Fig11-00-ST.dwg

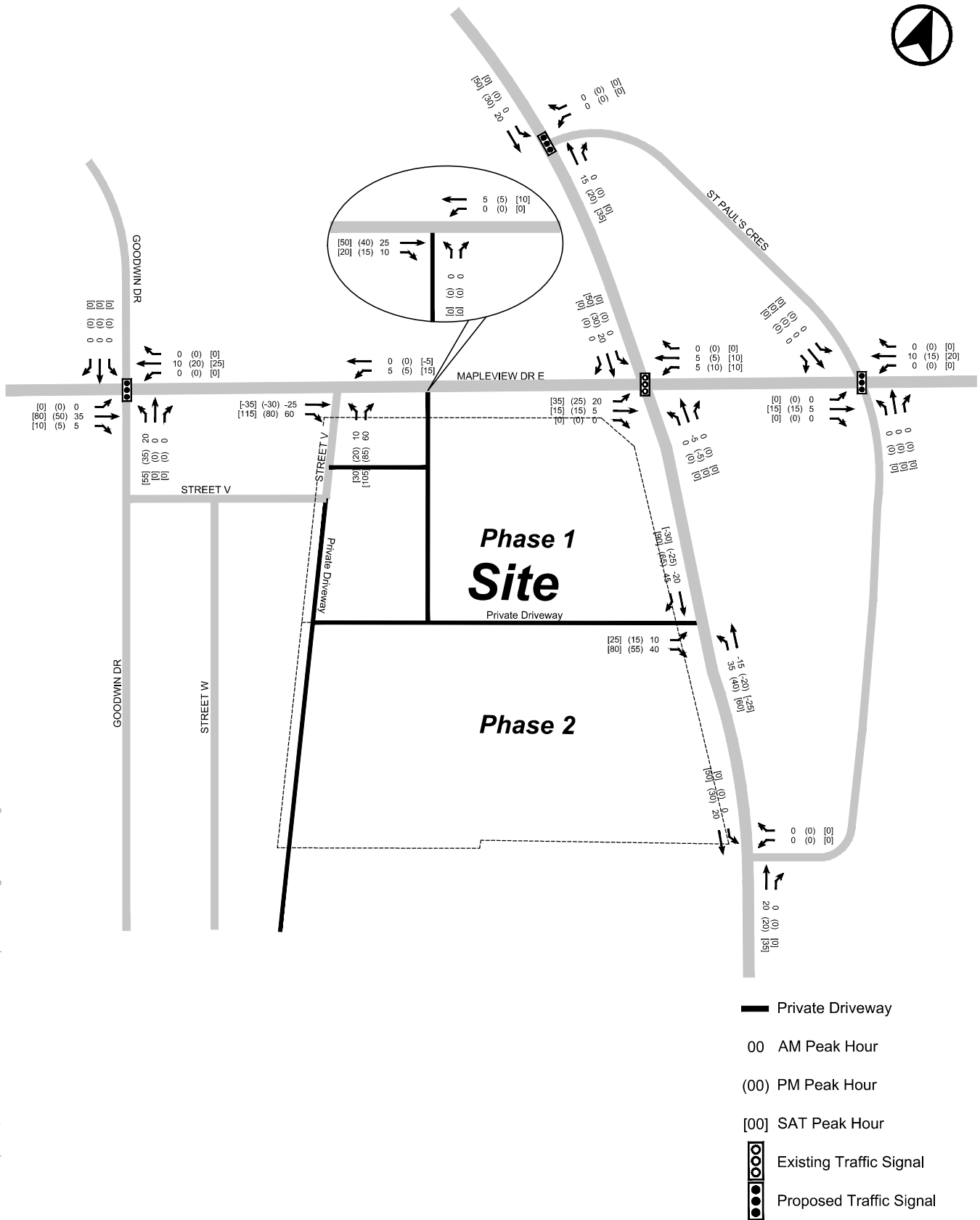


FIGURE 11 NEW SITE TRAFFIC VOLUMES

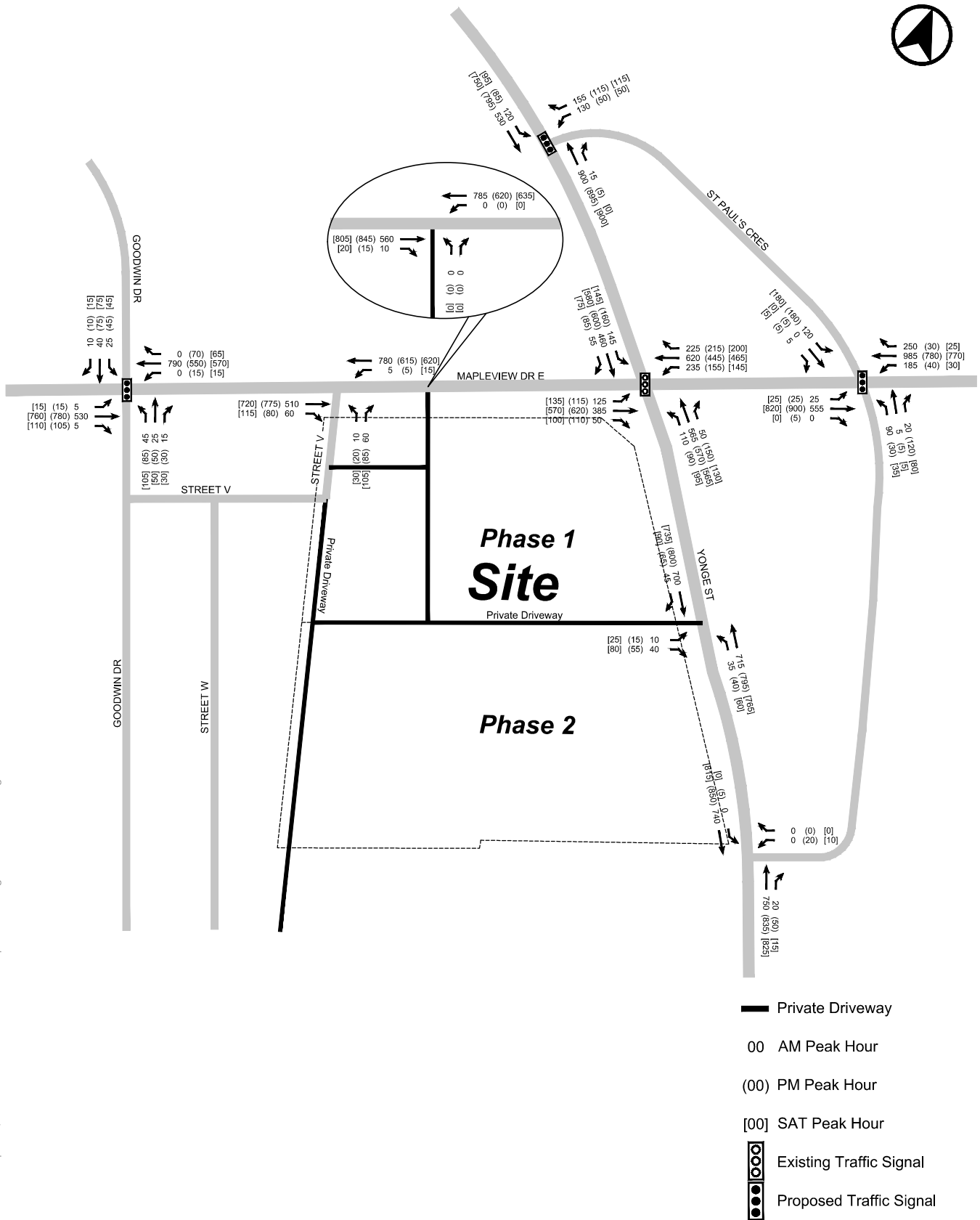


FIGURE 12 FUTURE TOTAL 2026 TRAFFIC VOLUMES

Date Plotted: April 12, 2022 Filename: P:\67\63\24\Graphics\CAD\Fig13-00-FT 2031.dwg

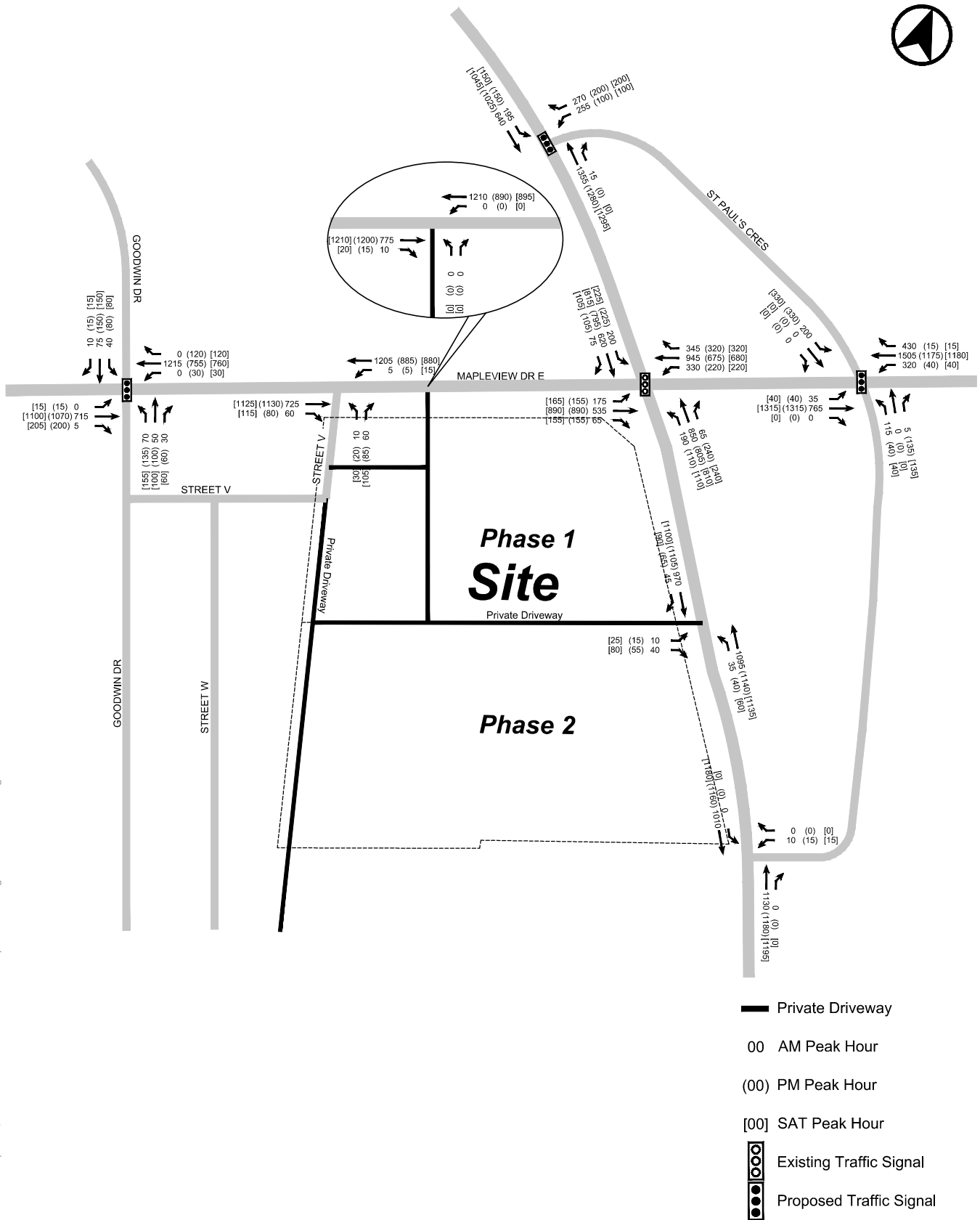


FIGURE 13 FUTURE TOTAL 2031 TRAFFIC VOLUMES

6.0 SYNCHRO CAPACITY ANALYSIS REVIEW

Traffic operations analyses have been undertaken at the area intersections using capacity analysis methodology as outlined in **Section 5**. Detailed analysis worksheets are attached in **APPENDIX G**.

6.1 SIGNALIZED INTERSECTIONS ANALYSIS

Traffic operations analysis results for the area signalized intersections for the existing, future background and future total conditions are reviewed in the following sections. Signals have been added to multiple intersections based on the Hewitt TIS future lane configurations and traffic control for 2031. A summary of Synchro capacity analysis results follows the discussion below in **Table 8**.

6.1.1 Yonge Street / Mapleview Drive East

The intersection of Yonge Street / Mapleview Drive East operates well under existing conditions. The existing cycle length for the intersection is 110 seconds and the maximum overall v/c ratio is 0.52.

Under future conditions, signal timing splits for all signalized intersections have been optimized in all scenarios to ensure smooth traffic operations within the study area. For the 2026 horizon year, intersections can comfortably accommodate forecasted volumes with the existing 110 second cycle length. The maximum overall v/c ratio for the 2026 horizon year is 0.58.

For the 2031 horizon year, the cycle length of all area intersections was raised from 110 seconds to 120 seconds during the peak hour periods, to accommodate a large volume of additional network traffic from the surrounding lands. In 2031, the intersection will operate with a maximum overall v/c ratio of 0.93 and can accommodate both area and forecasted site traffic.

6.1.2 Other Area Signalized Intersections

Other signalized intersections within the study area, under future conditions, include; Mapleview Drive East / Goodwin Drive, Mapleview Drive East / St Paul's Crescent, and Yonge Street / St Paul's Crescent North. These intersections are shown to be signalized by the Hewitt TIS and have been adopted as such for this future analysis.

Under future conditions, during the 2026 horizon year, intersections can comfortably accommodate forecasted volumes with a 110 second cycle length. The maximum overall v/c ratio for the 2026 horizon year is 0.56 at the intersection of Mapleview Drive East / St Paul's Crescent.

For the 2031 horizon year, the cycle length of all area intersections was raised from 110 seconds to 120 seconds during peak hour periods, to accommodate a large volume of additional network traffic from the surrounding lands. In 2031, the signals will operate with a maximum overall v/c ratio of 0.85 and can accommodate both area and forecasted site traffic.

6.1.3 Signalized Intersection Analysis Summary

All signalized intersections can operate within theoretical capacity during both the 2026 and 2031 future horizon years with buildout of the site as planned. The maximum overall v/c ratio is expected to be 0.93 for the intersection of Yonge Street / Mapleview Drive East during the afternoon and Saturday peak hour periods.

A summary of Synchro capacity analysis results is below in **Table 8**.

TABLE 8 SIGNALIZED INTERSECTION ANALYSIS SUMMARY

Lane Group	2022 Existing		2026 Future Background		2026 Future Total		2031 Future Background		2031 Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
Yonge Street & Mapleview Drive E										
EBL	0.18 (0.14) [0.20]	C (C) [C]	0.44 (0.28) [0.32]	C (C) [C]	0.52 (0.35) [0.42]	C (C) [C]	0.77 (0.43) [0.43]	D (C) [C]	0.85 (0.51) [0.54]	E (C) [C]
EBTR	Future only.		0.60 (0.78) [0.73]	D (D) [D]	0.60 (0.81) [0.76]	D (D) [D]	0.74 (0.95) [0.96]	D (E) [E]	0.74 (0.96) [0.98]	D (E) [E]
EBT	0.69 (0.79) [0.59]	D (D) [C]	Existing only.							
EBR	0.02 (0.04) [0.03]	C (C) [C]								
WBL	0.32 (0.30) [0.14]	C (C) [C]	0.68 (0.59) [0.59]	C (C) [C]	0.70 (0.65) [0.65]	C (C) [C]	0.89 (0.86) [0.88]	D (E) [E]	0.91 (0.90) [0.91]	D (E) [E]
WBT	0.41 (0.26) [0.36]	C (C) [C]	0.71 (0.41) [0.49]	D (C) [C]	0.71 (0.44) [0.55]	D (C) [D]	0.85 (0.57) [0.58]	D (C) [C]	0.86 (0.58) [0.60]	D (C) [D]
WBR	0.08 (0.07) [0.05]	C (C) [C]	0.25 (0.14) [0.13]	C (C) [C]	0.26 (0.14) [0.13]	C (C) [C]	0.50 (0.34) [0.35]	C (C) [C]	0.51 (0.34) [0.36]	C (C) [C]
NBL	0.06 (0.15) [0.13]	B (B) [B]	0.25 (0.25) [0.24]	B (B) [B]	0.26 (0.26) [0.25]	B (B) [B]	0.59 (0.43) [0.42]	C (C) [C]	0.61 (0.45) [0.45]	C (C) [C]
NBT	0.36 (0.45) [0.37]	B (C) [B]	0.41 (0.41) [0.39]	C (C) [C]	0.41 (0.41) [0.39]	C (C) [C]	0.70 (0.66) [0.65]	D (C) [D]	0.70 (0.66) [0.65]	D (C) [D]
NBR	0.02 (0.03) [0.01]	B (B) [B]	0.03 (0.10) [0.08]	B (C) [B]	0.03 (0.10) [0.08]	B (C) [B]	0.04 (0.17) [0.16]	C (C) [C]	0.04 (0.16) [0.16]	C (C) [C]
SBL	0.17 (0.23) [0.12]	B (B) [B]	0.37 (0.43) [0.37]	B (B) [B]	0.37 (0.42) [0.37]	B (B) [B]	0.81 (0.89) [0.89]	D (E) [E]	0.81 (0.89) [0.89]	D (D) [E]
SBT	Future only.		0.31 (0.39) [0.35]	C (C) [C]	0.33 (0.41) [0.38]	C (C) [C]	0.48 (0.61) [0.60]	C (C) [C]	0.50 (0.63) [0.64]	C (C) [C]
SBR			0.04 (0.06) [0.05]	B (B) [B]	0.04 (0.06) [0.05]	B (B) [B]	0.05 (0.08) [0.07]	C (C) [C]	0.05 (0.08) [0.07]	C (C) [C]
SBTR	0.20 (0.30) [0.21]	B (B) [B]	Existing only.							
Overall	0.42 (0.52) [0.40]	C (C) [C]	0.55 (0.57) [0.51]	C (C) [C]	0.55 (0.58) [0.53]	C (C) [C]	0.88 (0.92) [0.92]	D (D) [D]	0.89 (0.93) [0.93]	D (D) [D]

Table continued on following page.

Lane Group	2022 Existing		2026 Future Background		2026 Future Total		2031 Future Background		2031 Future Total		
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	
Mapleview Drive E & Goodwin Drive											
EBL	Not signalized in existing conditions.		0.04 (0.08) [0.09]	B (B) [B]	0.04 (0.07) [0.08]	B (B) [B]	-- (0.08) [0.08]	-- (B) [B]	-- (0.08) [0.08]	-- (B) [B]	
EBTR			0.43 (0.69) [0.68]	B (B) [C]	0.46 (0.70) [0.70]	B (B) [C]	0.44 (0.77) [0.77]	B (C) [C]	0.46 (0.78) [0.77]	B (C) [C]	
WBL			-- (0.13) [0.13]	-- (B) [B]	-- (0.14) [0.14]	-- (B) [B]	-- (0.39) [0.36]	-- (B) [B]	-- (0.41) [0.39]	-- (B) [B]	
WBTR			0.65 (0.51) [0.53]	B (B) [B]	0.65 (0.50) [0.51]	B (B) [B]	0.74 (0.55) [0.54]	B (B) [B]	0.74 (0.55) [0.52]	B (B) [B]	
NBL			0.04 (0.08) [0.07]	A (A) [A]	0.08 (0.14) [0.16]	A (A) [A]	0.11 (0.21) [0.19]	B (B) [B]	0.16 (0.30) [0.32]	B (C) [C]	
NBTR			0.04 (0.08) [0.07]	A (A) [A]	0.04 (0.08) [0.07]	A (A) [A]	0.11 (0.21) [0.19]	B (B) [B]	0.11 (0.21) [0.20]	B (B) [B]	
SBL			0.04 (0.07) [0.07]	A (A) [A]	0.04 (0.08) [0.07]	A (A) [A]	0.09 (0.17) [0.16]	B (B) [B]	0.09 (0.18) [0.17]	B (B) [B]	
SBTR			0.06 (0.09) [0.09]	A (A) [A]	0.06 (0.10) [0.09]	A (A) [A]	0.13 (0.22) [0.20]	B (B) [B]	0.13 (0.23) [0.22]	B (B) [B]	
Overall				0.32 (0.34) [0.31]	B (B) [B]	0.34 (0.38) [0.38]	B (B) [B]	0.48 (0.51) [0.49]	B (B) [B]	0.49 (0.56) [0.56]	B (B) [B]
St Paul's Crescent & Mapleview Drive E											
EBL	Not signalized in existing conditions.		0.26 (0.22) [0.22]	B (C) [C]	0.26 (0.22) [0.23]	B (C) [C]	0.76 (0.51) [0.49]	E (C) [C]	0.76 (0.52) [0.52]	E (C) [C]	
EBTR			0.32 (0.75) [0.72]	A (C) [C]	0.32 (0.75) [0.73]	A (C) [C]	0.34 (0.82) [0.83]	A (C) [C]	0.34 (0.83) [0.84]	A (C) [C]	
WBL			0.48 (0.47) [0.29]	B (C) [C]	0.48 (0.46) [0.30]	B (C) [C]	0.83 (0.65) [0.65]	C (D) [D]	0.84 (0.65) [0.65]	C (D) [D]	
WBTR			0.69 (0.68) [0.68]	B (C) [C]	0.69 (0.68) [0.69]	B (C) [C]	0.85 (0.76) [0.74]	B (C) [C]	0.86 (0.76) [0.75]	B (C) [C]	
NBTLR			0.31 (0.16) [0.11]	C (B) [B]	0.31 (0.17) [0.11]	C (B) [B]	0.37 (0.28) [0.28]	D (C) [C]	0.37 (0.28) [0.28]	D (C) [C]	
SBTLR			0.31 (0.32) [0.30]	C (B) [B]	0.32 (0.33) [0.30]	C (B) [B]	0.83 (0.71) [0.72]	E (C) [D]	0.83 (0.71) [0.72]	E (D) [D]	
Overall				0.56 (0.50) [0.46]	B (C) [C]	0.56 (0.50) [0.47]	B (C) [C]	0.85 (0.77) [0.78]	B (C) [C]	0.85 (0.77) [0.78]	B (C) [C]

Table continued on following page.

Lane Group	2022 Existing		2026 Future Background		2026 Future Total		2031 Future Background		2031 Future Total	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
Yonge Street & St Paul's Crescent										
WBL	Not signalized in existing conditions.		0.66 (0.45) [0.36]	D (D) [D]	0.66 (0.45) [0.36]	D (D) [D]	0.87 (0.68) [0.48]	E (E) [D]	0.87 (0.68) [0.47]	E (E) [D]
WBR			0.11 (0.08) [0.08]	D (D) [D]	0.11 (0.08) [0.08]	D (D) [D]	0.28 (0.65) [0.68]	D (D) [E]	0.28 (0.66) [0.69]	D (D) [E]
NBTR			0.44 (0.33) [0.32]	A (A) [A]	0.45 (0.34) [0.33]	A (A) [A]	0.78 (0.49) [0.48]	C (A) [A]	0.79 (0.49) [0.50]	C (A) [A]
SBL			0.30 (0.21) [0.23]	A (A) [A]	0.31 (0.22) [0.24]	A (A) [A]	0.74 (0.64) [0.65]	D (B) [B]	0.75 (0.66) [0.68]	D (B) [C]
SBT			0.21 (0.29) [0.26]	A (A) [A]	0.22 (0.30) [0.28]	A (A) [A]	0.28 (0.38) [0.38]	A (A) [A]	0.29 (0.40) [0.40]	A (A) [A]
Overall			0.47 (0.35) [0.32]	B (A) [A]	0.47 (0.35) [0.33]	B (A) [A]	0.80 (0.65) [0.65]	C (B) [B]	0.80 (0.66) [0.68]	C (B) [B]

Notes:

1. 00 (00) [00] = weekday morning peak (weekday afternoon peak) [Saturday midday peak].

6.2 UNSIGNALIZED INTERSECTION ANALYSIS

Traffic operations analysis results for the area signalized intersections for the existing, future background and future total conditions are reviewed in the following section.

Under existing conditions, unsignalized intersections generally operate well with LOS ratings remaining mostly below “C”. The exception is the intersection at Mapleview Drive E / St Paul's Crescent, which shows the southbound movement operating with a LOS E in the afternoon peak hour.

Multiple area intersections are signalized in future (per the Hewitt TIS) and therefore remaining intersections operate acceptably under 2026 future background and future total conditions. However, the intersection at Yonge Street / St Paul's Crescent South begins to see increased delay times for westbound left-turning vehicles, with a LOS E rating reported during the afternoon peak hour.

It is worth noting that under the 2031 future background scenario, Yonge Street / St Paul's Crescent South faces significant delay during peak hour traffic at LOS F. Notably, when compared with the 2031 future total scenario, development of the site as planned results in only a minor increase to the reported delay value. As a result of increased delay at for this movement in future, it is likely that drivers will avoid the congested movement by instead heading northbound on St. Paul's Crescent, turning left onto Mapleview Drive East and then making a westbound left-turn onto Yonge Street to head south. This would result in acceptable delays for the remaining vehicles making a westbound left at Yonge St / St Paul's Crescent South in future.

Other future unsignalized intersections and site driveways will operate well, with maximum LOS ratings of “E” at any given time, showing delays remain below 40 seconds in the 2031 horizon year.

Results of the unsignalized intersection analysis are summarized below in **Table 9**.

TABLE 9 UNSIGNALIZED INTERSECTION ANALYSIS SUMMARY

Lane Group	2022 Existing		2026 Future Background		2026 Future Total		2031 Future Background		2031 Future Total	
	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
Mapleview Drive E & Goodwin Drive										
EBTL	A (A) [A]	0.2 (0.4) [0.3]	Signalized in future.							
SBLR	B (B) [B]	11.9 (13.3) [11.8]								
Site Driveway (West) & Mapleview Drive E										
WBTL	Future total only.				A (A) [A]	0.2 (0.2) [0.8]	Future total only.	A (A) [A]	0.2 (0.2) [0.8]	
NBRL					A (B) [B]	9.4 (10.5) [10.8]		A (B) [B]	9.8 (11.9) [12.7]	
St Pauls Crescent & Mapleview Drive E										
EBTLR	A (A) [A]	0.4 (0.3) [0.2]	Signalized in future.							
WBTLR	A (A) [A]	1.1 (1.1) [0.6]								
NBTLR	B (B) [B]	13.4 (12.9) [12.0]								
SBTLR	D (E) [C]	29.2 (36.3) [16.5]								
Yonge Street & St Paul's Crescent North										
WBLR	B (B) [B]	11.4 (10.2) [10.0]	Signalized in future.							
SBL	A (A) [A]	8.5 (8.6) [8.6]								
Yonge Street & Site Driveway (East)										
EBLR	Future total only.				B (B) [C]	13.2 (14.8) [16.1]	Future total only.	C (C) [E]	19.1 (24.9) [36.5]	
NBL					A (A) [A]	9.3 (9.7) [9.7]		B (B) [B]	10.4 (11.2) [11.6]	
Yonge Street & St Paul's Crescent South										
WBLR	C (C) [C]	16.7 (22.6) [16.7]	A (D) [D]	0.0 (34.5) [28.7]	A (E) [D]	0.0 (36.6) [31.3]	F (F) [F]	57.7 (74.6) [75.0]	F (F) [F]	60.8 (79.9) [84.7]

Notes:

- 00 (00) [00] = weekday morning (weekday afternoon) [Saturday midday].
- Site driveway (EBR in only) is not shown due to no delay reported in any scenario.

6.3 SITE DRIVEWAY SIGNAL JUSTIFICATION ANALYSIS

The requirement to signalize site driveways onto both Yonge Street and Mapleview Drive East has been evaluated for the 2031 future total horizon, in accordance with the Ontario Traffic Manual (OTM) Book 12. Justification 7 was consulted, given 8-hour volumes are not available for future conditions.

As an alternative to utilizing 8-hour volumes, Average Hourly Volumes (AHV) were calculated by taking the sum of AM and PM peak hours, then dividing by 4 for weekday volumes and by 2 for weekend volumes. Further details are discussed below and **APPENDIX H** contains warrant details.

Notably, for “T” intersections, threshold values should be increased by 50% and therefore the ‘Entire %’ column should equal or exceed 150% to justify a signal. A further 50% should also be applied for future intersections.

6.3.1 Site Driveway (West) / Mapleview Drive East

The requirement for signalization of the Site Driveway (West) / Mapleview Drive East (connecting southwards to Street ‘V’) has been assessed. Based on the analysis, the Site Driveway (West) / Mapleview Drive East intersection signal warrant justification was not met and a signal is not required for the driveway.

Table 10 contains a summary of the weekday and weekend signal warrant analysis.

TABLE 10 JUSTIFICATION 7 FREE FLOW SIGNAL WARRANT ANALYSIS – MAPLEVIEW DRIVE

Justification	Description	Minimum Requirement 2 or more lanes ¹		Compliance			Warranted?
				Sectional		Entire %	
		Free Flow	Restr. Flow	Numerical	%		
Weekday Analysis							
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	600	900	1050	175%	36%	NO
	B. Vehicle volume, along minor streets (average hour)	120	170	44	36%		
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	600	900	1006	168%	36%	NO
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	120	170	44	36%		
Weekend Analysis							
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	600	900	1135	189%	56%	NO
	B. Vehicle volume, along minor streets (average hour)	120	170	68	56%		
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	600	900	1068	178%	56%	NO
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	120	170	68	56%		

Notes:

- For “T” intersections, these values should be increased by 50%.
- For traffic signals to be considered, Justification 7 as per Table 21 is used but with a 20% increase over the required volumes for an existing intersection and a 50% increase for a future intersection or roadway.

6.3.2 Site Driveway (East) / Yonge Street

The requirement for signalization of the Site Driveway (East) / Yonge Street has also been assessed. Based on the analysis, the Site Driveway (East) / Yonge Street intersection signal warrant justification was not met and a signal is not required for the driveway.

Table 11 contains a summary of the weekday and weekend signal warrant analysis.

TABLE 11 JUSTIFICATION 7 FREE FLOW SIGNAL WARRANT ANALYSIS – YONGE STREET

Justification	Description	Minimum Requirement 2 or more lanes ¹		Compliance			Warranted?
				Sectional		Entire %	
		Free Flow	Restr. Flow	Numerical	%		
Weekday Analysis							
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	600	900	1154	192%	25%	NO
	B. Vehicle volume, along minor streets (average hour)	120	170	30	25%		
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	600	900	1124	187%	25%	NO
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	120	170	30	25%		
Weekend Analysis							
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	600	900	1245	208%	44%	NO
	B. Vehicle volume, along minor streets (average hour)	120	170	53	44%		
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	600	900	1193	199%	44%	NO
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	120	170	53	44%		

Notes:

1. For "T" intersections, these values should be increased by 50%.
2. For traffic signals to be considered, Justification 7 as per Table 21 is used but with a 20% increase over the required volumes for an existing intersection and a 50% increase for a future intersection or roadway.

7.0 PROPOSED DRIVE-THRU OPERATIONS REVIEW

Building F within the Phase 1 development proposal includes an approximately 500 m² GFA fast-food restaurant with a one-way drive-through loop, which wraps around the parking for the building, located immediately to the north. Restaurant drive through patrons will enter from the north side of the loop, make their order at a microphone enabled station midway, then pick up and pay for their order at another downstream station before exiting from the south side of the loop. The drive through area can accommodate a total of 12 vehicles, including those vehicles that are ordering and paying/picking up their food.

Additional vehicles beyond 12 within the drive through system at the same time will result in potential spillover onto the proposed plaza's internal parking circulation artery which is also a fire route. As such, BA Group has reviewed the operations of the proposed drive through system based upon the estimated traffic demand for the fast-food restaurant as summarized in **Section 5.7.2** to ensure that vehicle queue spillage onto the fire route is minimal and negligible during restaurant operations.

7.1 TRAFFIC DEMAND

Traffic demand at the drive through is estimated based on the site trip generation provided within **Table 6** in **Section 5.7.2**. It should be noted that both fast-food restaurant primary trips and pass-by trips will be reflected within its drive through traffic. Also, the site trip generation includes both drive through patrons and sit in restaurant patrons.

To separate the drive through versus sit in patrons, BA Group has calculated a ratio for drive through relative to total patrons at a similarly located (i.e. suburban) Tim Horton's based on traffic counts on Thursday, May 26, 2011 and Saturday, May 28, 2011 during the weekday morning and afternoon and Saturday peak periods. Based on this review, the proportion of drive through traffic is in the order of 85%, 70% and 70% during the weekday morning and afternoon and Saturday peak hours, respectively.

These ratios were applied to the overall fast-food restaurant traffic generation to estimate the expected drive through traffic demand during the peak hours as summarized in **Table 12**.

TABLE 12 PROPOSED SITE DRIVE THROUGH TRIP GENERATION

	AM Peak Hour			PM Peak Hour			SAT Peak Hour		
	In	Out	2-Way	In	Out	2-Way	In	Out	2-Way
Total Trips	125	120	245	95	85	180	150	145	295
Drive Thru %	--	--	85%	--	--	70%	--	--	70%
Drive Thru	104	104	208	63	63	126	103	103	206

Based on the foregoing, the restaurant is expected to generate in the order of **104**, **63**, and **103** vehicles entering the drive through during the weekday morning and afternoon and Saturday peak hours, respectively.

7.2 OPERATIONS REVIEW METHODOLOGY

BA Group has developed a discrete event simulation approach to model the operations and to observe the performance of the drive through system. The discrete event component defines the chain of operations that the system carries out to complete the drive through activities and the resource dependencies these operations require (i.e the ordering station or the payment/pick-up station).

Arrivals will be generated randomly based on a Poisson distribution with mean equal to the expected drive through inbound demand which is then fed as agents through the model to observe their interaction with the required resources through the chain of processes. Service time distribution at the ordering and payment/pick-up stations was determined empirically by observing the time duration spent by drive through vehicles between their arrival to make an order and leaving the drive through with their order, less their duration spent in queue. The resultant combined service time distribution generally reflects a gamma distribution with average service times of 37, 41 and 55 seconds during the weekday morning and afternoon and Saturday peak hours, respectively.

Using this simulation, vehicle accumulation and their dwell time in the drive through over the peak hours are explicitly tracked and modelled within the system. The queuing in the system will emerge from this interaction during the hour-long simulation. A series of 10 simulation runs was conducted to observe the stochasticity of the drive through system, relative to fluctuations in demand and service times at each service step. Detailed results from each simulation during each analysis peak hour are attached in **Appendix I**.

7.3 OPERATIONS ASSESSMENT

The average resultant system queue and wait time distribution over the 10 simulation runs during the peak hours are summarized in **Table 13**.

TABLE 13 AVERAGE QUEUE AND SYSTEM TIME BY PEAK PERIOD

Period	Simulated Demand	Queue (Vehicle)				System Time (Seconds)			
		Average	85th	95th	Max	Average	85th	95th	Max
AM	108	1.4	2.7	4.3	7.0	48.1	78.2	108.0	144.7
PM	68	0.9	2.0	2.8	5.4	47.6	74.6	104.7	127.6
SAT	108	4.3	7.7	10.1	12.9	151.7	247.4	310.3	364.1

Based on the foregoing, the average queue during the weekday morning and afternoon peak hours is in the order of 1 to 2 vehicles. These vehicles will be in the drive through system for an average of 50 seconds during both the weekday morning and afternoon peak hours.

Queues and system time are generally higher on Saturday due to a combination of higher traffic demand and longer service time. The maximum queue does reach over 12 vehicles but only for approximately 15 seconds over the peak hour. Generally, Saturday operations at the drive through will be in the order of 4 vehicles waiting in the drive through for 2.5 minutes. These anticipated queues can generally be accommodated on-site within the drive through queuing area during all peak hours.

8.0 VEHICULAR PARKING CONSIDERATIONS

8.1 ZONING BY-LAW 054-04 REQUIREMENTS

The site is subject to Innisfil By-law 054-04, which has a minimum parking requirement of 1 space for every 19 m² of gross floor area. This results in a minimum parking requirement of 401 spaces, as summarized in **Table 15**.

TABLE 14 ZONING BY-LAW 054-04 PARKING REQUIREMENTS

Use	Units / Floor Area	Rate (Minimum)	Requirement (Minimum)
Non-Residential			
Retail Stores	7,636 m ²	1 space / 19 m ² GFA	401 spaces
TOTAL			401 spaces

1. Site statistics are based upon the architectural plans from CMV Group Architects, dated March 24, 2022.

However, the requirements of Zoning By-law 054-04 are outdated thus BA Group has referenced City of Barrie By-law 2009-141 to inform the minimum parking requirements for the development.

8.2 ZONING BY-LAW 2009- 141 REQUIREMENTS

As shown in **Table 15**, the City of Barrie Zoning By-law 2009-141 parking standards results in a minimum parking requirement of 254 spaces.

TABLE 15 ZONING BY-LAW 2009-141 PARKING REQUIREMENTS

Use	Units / Floor Area	Rate (Minimum)	Requirement (Minimum)
Non-Residential			
Retail Stores	7,636 m ²	1 space / 30 m ² GFA (min. 2 spaces)	254 spaces
TOTAL			254 spaces

1. Site statistics are based upon the architectural plans from CMV Group Architects, dated March 24, 2022.

8.3 PROPOSED PARKING SUPPLY

The current architectural plans illustrate a total of **445 parking spaces** within a surface parking garage. The proposed parking supply therefore satisfies the Zoning By-law parking requirement.

8.3.1 Barrier Free Parking Supply

Where the car-parking requirement is 100 spaces or more, City of Barrie By-law 2009-141 requires a minimum of 1 space plus 3% of required parking spaces are barrier free. Application of this rate to the proposed car parking provision of 254 spaces results in a requirement for 11 barrier free spaces. The proposed provision of 14 accessible spaces satisfies this requirement.

9.0 BICYCLE PARKING CONSIDERATIONS

9.1 ZONING BY-LAW 2009-141 REQUIREMENTS

The site is identified by the City of Barrie as falling within the “Yonge Street Mixed Use Corridor” following the Hewitt’s Secondary Plan.

Under Zoning By-law 2009-141, only properties within the “Neighbourhood Mixed Use” zone are required to provide bicycle parking. Therefore, the site is not required to provide bicycle parking.

9.2 PROPOSED BICYCLE PARKING SUPPLY

The current architectural plans indicate the provision of 12 bicycle parking spaces located at-grade in close proximity to the food store entrance.

10.0 LOADING CONSIDERATIONS

10.1 ZONING BY-LAW 054-04 REQUIREMENTS

Application of the loading standards outlined in Zoning By-law 054-04 to the proposed development program requires the provision of 3 loading spaces to service the proposed retail development, as summarized in **Table 16**.

TABLE 16 ZONING BY-LAW 054-04 LOADING REQUIREMENTS

Gross Floor Area	Loading Spaces
Over 2,787 sq.m.	3 spaces
TOTAL	3 spaces

1. Site statistics are based upon the architectural plans from CMV Group Architects, dated March 24, 2022.

The loading provisions of Zoning By-law 054-04 require the loading spaces to have minimum width of 3.6m, a minimum length of 12m and a minimum vertical clearance of 4.2m.

10.2 PROPOSED LOADING SUPPLY AND ARRANGEMENTS

The current architectural plans illustrate the provision of 5 loading spaces that will meet the refuse / recycling and delivery needs of the development. The loading spaces are located in the following locations:

- 2 loading spaces are located to serve Building A (food store)
- 1 loading space is located between Building B and Building C
- 1 loading space is located between Building C and Building E; and
- 1 loading space is located between Building E and Building F

Vehicle manoeuvring diagrams illustrating ingress and egress to / from the proposed loading spaces in Building A (food store) are illustrated in **APPENDIX C**.

11.0 SUMMARY AND CONCLUSIONS

BA Group has been retained by Sobeys Canada to provide urban transportation advisory services in relation to the proposed redevelopment of 673 Maplevue Drive East in the City of Barrie (herein referred to as the 'site'). The key findings of the report are summarized below.

Transportation Context

1. The site's surrounding road network provides a relatively high level of access between the site and the rest of the City of Barrie. Its proximity to Highway 400 and Maplevue Drive East Interchange is beneficial for those travelling farther north/south of the site.
2. There are planned improvements for the road network in the vicinity of the site, which include:
 - Road widening of Maplevue Drive East; and
 - Right of way widening of Yonge Street.
3. The site is served by 2 Barrie Transit bus routes, as well as by GO Transit bus and train services within a 10-minute walk from the site.
4. The site's proximity to existing cycling infrastructure is limited to the existing bicycle lanes on Maplevue Drive East (east of Yonge Street), however, planned cycling infrastructure will be provided adjacent to the site along Maplevue Drive East and Yonge Street.

Proposal Overview

5. Phase 1 of the development will provide a commercial development, which includes a total of 7,636 m² of retail space including a 4,024 m² of food store space.
6. The development plan contemplates a total of 3 new access points. The proposed access points include:
 - a proposed East-West driveway connection to Yonge Street
 - a proposed North-South driveway connection to Street 'V' and
 - a proposed channelized right lane connection to Maplevue Drive East.

Transportation Demand Management Plan

7. The preliminary proposed Mobility Plan includes the following TDM strategies as part of the proposed development.
 - provision of new pedestrian infrastructure (i.e. sidewalks along the new street network) to make the neighbourhood more walkable and safe for pedestrians
 - improvement to transit service and infrastructure along Yonge Street and Maplevue Drive East; and
 - provision of pre-loaded Ride Cards to new tenants.

Vehicular Traffic Volumes Forecast

8. Traffic volume 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.
9. 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.
10. Existing traffic volumes were established for the weekday morning, afternoon, and Saturday peak hour periods on the area street network based upon intersection traffic count information collected by Spectrum Traffic Data on behalf of BA Group.
11. 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”).
12. Given that the Hewitt TIS did not include all intersections within the study area into its analysis, volumes for missing intersections (primarily Yonge Street / Maplevue 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. Volumes were adjusted and balanced to ensure future background volumes were sensible given the lack of detailed information available.
13. 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. It was conservatively assumed that the site does not generate any traffic under future background conditions for this analysis.
14. 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). Pass-by trips were also considered based on the ITE Trip Generation Handbook, 3rd Edition.
15. 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.

16. Site traffic has been assigned onto the area road network based on the 2016 Transportation for Tomorrow Survey (TTS) and existing road network traffic patterns and connectivity. Assignment has been calibrated with the knowledge that areas south of the site are under-represented under existing conditions and will be more active in future.

Vehicle Traffic Operations Analysis

17. Traffic operations for the area intersections for the existing, future background and future total conditions are reviewed. Signals have been added to multiple intersections based on the Hewitt TIS future lane configurations and traffic control for 2031.
18. The intersection of Yonge Street / Mapleview Drive East operates well under existing conditions. The existing cycle length for the intersection is 110 seconds and the maximum overall v/c ratio is 0.52.
19. For the 2026 horizon year, all intersections can comfortably accommodate forecasted volumes with the existing 110 second cycle length. The maximum overall v/c ratio for the 2026 horizon year is 0.58.
20. For the 2031 horizon year, the cycle length of all area intersections was raised from 110 seconds to 120 seconds during peak hour periods, to accommodate a large volume of additional network traffic from the surrounding lands. In 2031, the intersection at Yonge Street / Mapleview Drive East will operate with a maximum overall v/c ratio of 0.93 and can accommodate area and forecasted site traffic.
21. Other signalized intersections within the study area, under future conditions, can comfortably accommodate forecasted volumes with a 110 second cycle length in the 2026 horizon year.
22. For the 2031 horizon year, the cycle length of all area intersections was raised from 110 seconds to 120 seconds during the peak hour periods, to accommodate a large volume of additional network traffic from the surrounding lands. In 2031, the signals will operate with a maximum overall v/c ratio of 0.85 and can accommodate both area and forecasted site traffic.
23. Under existing conditions, unsignalized intersections generally operate well with LOS ratings remaining mostly below "C". The exception is the intersection at Mapleview Drive East / St Paul's Crescent, which the southbound movement operates at LOS E in the afternoon peak hour.
24. Multiple area intersections are signalized in future (per the Hewitt TIS) and therefore remaining intersections operate acceptably under 2026 future background and future total conditions. However, the intersection at Yonge Street / St Paul's Crescent South begins to see increased delay times for westbound left-turning vehicles, with a LOS E rating reported during the afternoon peak hour.
25. As a result of increased delay at for this movement in future, it is likely that drivers will avoid the congested movement and utilize nearby signalized intersections, resulting in acceptable delays for the remaining vehicles making a westbound left at Yonge Street / St Paul's Crescent South in future.
26. Other future unsignalized intersections and site driveways will operate well, with maximum LOS ratings of "E" at any given time, showing delays remain below 40 seconds in the 2031 horizon year.

27. The requirement for signalization of the Site Driveway (West) / Maplevue Drive East (connecting to Street 'V') has been assessed based on Justification 7 of the Ontario Traffic Manual (OTM) Book 12 signal warrant procedure.
28. Based on the warrant analysis, the justifications were not met and a signal is not required for the driveway.

Drive Through Operations

29. The drive through is expected to have traffic demand of in the order of 104, 63 and 103 vehicles during the weekday morning and afternoon and Saturday peak hours, respectively.
30. Based on a review of time duration spent by drive through vehicles between their arrival to make an order and leaving the drive through with their order, less their duration spent in queue, the average resultant service time is 37, 41 and 55 seconds during the weekday morning and afternoon and Saturday peak hours, respectively.
31. A series of 10 simulations were run for each analysis time period that reflect the chain of drive through processes and the above service time distributions. The simulation analyses indicate average queues of 1 to 4 vehicles and in system times between 50 to 150 seconds, ranging dependent of the subject peak hour. These anticipated queues can generally be accommodated on-site within the drive through queuing area during all peak hours

Vehicular Parking

32. The site is subject to the Town of Innisfil Zoning By-law 054-04. Application of Innisfil Zoning By-law 054-04 results in a parking requirement of 401 spaces.

The requirements based on City of Barrie By-law 2009-141 are also considered and result in a parking requirement of 254 spaces.

33. The current architectural plans illustrate a total of 445 parking spaces within the surface parking garage.
34. The parking provisions comply with the Zoning By-law requirements.

Bicycle Parking

35. The site falls within "Yonge Street Mixed Use Corridor" in the Hewitt's Secondary Plan and therefore does not require bicycle parking spaces.
36. The current architectural plans illustrate a total of 12 parking spaces.

Loading Considerations

- 37. The site is subject to the minimum loading requirements of the Town of Innisfil Zoning By-law 054-04.
- 38. Application of the loading standards outline in Zoning By-law 054-04 to the proposed development results in a requirement of 3 spaces.
- 39. The current architectural plans illustrate the provision of 5 loading spaces that will meet the refuse / recycling needs of the development.

Overall Conclusion

- 40. The existing (with the planned modifications) and planned transportation networks can support the proposed development, and the planned site-related transportation networks will provide for efficient circulation of pedestrians, cyclists and vehicles of the site and the surrounding neighbourhood.