

TRAFFIC IMPACT STUDY

DRAFT PLAN OF SUBDIVISION

FINAL ▪ MARCH 2019

REPORT PREPARED FOR



**BALLYMORE BUILDING
(BARRIE) CORP.**
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EXECUTIVE SUMMARY

Ballymore Building (Barrie) Corp. retained The Municipal Infrastructure Group (TMIG) to prepare this traffic impact study in support of the proposed Draft Plan of Subdivision residential development located on a 26.4 Hectare parcel of land in the south half of Lot 16, Concession 11 within what is known as Phase 1 and Phase 3 lands of the Hewitt's Secondary Plan in the City of Barrie. This report determines the Ballymore-related site traffic and the subsequent traffic-related impacts on the adjacent road network during the weekday AM and PM peak hours.

The proposed subdivision is situated adjacent to the north side of Lockhart Road, abutting the east side of the CN Rail line (east of Yonge Street). Ballymore's lands are bisected by a large Natural Heritage System (NHS), effectively splitting the development into two distinct parcels consisting of a total of 469 residential units. The northerly portion (in Hewitt's Phase 1) of the Ballymore subdivision proposes 87 street-related freehold townhouses, while the southerly portion (in Hewitt's Phase 3) proposes a mix of townhouses and apartments totalling approximately 382 units. The final distribution of typologies in the Phase 3 parcel will be refined through future site plan applications, but for the purpose of this assessment we have assumed the maximum permitted number of units as prescribed in the Hewitt Secondary Plan Area policy of 469 residential units.

Vehicular access to both north and south parcels is proposed via the extension of a future collector road (Kneeshaw Drive) proposed within the Draft-approved development to the north of the Phase 1 lands, ultimately connecting to Mapleview Drive East to the north. This future north-south collector road will extend southerly through the Phase 1 lands, through the Natural Heritage System (NHS), into and serving the southerly Ballymore parcel connecting to Lockhart Road at the east limit of Ballymore's frontage. Although the development of the lands will be phased (the northerly portion proceeding first, followed by the southerly portion in the future, with Phase 3 of the Hewitt's Secondary Plan Area), it has been agreed after extensive consultations with the City of Barrie that the new collector road (Kneeshaw Drive) shall be built in its entirety as part of the Phase 1 development.

The Hewitt Updated Master Transportation Study for the proposed draft plan of subdivisions for the entire Hewitt Secondary Plan Area, including the Ballymore Lands, evaluated the Hewitt Secondary Plan Area development for the following two horizons:

- Interim horizon (2021), which analyzed the traffic impacts of the partial development of the Hewitt Lands prior to the opening of Harvie Road / Big Bay Point overpass at Highway 400; and
- Ultimate horizon (2031), which analyzed the traffic impacts associated with the full build-out of the Hewitt Secondary Plan.

Analysis of the Ultimate horizon accounted for all City-proposed roadway improvements and provided the recommended intersection configurations required to accommodate the full build-out of the Hewitt Lands.

This Traffic Impact Study builds upon Updated Master Transportation Study with a focus on the proposed Ballymore development. Based on Ballymore's development proposal, traffic scenarios for the subject lands echo the Master Transportation Study with the Phase 1 (northerly) Ballymore parcel expected to be built-out by 2023 plus 73 units of the Phase 3 (southerly) parcel (160 units total), with the balance of Phase 3 (southerly) parcel built-out by 2031.

The proposed development, during the 2023 planning horizon, is expected to generate a total of 77 vehicle trips during the AM peak hour consisting of 22 inbound and 55 outbound trips. During the PM peak hour, it is expected to generate 106 new vehicle trips consisting of 66 inbound and 40 outbound trips.

Full build-out of the Ballymore lands is expected within the 2031 planning horizon and is expected to generate a total of 225 vehicle trips during the AM peak hour consisting of 65 inbound and 160 outbound trips. During the PM peak hour, it is expected to generate 311 new vehicle trips consisting of 193 inbound and 118 outbound trips.

Under the future total 2023 traffic conditions, with the combination of background development, corridor growth, and site traffic, the study intersections are expected to operate with excellent operational characteristics and reserve capacity during both study peak hours. Likewise, under the future total 2031 traffic

conditions, the impact of the Ballymore site traffic is only marginally apparent, and the overall operations are expected to remain at excellent levels of service during both study peak hours.

As a result of extensive consultations and investigation, due to significant constraints brought about by the location of the collector road within the Draft-approved subdivision to the north, the extent of the NHS bisecting the Ballymore lands and the desire to minimize the intrusiveness on same of the future collector road, as well as the future CNR / Lockhart Road grade separation requiring the new collector intersection to be situated at the east limit of Ballymore's Lockhart Road frontage, strict adherence to the City's geometric guidelines was not possible.

A design investigation showing other potential solutions for the collector road alignment was prepared and shared with City staff during the Draft Plan conformity exercise and as part of the Lake Simcoe Region Conservation Authority (LSRCA) design charrette in late 2018, proposing a series of 90-degree bends and roundabouts to safely and efficiently accommodate the mobility demands. Based on these submissions and consultations, the City generally agreed that such a road alignment was reasonable and appropriate, assuming acceptable traffic calming measures could be accommodated within the proposed 24-metre right-of-way (ROW) to address the concern of speeds and traffic control, while maintaining the mobility needs and functionality of the collector road.

In support of the proposed collector road alignment, a series of traffic calming measures were evaluated and a functional design was prepared to demonstrate how the road can be constructed within the 24-metre ROW and which traffic calming elements are most appropriate with regards to addressing vehicle speeds and traffic control while maintaining appropriate collector road functionality.

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CONTENTS

1	INTRODUCTION	1
1.1	Retainer and Objective.....	1
1.2	Study Team	1
2	SITE CHARACTERISTICS	2
2.1	Study Environs	2
2.2	Study Area.....	2
2.3	Draft Plan of Subdivision	2
3	COLLECTOR ROAD ALIGNMENT	3
3.1	Conformity Submission Review.....	3
3.2	City of Barrie Conformity Consultations	3
3.3	Collector Road Assessment and Functional Design.....	4
3.3.1	Traffic Calming Review	4
3.3.2	Collector Road Traffic Control	9
4	EXISTING CONDITIONS	10
4.1	Road Network	10
4.2	Transit Services.....	10
4.3	Existing Bicycle Routes and Trails	11
5	FUTURE BACKGROUND CONDITIONS.....	13
5.1	Study Area Transportation Network Improvements	13
5.2	Proposed Pedestrian Routes.....	13
5.3	Proposed Cycling Routes	13
5.4	Pathway and Trail Network Plan for the Hewitt Secondary Plan Area.....	14
5.5	Study Horizon Years	14
5.6	Background Developments	14
5.7	Organic Traffic Growth	15
5.8	Background Traffic Volumes.....	15
6	SITE TRAFFIC	18
6.1	Site Trip Generation	18
6.2	Site Trip Distribution and Assignment	19
7	FUTURE TOTAL TRAFFIC	22
8	CAPACITY ANALYSIS	24
8.1	Site Access Intersection Capacity Analysis.....	24
9	CONCLUSION	26

APPENDICES

APPENDIX A	DRAFT PLAN OF SUBDIVISION
APPENDIX B	CONFORMITY SUBMISSION ROAD ALIGNMENT
APPENDIX C	DRAFT PLAN FUNCTIONAL DESIGN (NEW COLLECTOR ROAD ALIGNMENT AND TRAFFIC CALMNG MEASURES)
APPENDIX D	BARRIE TRANSIT AND GO TRANSIT MAPS AND SCHEDULES
APPENDIX E	FUTURE SIDEWALK NETWORK PLAN
APPENDIX F	FUTURE CYCLE NETWORK PLAN
APPENDIX G	FUTURE PATHWAY NETWORK PLAN
APPENDIX H	CAPACITY ANALYSIS

FIGURES

Figure 2-1	Site Location	2
Figure 4-1	Existing Transit Services	11
Figure 5-1	Background (2023) Traffic Volumes	16
Figure 5-2	Background (2031) Traffic Volumes	17
Figure 6-1	2023 Site Traffic Volumes	20
Figure 6-2	2031 Site Traffic Volumes	21
Figure 7-1	Total 2023 Traffic Volumes	22
Figure 7-2	Total 2031 Traffic Volumes	23

TABLES

Table 3-1	Traffic Calming Measures	5
Table 6-1	Site Trip Generation (2023 Horizon Year)	18
Table 6-2	Site Trip Generation (2031 Horizon Year)	18
Table 6-3	Distribution of Traffic from the Proposed Development	19
Table 8-1	2023 Capacity Analysis	24
Table 8-2	Ultimate Horizon (2031)	25

1 INTRODUCTION

1.1 Retainer and Objective

The Municipal Infrastructure Group (TMIG) was retained by Ballymore Building (Barrie) Corp. to assist them in their development of a Draft Plan of Subdivision (herein referred to as the 'Ballymore Draft Plan') and to prepare a Traffic Impact Study (TIS) in support of for their Draft Plan of Subdivision submission. The Ballymore lands are generally located in the south half of Lot 16, Concession 11 within the Hewitt's Secondary Plan Area (herein referred to as "HSPA"), in the City of Barrie. This study investigates and presents the following:

- A design / conformity review of the proposed collector road and an accompanying functional design of the proposed collector road alignment.
- An evaluation of potential traffic calming measures to safely and efficiently accommodate all road users.
- Estimate subject site traffic generation, distribute to the adjacent road network, and determine the future impacts in the context of all local transportation modes within the broader HSPA.
- Confirm adequate infrastructure is planned to accommodate the development and specific recommend lane configurations, turn lane requirements, intersection controls, and site accesses.

This report relies and builds upon findings and conclusions contained in a recently prepared Updated Master Transportation Study dated October 2018 in support of the HSPA, which includes the Ballymore Draft Plan. The Updated Master Transportation Study included the evaluation of the HSPA for the following two horizons:

- Interim horizon (2023, which analyzed the traffic impacts of the partial development of the HSPA prior to the opening of Harvie Road / Big Bay Point overpass at Highway 400; and
- Ultimate horizon (2031), which analyzed the traffic impacts associated with the full build-out of the HSPA.

Analysis of the Ultimate horizon accounted for all City-proposed roadway improvements projects and provided the recommended intersection improvements required to accommodate the full build-out of the HSPA.

This TIS builds upon the Updated Master Transportation Study with a focus on the proposed Ballymore Draft Plan. Based on Ballymore's development proposal, traffic scenarios for the subject lands grow upon the Master Transportation Study 2021 planning horizon with the Phase 1 (northerly) Ballymore parcel expected to be built-out by 2023 plus 73 units of the Phase 3 (southerly) parcel (160 units total), with the balance of Phase 3 (southerly) parcel built-out by 2031.

1.2 Study Team

The TMIG team involved in the preparation of this study are:

- J.A. (Jim) Bacchus, B.A., MITE, Director of Transportation Services
- Michael Dowdall, C.E.T., Project Manager
- Liban Mohamed, B.E.S., LEED Green Associate, Transportation Planner

2 SITE CHARACTERISTICS

2.1 Study Environs

The subject site is currently agricultural and is located east of Yonge Street, south of Maplevue, immediately east of the CN Rail line and north of Lockhart. The proposed site and the surrounding road network is illustrated in **Figure 2-1**.

Figure 2-1 Site Location



2.2 Study Area

The study area includes the following intersections:

- Kneeshaw Drive / Lockhart Road
- Kneeshaw Drive / Key Internal Intersections

2.3 Draft Plan of Subdivision

The development proposal involves 123 townhouse units and 346 apartment units with a total of 469 units. Vehicular access to the development is proposed via Kneeshaw Drive, a future north-south primary collector road that will extend north from Lockhart Road and connect to Maplevue Drive East through other future HSPA developments to the north of the Ballymore lands.

The proposed Ballymore Draft Plan of Subdivision is provided in **Appendix A**.

3 COLLECTOR ROAD ALIGNMENT

The following section reveals the process by which the proposed collector road alignment was developed and adapted to the many significant physical constraints (both existing and future). This section will provide an overview of the conformity review submitted on September 2018, a summary of City of Barrie comments during their conformity review, the results of subsequent City consultations regarding road alignment alternatives, and a traffic calming measures review addressing the now-proposed collector road alignment.

3.1 Conformity Submission Review

On September 2018, a conformity review was submitted to the City of Barrie for review by TMIG reviewing a proposed alignment for the Collector Road through Ballymore's Phase 1 and 3 lands. The conceptual design referenced the City of Barrie's guidelines as well as the Geometric Design Guide for Canadian Roads, issued by the Transportation Association of Canada (TAC).

Given the location of the collector road within the Draft-approved subdivision to the north, the extent of the NHS bisecting the Ballymore lands and the desire to minimize the intrusiveness on same of the future collector road, as well as the future CNR / Lockhart Road grade separation requiring the new collector intersection to be situated at the east limit of Ballymore's Lockhart Road frontage, strict adherence to the City's geometric guidelines was not possible. Therefore, a conceptual design was prepared proposing a series of tighter-than-desired horizontal curves to create the necessary linkages to serve the Ballymore lands.

An excerpt of our Conformity Submission is appended for reference and context in **Appendix B**.

3.2 City of Barrie Conformity Consultations

In review of the Draft Plan conformity submission, City staff were concerned about the road alignment design trade-offs proposed and of primary concern was the design speed utilized in our design. The City subsequently confirmed a design speed requirement of 70 km/h for Collector Roads, versus the 60 km/h design speed adopted in our analysis (typically permitted in urban areas by TAC). Application of a 70 km/h design speed in regard to minimum centreline radius, intersection angle, sight distance, etc., resulted in non-compliance of the then-proposed road alignment (see **Appendix B**).

Further to receipt of City comments, subsequent analysis concluded that adoption of the 70 km/h design speed renders any attempt to deliver a collector road with a curvilinear alignment impossible given the existing/future constraints described above. Representation of what a road alignment would look like by adopting the 70 km/h design speed is provided in **Appendix B**.

As is evident from this figure, the curvilinear road alignment cannot be constructed if the higher design speed is applied, therefore a new approach was needed to develop the lands and deliver the collector road to the City. With input from City staff and after consultations with all agencies during the LSRCA design charrette, Ballymore's consultant team has developed a new collector road alignment provided in **Appendix C** (Draft Plan Functional Design) that strives to achieve a safe and efficient collector / local road system, while minimizing the impacts on the NHS and delivering the targeted development density.

This proposed road alignment will require implementation of several traffic calming / traffic control measures in a few key areas to ensure safe and efficient traffic flow for all road users. The following presents a review of the most appropriate traffic calming options, an evaluation of those options, and the recommended set of traffic measures to be implemented.

3.3 Collector Road Assessment and Functional Design

3.3.1 Traffic Calming Review

Under the Canadian Guide to Traffic Calming, traffic calming has been defined as “the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behaviour and improve conditions for non-motorized street users.” While the purpose of traffic calming measures is to address concerns about the behaviour of motor vehicle drivers travelling on streets within their jurisdiction, the intent is to achieve driver behaviours that are appropriate within the context of a road’s intended use.

Often described as “speeding”, “infiltration”, and/or “shortcutting”, inappropriate actions by motorists can have a detrimental impact on the quality of life or livability of a community, leading to:

- Lack of feeling safe and secure within a neighbourhood;
- Deterrent from walking and cycling due to safety concerns, particularly for vulnerable road users;
- Decreased interaction between residents within a neighbourhood;
- Loss of community identity; and
- Increased air and noise pollution from increased traffic volumes

With respect to the concerns voiced by the City of Barrie regarding the now-proposed road alignment pattern for the Ballymore Draft Plan (see **Appendix C**), the prevailing comment was the concern over vehicular speed through the ‘Bends’ proposed in the lands north of the natural heritage area. Volume of traffic is not an inherent concern given the low likelihood of “infiltration” and/or “shortcutting” through this part of the HSPA, so this review is focused on traffic calming measures geared toward reducing the negative effects of higher-than-desirable vehicle speeds.

Although one of the most common traffic calming measures used to reduce vehicle speed is the speed hump because of its effectiveness and low cost, City staff have voiced concerns over unintended and negative impacts of such a measure on emergency services, transit, and service vehicles. As such this report will focus on other measures to affect speed reduction along the collector road. Additionally, City of Barrie on a January 10, 2011 staff report noted that rumble strips not be considered as a traffic calming measure in residential areas. Thus, permanent traffic calming measures to be reviewed for application on the subject collector road are:

- Textured crosswalks (pavement markings/zebra striping);
- Raised intersections/sidewalks;
- Curb Extensions;
- Curb Radius Reductions;
- Raised Median Islands; and
- Traffic Circles

Additional temporary traffic calming measures that could be utilized alongside the permanent traffic calming measures on minor collector roads could include:

- Speed Cushions;
- Signage; and
- Radar Speed Advisory Boards.

The following **Table 3-1** details the above-mentioned traffic calming measures appropriate for a Collector Road including description, purpose, advantages/disadvantages, and the preferred option through the bends proposed in Phase 1 lands.

Table 3-1 Traffic Calming Measures

Traffic Calming / Speed Management Measures	Description	Purpose	Advantages	Disadvantages	Recommendation
Vertical Deflection					
Raised Intersections	Is an intersection that may include crosswalks, constructed at a higher elevation than the adjacent approach roadways	Is to reduce vehicle speeds, better define crosswalk areas, and reduce pedestrian vehicle conflicts	Reduction in 85th percentile speed of up to 10km/h	Slows emergency vehicles to approximately 25km/h	NOT RECOMMENDED. This option requires a mandatory installation of WA-50 Speed Hump. Furthermore, this option is used mainly in commercial areas and business districts with high pedestrian activity
Raised Crosswalk	Is a marked pedestrian crosswalk at an intersection constructed at a higher elevation than the adjacent roadway	Is to reduce vehicle speeds, improve pedestrian visibility, and reduce pedestrian vehicle conflicts	Reduction in 85th percentile speed from 5km/h to 13 km/h	Impacts and delays to emergency vehicles; fire vehicles – 3.8 seconds delay per raised crosswalk	NOT RECOMMENDED. Although this option could be implemented since there are sidewalks on both sides of the road, vertical deflection devices are not desirable by emergency services and can create snow removal challenges.

Horizontal Deflection					
Chicane	Is a series of curb extensions on alternating sides of a roadway, which narrow the roadway and require drivers to steer from one side of the roadway to the other to travel through the chicane	Is to discourage shortcutting or through traffic and reduce overall speeds by enforcing the lateral shifting of vehicles through the chicane	Reduction of speed between 6 and 10km/h	May affect emergency vehicle response times and loss of on-street parking; must be removed inside and within 5m of the chicane	NOT RECOMMENDED. This option relies on regulatory signs and driver courtesy to ensure there is not a two-way conflict. Moreover, this option may introduce a head-on collision hazard as well affect emergency vehicle response times
Curb Radius	Is the reduction is the reconstruction or modification of an intersection corner with a smaller radius, usually between the 3m to 5m range	Is to slow down right-turning vehicles, reduce crossing distances for pedestrians, and to improve visibility of pedestrians	Speed reduction for right-turning vehicles	Maintenance and pedestrian conflicts due to large vehicles and busses possibly mounting the curb unless designed with an appropriate pedestrian waiting and crossing area	NOT RECOMMENDED. This option will not have significant impact on vehicle speeds. Also, this option only reduces speeds when vehicles are making right-turn movements, not expected to be of particular concern.
Traffic Circle OR Roundabout	Is an island located at the centre of an intersection, which requires vehicles to travel through the intersection in a counter-clockwise direction around the island	Is effective in reducing vehicular speeds through the intersection by impeding the straight-through movement. All vehicles from all approaches must yield to traffic circling the raised island.	Reduction in 85th percentile speed up to 14km/h	Delay between 1.3 and 10.7 seconds for emergency vehicle response times	RECOMMENDED. Proven to reduce the frequency and severity of collisions.

Roadway Narrowing					
Curb Extension/ Neckdown/Choker	Is a horizontal intrusion of the curb into the roadway resulting in a narrow section of roadway	Is to reduce vehicle speeds, reduce crossing distance for pedestrians, increase visibility of pedestrians, and prevent parking close to an intersection	Reduction between 2 and 8km/h	Not compatible with bicycle lanes and can be hazardous for drivers and cyclists if not designed and maintained properly	RECOMMENDED. This option has the capability to work as long as it's combined with other traffic calming measures (i.e., raised median also recommended)
Lane Narrowing	Is the process of reducing lane widths using pavement markings	Is for drivers to perceive the roadway to be less comfortable at higher speeds due to the narrowing of the lanes and ultimately reduce operating speeds	Reduction in 85th percentile speed up to 10km/h	Cyclist can feel squeezed closer to vehicles if no bicycle lanes are provided	RECOMMENDED. This option will reduce speeds at the bends in the north parcel.
Raised Median Island	Is an elevated median constructed on the centerline of a two-way roadway to reduce the overall width of the adjacent travel lanes	Is to reduce vehicle speeds and to reduce pedestrian-vehicle conflicts	Reduction of speed between 3 and 8km/h	May restrict access to driveways from one direction only and cyclists may feel squeezed where insufficient room has been left between a central median and the adjacent curb	RECOMMENDED. This option will work as it will not only reduce vehicle speeds but will also function as a pedestrian refugee and reduce pedestrian-vehicle conflicts.

Surface Treatment					
Textured Pavement	Is roadway pavement that incorporates a textured and/or patterned surface which contrasts other adjacent roadways in the surrounding area	The difference in texture alerts drivers of the potential need to reduce speed	Textured treatment may improve aesthetics and enhance the character of the street	Can be difficult for cyclists and pedestrians to negotiate. Requires regular maintenance as well may increase street sweeping time	NOT RECOMMENDED. Because of its texture it may create unwanted noise from vehicle wheels.
Dragon Teeth	Are a series of triangular pavement markings along the edge of the travelled lanes	They provide a visual change of the roadway and alert drivers that they are entering a residential community	No increase in noise and can be implemented immediately at low cost. No impact to emergency vehicles, snow plowing, and police enforcement	Pavement markings will require regular replacement due to tire wear and may be less effective in winter months due to snow/ice cover	RECOMMENDED. This option could be used to alert drivers that they are entering a 'calmed' area. This measure should be used with other traffic calming measures to reduce speed.
On-Road 'Sign' Pavement Markings	Provide information that would typically be shown to drivers through signage but are painted on the roadway to provide a larger image, and one that is directly in the driver's line of sight.		Reduction of speed between 6 and 14km/h and could be implemented rapidly	Pavement markings will require regular maintenance and may be less effective in winter months due to snow/ice cover	RECOMMENDED. This option is low cost and can be applied as a complimentary / secondary measure to other recommended features.
Education					
Vehicle Activated Signs (VAS)	Are electronic roadside warning signs equipped with radar speed detectors and an illuminated display	Is to alert drivers with the aim that they reduce their travel speed as they approach specific conditions or hazards ahead	Reduction in 85th percentile speeds of 10km/h	Requires regular maintenance and a source of power	RECOMMENDED. This option if used will need another traffic calming measure. The placement should allow adequate time and distance for drivers to adjust their speed accordingly.

The above **Table 3-1** highlights which options might be appropriate for the now-proposed road pattern for the Ballymore Draft Plan. It is our recommendation that to promote slower speeds through the critical areas, while maintaining a functional multi-modal collector road environment, a combination of traffic calming measures be implemented as shown on our Draft Plan Functional Design attached as **Appendix C**.

These features include the following key recommendations:

- North parcel:

- o Raised medians at the approaches to, and through the 90-degree bends in the 'Phase 1' north parcel,
- o Reduced lane widths through the bends,
- o Advance warning signage / pavement markings for the raised median feature,
- South parcel:
 - o Two roundabouts to act as 'book-ends' for the development layout of the southerly parcel,
 - o Westerly roundabout to act as traffic calming measure at the south end of the NHS and for a potential future vehicular access to the south development Block,
 - o Easterly roundabout to act as a traffic control measure to serve the development Blocks abutting/adjacent to the Storm Water Management Pond and as an entry feature into the broader development.

These features can all be refined as we move through Draft Plan of Subdivision process and into the detailed engineering submission stage.

3.3.2 Collector Road Traffic Control

TMIG's objective in assessing the internal collector road design characteristics within the Ballymore Lands is to determine the best combination of traffic control and mobility that results in optimal operations (both real and perceived) in the quality of life and community safety. Thus, an internal collector road network assessment was undertaken to determine appropriate intersection controls required at internal intersections. This assessment was based on the site traffic volumes generated under Ultimate traffic conditions, which corresponds to the full build-out of the entire Hewitt development.

Based on the projected traffic volumes along the collector roads within the Hewitt development included in the Updated Master Transportation Study, signalization of collector-to-collector intersections is not recommended.

The following intersection controls are recommended for the various intersection types:

- Major Collector to Major Collector – All-way stop control;
- Major Collector to Minor Collector – Two-way stop control at the minor approaches; and
- Minor Collector to Minor Collector – All-way stop control.

Within the Ballymore Barrie Lands, Kneeshaw Drive is designated as a minor collector road, and no other minor collector roads will exist within the development, all other intersections being connections to Local Roads, with the exception of Lockhart Road. Therefore, traffic controls for all internal Ballymore lands intersections are recommended to be Two-way Stop control (stop-control for the minor legs only). However, we recommend that the City monitor volumes and speeds along the Kneeshaw Drive segment at the north end of the north Ballymore parcel to ensure warrants for All-way Traffic Control are not met, and more importantly vehicle speeds are in compliance with legislated maximum speed.

It should be noted that under 2031 traffic conditions, traffic signals are not strictly speaking warranted at the intersection of Kneeshaw Drive and Lockhart Road. However, given this intersection will be a key interface between the arterial network and this portion of the HSPA provision should be made for ultimate signalization of this intersection and the City should monitor this intersection for confirm if/when signal warrants are satisfied.

4 EXISTING CONDITIONS

4.1 Road Network

The following describes the existing road infrastructure within the study area.

Mapleview Drive East is a two-lane major arterial road to the north of the subject site that runs east-west within the study area. This roadway has a rural cross section on the south side of the road, with an urban cross-section (curb, gutter, sidewalk, etc.) on the north side of the road adjacent to significant residential developments. A transition in speed limits occurs immediately north of the subject site, approximately 400 metres east of Yonge Street. A posted speed limit of 50 km/h exists to the west of the transition point, and a speed limit of 60 km/h to the east. A sidewalk is located on the north side of Mapleview Drive East from Yonge Street to approximately 550 metres east of Prince William Way.

Based on Barrie's 2013 Multi-Modal Active Transportation Plan (MMATMP), the section of Mapleview Drive East within the study area will be widened to a 4-lane roadway with a continuous median or two-way left-turn lane (TWLTL) by 2031. By 2041, the existing at-grade rail crossing east of Yonge Street will be converted to a grade separated crossing.

Lockhart Road is a major collector road to the south of the subject site with a two-lane rural cross-section, and runs east-west within the study area. A posted speed limit of 60 km/h applies to the section of road within the study area. Based on Barrie's 2013 MMATMP, the section of Lockhart Road within the study area will be widened to a 4-lane roadway with a continuous median or two-way left-turn lane (TWLTL) by 2031. By 2041, the existing at-grade rail crossing east of Yonge Street will be converted to a grade separated crossing.

Yonge Street is a major arterial road to the east of the subject site with a two-lane rural cross-section to the south of Mapleview Drive East, and an urban 5-lane cross-section to the north. Yonge Street runs north-south and has a posted speed limit of 60 km/h within the study area. Based on Barrie's 2013 MMATMP, the section of Yonge Street from Mapleview Drive East to Lockhart Road will be widened to a 4-lane roadway with a continuous median or two-way left-turn lane (TWLTL) by 2031.

There are two at-grade rail-road crossings within the study area, one on Lockhart Road approximately 340m east of Yonge Street, and the other on Mapleview Drive East approximately 220m east of Yonge Street.

4.2 Transit Services

The northern boundary of the subject site is located approximately 650m south of bus routes operated by Barrie Transit that service bus stops along Mapleview Drive East. The Barrie South GO station is located approximately one kilometre northwest of the development site. The existing transit network within the vicinity of the Ballymore Barrie development is provided in **Figure 4-1**. See **Appendix D** for Barrie Transit and GO Transit maps and schedules.

Barrie Transit

8A RVH/Yonge / 8B Park Place bus routes operate in a loop through major centres throughout Barrie such as Georgian College to the north, the Downtown Terminal, and the Barrie South GO Station, among others. Individually, the 8A and 8B bus routes operate at 30-minute headways during weekday AM and PM peak periods. Combined, the 8A and 8B routes provide approximately 15 minute headways in the southbound direction departing Georgian College, and maintain approximately 30-minute headways in the northbound direction departing from Park Place. The existing stop located closest to the subject site is at the Barrie South GO Station on Yonge Street.

4A East Bayfield / 4B South GO bus routes operate as a loop connecting the southeast corner of Barrie to major destinations in the north end of Barrie, such as the Georgian Mall. Other major destinations along the route include the Downtown Terminal, Allandale GO Station, and the Barrie South GO Station. The 4A and 4B bus routes operate at 35-minute headways during the AM and PM peak periods. Existing stops located

closest to the subject site are the Barrie South GO Station on Yonge Street, and a stop at Royal Jubilee Drive at Mapleview Drive East.

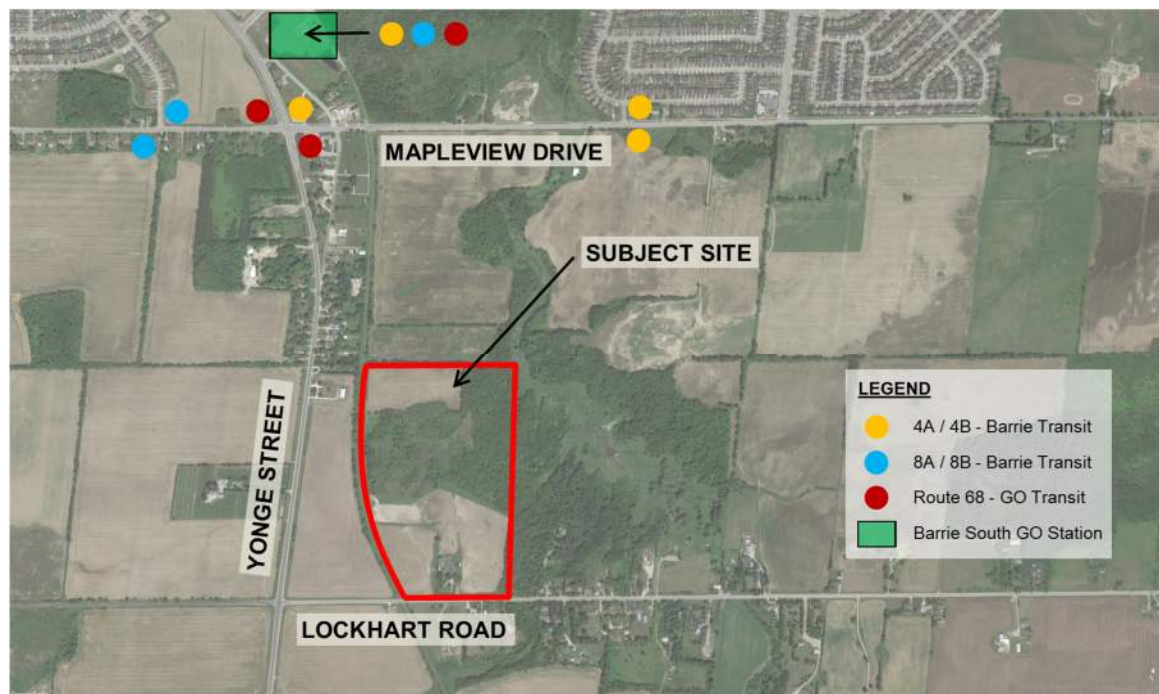
GO Transit

The Barrie South GO Station is located approximately one kilometre northwest of the subject site. The Barrie South GO Station is serviced by the following GO train and bus routes in addition to the Barrie Transit bus routes listed previously:

GO Bus Route 68 operates from Barrie to Aurora, and **GO Bus Route 68B** provides service from Barrie to Newmarket. Connections to the Barrie GO Train line and GO Bus Route 65 at Newmarket and Aurora Go Stations allow Go Transit riders to travel to Union Station in downtown Toronto. Route 68B operates during the weekday AM and PM peak periods, while Route 68 operates during off-peak hours. During the AM and PM peak periods, Route 68B operates with headways of approximately one hour in both the southbound and northbound directions. Route 68 also operates with one hour headways during the weekday off-peak hours in both the southbound and northbound directions. Routes 68 and 68B also maintain approximately 1 hour headways in the northbound and southbound directions on weekends.

Barrie GO Train Line operates between Barrie South GO and Allandale Waterfront GO Stations in Barrie to Union Station in Toronto. Seven southbound trains depart from Barrie during the AM peak period, with headways between trains ranging from approximately 15 to 30 minutes. Seven northbound trains depart Union Station at 30-minute headways to travel to Barrie during the PM peak period. On weekends, the Barrie GO Train Line operates three southbound trains in the morning and three northbound trains in the evening that travel the entirety of the Barrie GO Train route between Barrie and Union Station. Additional trains are run on the Barrie GO Train line on weekends between Aurora and Union Station, with GO Bus routes providing connections from Aurora to Barrie.

Figure 4-1 Existing Transit Services



4.3 Existing Bicycle Routes and Trails

There are a number of existing bicycle routes and trails within Barrie, but many of the elements are not connected to form a cohesive network. The majority of cycling facilities in the City are signed routes (mixed

traffic), with stretches of bicycle lanes along certain corridors. Signed routes are provided in the north end and downtown areas of the City along major streets. Separate bicycle lanes exist in short stretches along major corridors. Notably, bicycle lanes exist in the HSPA along Maplevue Drive East from Yonge Street to just east of Prince William Way, providing access to the Barrie GO South station.

5 FUTURE BACKGROUND CONDITIONS

5.1 Study Area Transportation Network Improvements

The major roadway improvement projects assumed completed for the 2023 and 2031 horizon year traffic analyses were derived from the Updated Master Transportation Study for the HSPA, review of the Transportation Master Plans (TMP) of the City of Barrie, Town of Innisfil, and County of Simcoe as well as a review of the City of Barrie's Multi-Modal Active TMP (MMATMP), and discussions with City staff. The capital budget of the City of Barrie was also reviewed to confirm the estimated timing of the planned road improvements.

5.2 Proposed Pedestrian Routes

The planned Pedestrian Network Plan (from the Updated Master Transportation Study) aims to ensure direct connections to all destinations within the study area, which are comfortable, safe and accessible. This plan considers the location of primary destinations and nodes of activity, efficient connections to these areas, and continuity in pedestrian routes, comfort, enjoyment, safety, and creating route options for pedestrians. Effort is made to ensure routes will link various neighbourhoods and an array of destinations including parks, greenways, schools, and commercial land uses.

Sidewalks are proposed on both sides of almost all roadways in the study area. According to City policy, sidewalks shall generally be provided on both sides of all streets with the exception of local streets in industrial areas, residential streets with less than ten dwelling units or cul-de-sacs; window streets, or a street flanking the Natural Heritage System or a public park. In these cases, sidewalks shall only be required on one side of the street. Further guidelines outlining the specifications and classifications of the sidewalk network are outlined in the City's Multi-Modal Active TMP. The proposed future sidewalk network plan of the HSPA is provided in **Appendix E**.

5.3 Proposed Cycling Routes

The Updated Master Transportation Study proposes planned bicycle facilities to ensure uninterrupted and continued connections via arterial and collector roads. Further attention has been given to ensuring cycling routes link major destinations, with particular attention paid to schools.

Along arterial roads, there are buffered bike lanes which will provide further separation between vehicles and cyclists. These bicycle lanes along arterial roads continue west and north of the subject lands, allowing for further connectivity to other areas in the City, including downtown Barrie, and the Salem Lands.

Bike lanes are proposed along Kneeshaw Drive through the Ballymore Draft Plan which will allow for local trips to commercial developments, schools, parks and recreational area accessible by bike. The subject lands are located in close proximity to the Barrie South GO station (located off of Yonge Street), which can be accessed by bike along the bike lanes provided on Yonge, which will promote multi-modal transportation use for trips in and out of the study area.

Guidelines detailing the specifications of the cycling network, including bicycle lanes and buffers, are outlined in the City of Barrie Multi-Modal Active Transportation Master Plan. The proposed Cycling Network Plan is attached in **Appendix F**.

5.4 Pathway and Trail Network Plan for the Hewitt Secondary Plan Area

The Updated Master Transportation Study proposes off-street pathways and trails are to be provided for both recreational and utilitarian purposes. Pathways and trails are used to link different neighbourhoods together and provide space for recreational activity. These routes may be used by multiple modes of active transportation, including pedestrians and cyclists. These networks also ensure more direct links to destinations such as schools and shopping and provide enhanced mobility options.

The Pathway and Trail Network in the HSPA will be provided adjacent to Kneeshaw Drive and will be developed in the Natural Heritage System areas. The pathways are proposed to offer more direct routes to many destinations and a safe off-road cycling and pedestrian experience. The pathways are generally planned to follow creeks and to provide links between key land uses. Additionally, the major Active Transportation (AT) Pathway which is a Trans-Canada Trail exists west of the HSPA. This provides access north into downtown Barrie and along the Lake Simcoe waterfront. This offers opportunity for both recreational and utilitarian use. Access to this trail is permitted along the east-west arterial roads in the HSPA.

Detailed design guidelines for pathway and trail systems are outlined in the City of Barrie Multi-Modal Active Transportation Master Plan. The Pathway and Trail Routes in the HSPA are outlined is attached in **Appendix G**.

5.5 Study Horizon Years

Based on the development proposal, the Ballymore north parcel (in the Phase 1 Hewitt lands) was assumed built-out by 2023, while the south parcel was assumed complete by the HSPA full-buildout development horizon of 2031. These horizons were selected for analysis of traffic operations in the study area.

For the purpose of the report, development of the subject lands is assumed as follows:

- Interim horizon (2023) – build-out of the north parcel (Hewitt's Phase 1 lands) located north of the Natural Heritage System consisting of 87 residential units; and
- Ultimate horizon (2031) - build-out of interim horizon units plus build-out of the south parcel proposing 382 residential units (a mix of townhouses and apartments) located south of the Natural Heritage System.

5.6 Background Developments

Future development to the north, east, and west of the site within the HSPA that were considered as a part of the background traffic analysis in this report include:

Development I (Crisdawn Construction Inc.) – Located north of the subject site and the 2303757 Ontario Inc. lands, Development I includes two blocks of medium/high density housing, totaling 546 units, and 134 single-detached and townhouse units. The medium/high-density units will be located in the northern half of Development I, immediately south of Maplevue Drive East. The single-detached and townhouse units will be located in the southern portion of the Development I lands. The development will provide access to Maplevue Drive to the north and Lockhart Road to the south via Kneeshaw Drive. It should be noted that the proposed Kneeshaw Drive in the traffic brief, was labeled Street '1' in the Updated Master Transportation Study, whereas the access in the Crisdawn Lands is labeled Street 'D'.

Development K (Crisdawn Construction Inc.) - A summary of the estimated Hewitt Area trip generation based on typical land uses within each subdivision was included in Appendix C of the 2018 Updated Master Transportation Study. According to the trip generation summary table, the residential development lands located to the east of the subject site are identified as subdivision K. As no draft plan was available for the development K lands at the time of this report, the unit counts and associated trip generation provided in Appendix C of the Updated Master Transportation Study were taken as the background traffic generated by Development K for the purposes of traffic analysis.

Development L (2303757 Ontario Inc) – Located immediately north of the subject site, a total of 57 residential units have been proposed, consisting of 14 townhouse units, and 43 single-detached units. The development

will provide access to Mapleview Drive to the north and Lockhart Road to the south via Kneeshaw Drive. It should be noted that the proposed Kneeshaw Drive site access was labeled Street '1' in the Updated Master Transportation Study, whereas the access is labeled Street 'C' in the 2303757 Ontario draft plan.

Development V (ASA Developments) - According to the trip generation summary table located in Appendix C of the Updated Master Transportation Study, the residential development lands located to the west of the subject site are identified as subdivision V. As no draft plan was available for the development V lands at the time of this report, the unit counts and associated trip generation provided in Appendix C of the Updated Master Transportation Study were taken as the background traffic generated by Development V for the purposes of traffic analysis.

For the purposes of traffic analysis, it was assumed that 5% of the traffic from developments north of the subject site would use Lockhart Road to access the broader road network. The remaining 95% of traffic was assumed to use Mapleview Drive East to the north, as it is a physically closer access point to the surrounding road network.

As detailed site plans were not available for the developments to the east and west of the subject site, it was assumed that 50% of the traffic from Development K and Development V would access the road network at Lockhart Road.

5.7 Organic Traffic Growth

As stated in the Updated Master Transportation Study, non-specific background traffic growth was accounted for by applying average annual growth rates to existing traffic demand. The average annual growth rates of 1.57% for AM peak hour traffic and 1.62% for the PM peak hour traffic were derived from calculations based on the City's EMME macro travel demand forecast model.

It must be said that this approach may be double-counting some of the future traffic forecasts, since the EMME model is supposed to inherently account for all future development within the City. In this regard, the combination of specific background developments, PLUS an allowance for 'growth' provides for a conservative (high) representation of future traffic volumes.

5.8 Background Traffic Volumes

The Updated Master Transportation Study evaluated the external roadway network for an interim horizon (2021) prior to the opening of the Harvie Road / Big Bay Point Road Highway 400 overpass and an ultimate horizon (2031) corresponding with the full build-out of the HSPA. The analysis included the following components for each horizon year:

- The mesoscopic level analysis – Aimsun Modeling Software; and
- The microscopic level analysis – Synchro 8.0 Software.

The Aimsun Model was utilized as a large scale review of the entire HSPA with respect to the southern portion of Barrie and the northern portion of Innisfil, and as a screening tool to present the areas of constraint for detailed analyses using the Synchro software.

In addition to the detailed analyses for the identified constraint areas, the proposed Kneeshaw Drive intersections at Lockhart Road and Mapleview Drive East analyzed at the microscopic level to determine the required lane configurations and dimensions of any required turning lanes.

2031 background traffic volumes for the AM and PM peak hours were determined by calculating the difference between the 2031 total traffic volumes and the predicted 2031 HSPA estimated site traffic volumes provided in the Updated Master Transportation Study. The 2023 planning horizon (Ballymore Phase 1 build-out) background traffic volumes were subsequently derived from applying the average annual growth rates to linearly reduce the 2031 background traffic volumes to the 2023 horizon year.

Figure 5-1, and 5-2 illustrate the future background (2023 and 2031) AM and PM peak hour traffic volumes, respectively, within the study area.

Figure 5-1 Background (2023) Traffic Volumes

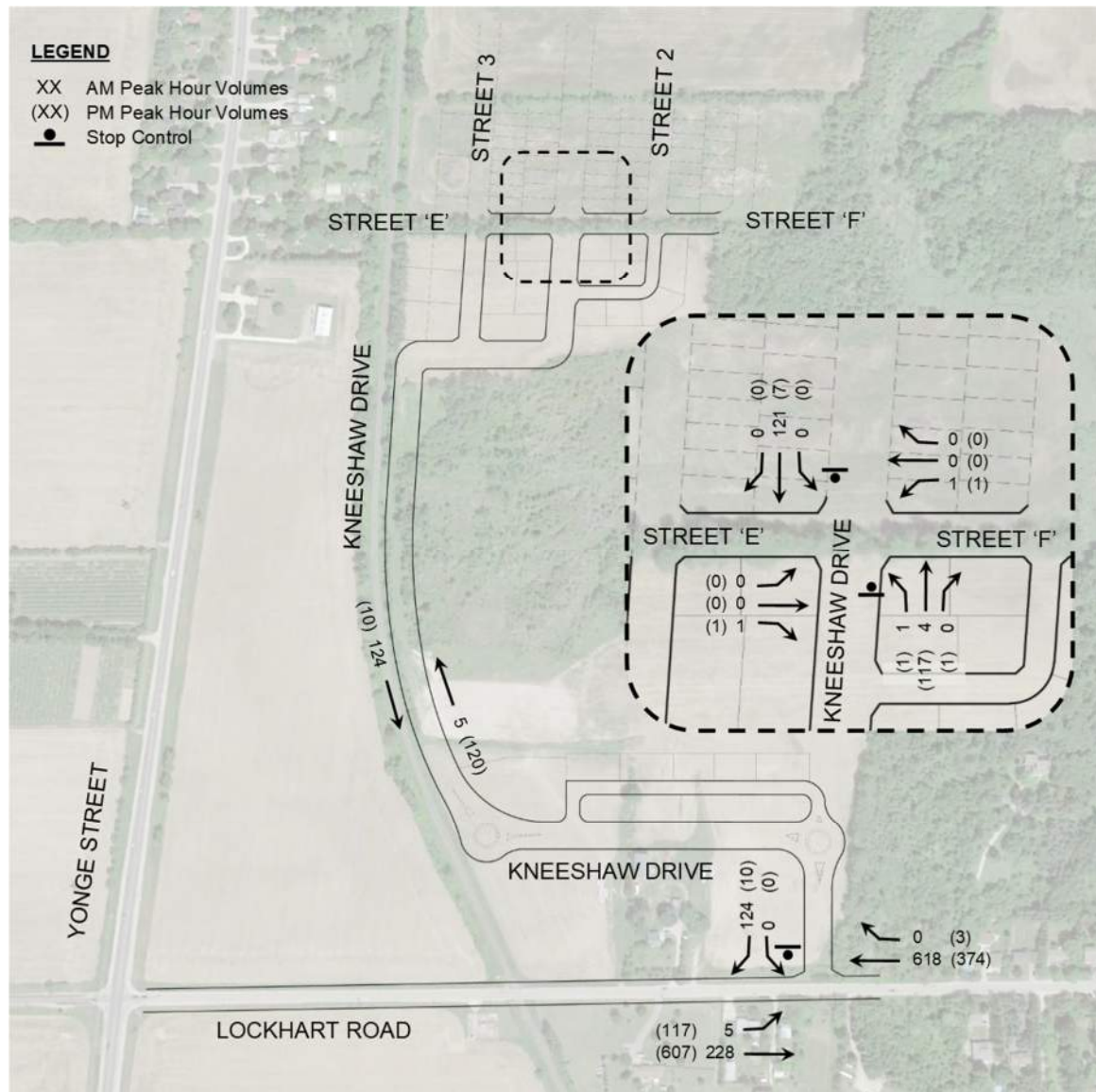
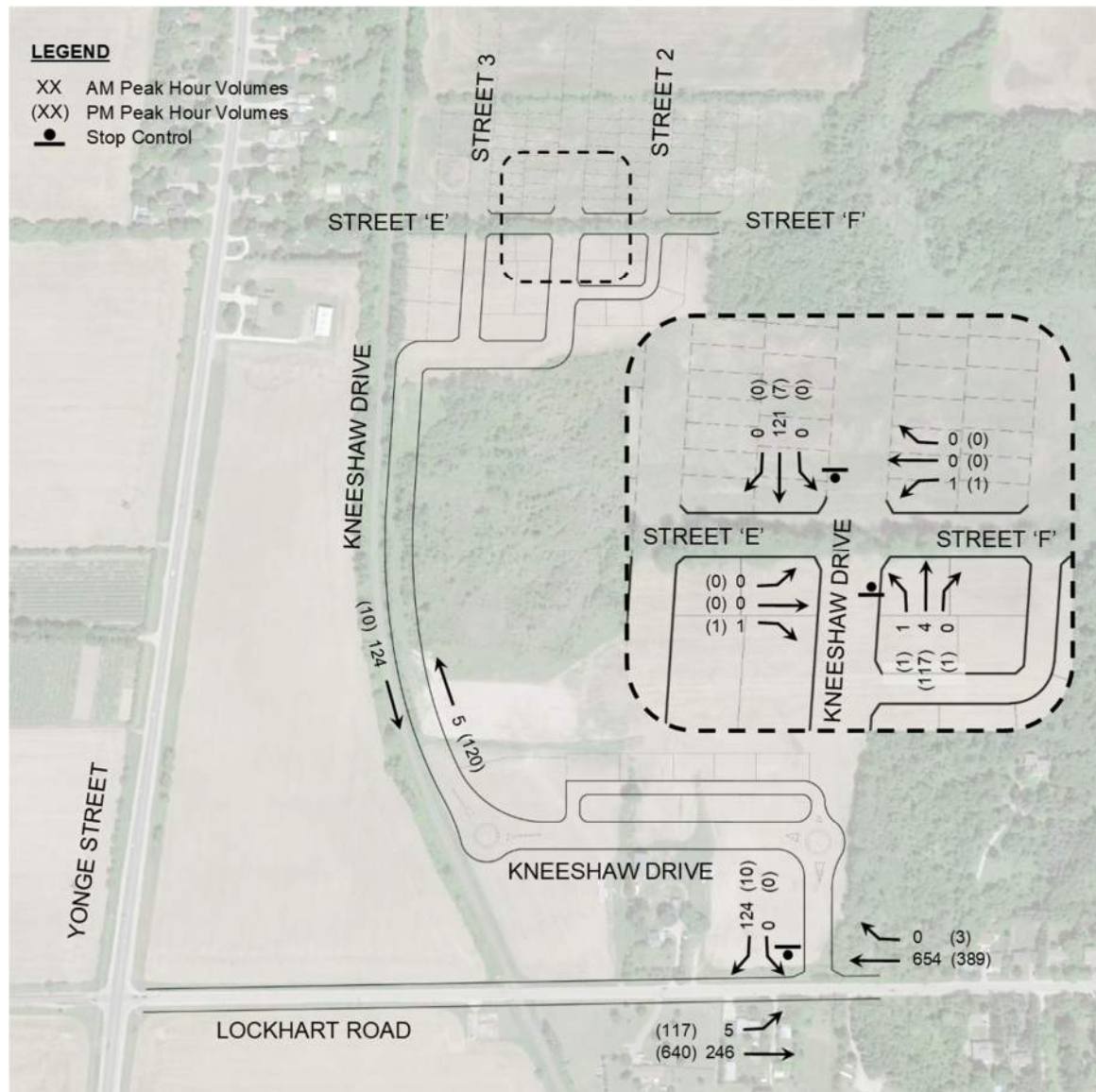


Figure 5-2 Background (2031) Traffic Volumes



6 SITE TRAFFIC

6.1 Site Trip Generation

The proposal for the Ballymore Draft Plan is to develop the area into a residential development with a total of 123 townhouse and 346 apartment units.

The traffic generation for the subject site has been based on proxy site trip generation rates utilized in the Updated Master Transportation Study, which confirmed that:

“...the proxy site trip generation rates are lower than ITE rates for Single Family Detached Housing land use, but it should be noted that the subject development is comprised of mix of uses and mix of residential unit types. Therefore, there will be some internal trip generation within the subdivisions and the proxy site rates are used to evaluate the external trips only. This is similar to the City of Barrie Emme model, while the ITE rates incorporate both external and internal trips. Furthermore, the proxy site trip generation rates are greater than other types of residential units that are included in the proposed development such as Townhouses and low-rise apartments. The proposed proxy rates are well placed in the range of rates observed and reported by the ITE surveys for the Single Family Detached Housing.”

The trip rates from the above-noted proxy site were adopted for the 2023 and 2031 planning horizons and applied to the respective estimated build-out of residential units. The estimated total trip generation of the subject site is illustrated in **Tables 6-1** and **6-2**.

Table 6-1 Site Trip Generation (2023 Horizon Year)

Parameters	160 – Unit Residential Peak Hour Trip Generation					
	Weekday AM			Weekday PM		
	In	Out	Total	In	Out	Total
Proxy Rates	0.14	0.34	0.48	0.41	0.25	0.66
Total Trips	22	55	77	66	40	106

The proposed development, during the 2023 planning horizon, is expected to generate a total of 77 vehicle trips during the AM peak hour consisting of 22 inbound and 55 outbound trips. During the PM peak hour, it is expected to generate 106 new vehicle trips consisting of 66 inbound and 40 outbound trips.

Table 6-2 Site Trip Generation (2031 Horizon Year)

Parameters	469 – Unit Residential Peak Hour Trip Generation					
	Weekday AM			Weekday PM		
	In	Out	Total	In	Out	Total
Proxy Rates	0.14	0.34	0.48	0.41	0.25	0.66
Total Trips	65	160	225	193	118	311

Full build-out of the development lands is expected within the 2031 planning horizon and is expected to generate a total of 225 vehicle trips during the AM peak hour consisting of 65 inbound and 160 outbound trips. During the PM peak hour, it is expected to generate 311 new vehicle trips consisting of 193 inbound and 118 outbound trips.

6.2 Site Trip Distribution and Assignment

The distribution of site trips at Lockhart Road was based on the 2031 results from the Aimsun model discussed in the modeling report appended to the Updated Master Transportation Study. The Aimsun 2031 volume outputs are located in Appendix H of that report.

The distribution of trips at Lockhart Road and Kneeshaw is illustrated in **Table 6-3**.

Table 6-3 Distribution of Traffic from the Proposed Development

Peak Hour	Ingress Traffic Direction		Egress Traffic Direction	
	Eastbound via Lockhart Road	Westbound via Lockhart Road	Eastbound via Lockhart Road	Westbound via Lockhart Road
AM	94%	6%	1%	99%
PM	98%	2%	2%	98%

Overall, 50% of the site trips originating north of the NHS were assigned to Lockhart Road, and 50% to Maplevue Drive East. A full 100% of the site traffic originating south of the NHS was assigned to Lockhart Road as a conservative measure to isolate the impacts at this future arterial road intersection.

Figures 6-1 and 6-2 illustrate the 2023, and 2031 estimated site trips generated by the proposed Ballymore development which are assigned to the nearby road network for the weekday AM and PM peak hours.

Figure 6-1 2023 Site Traffic Volumes

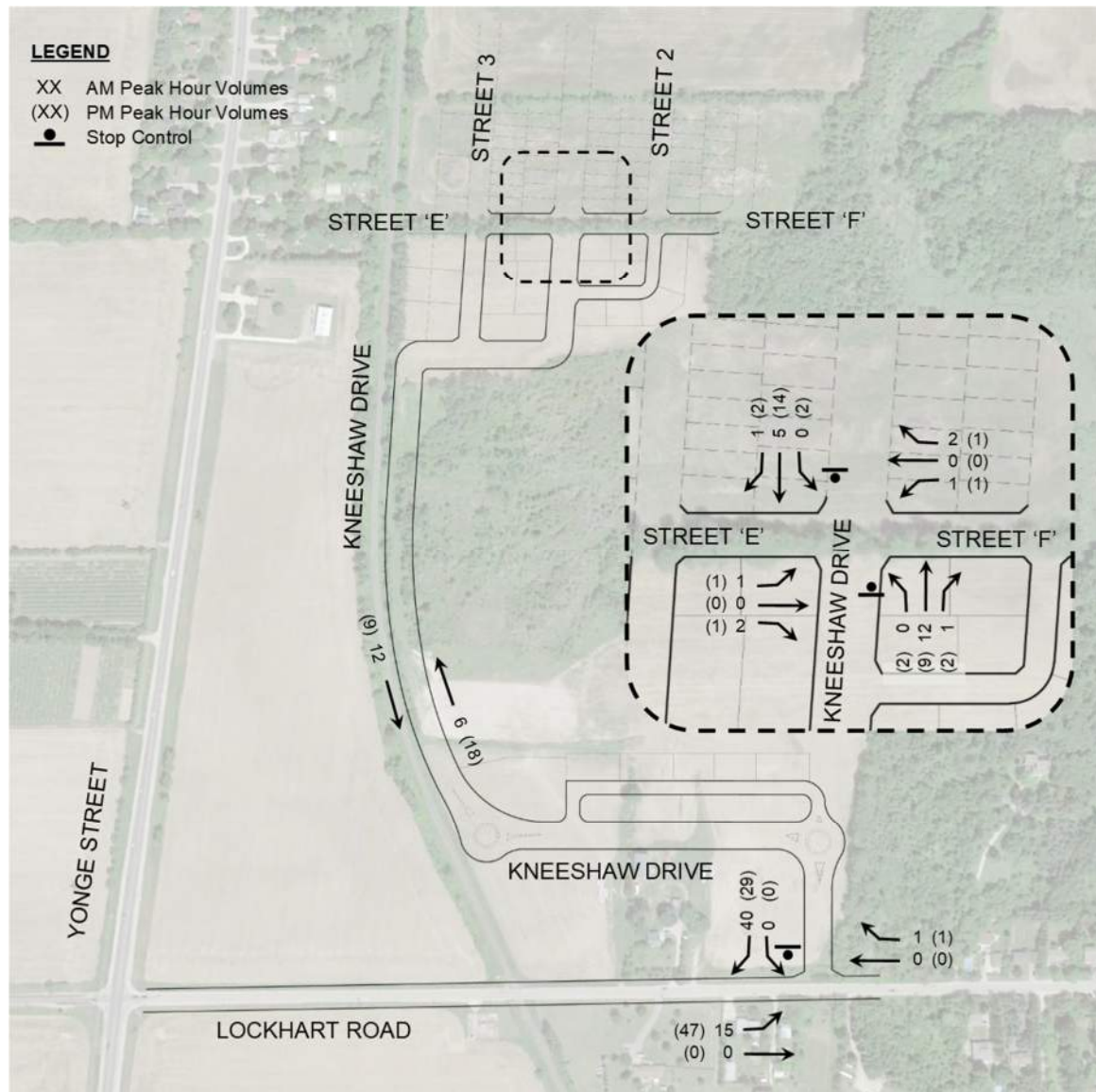
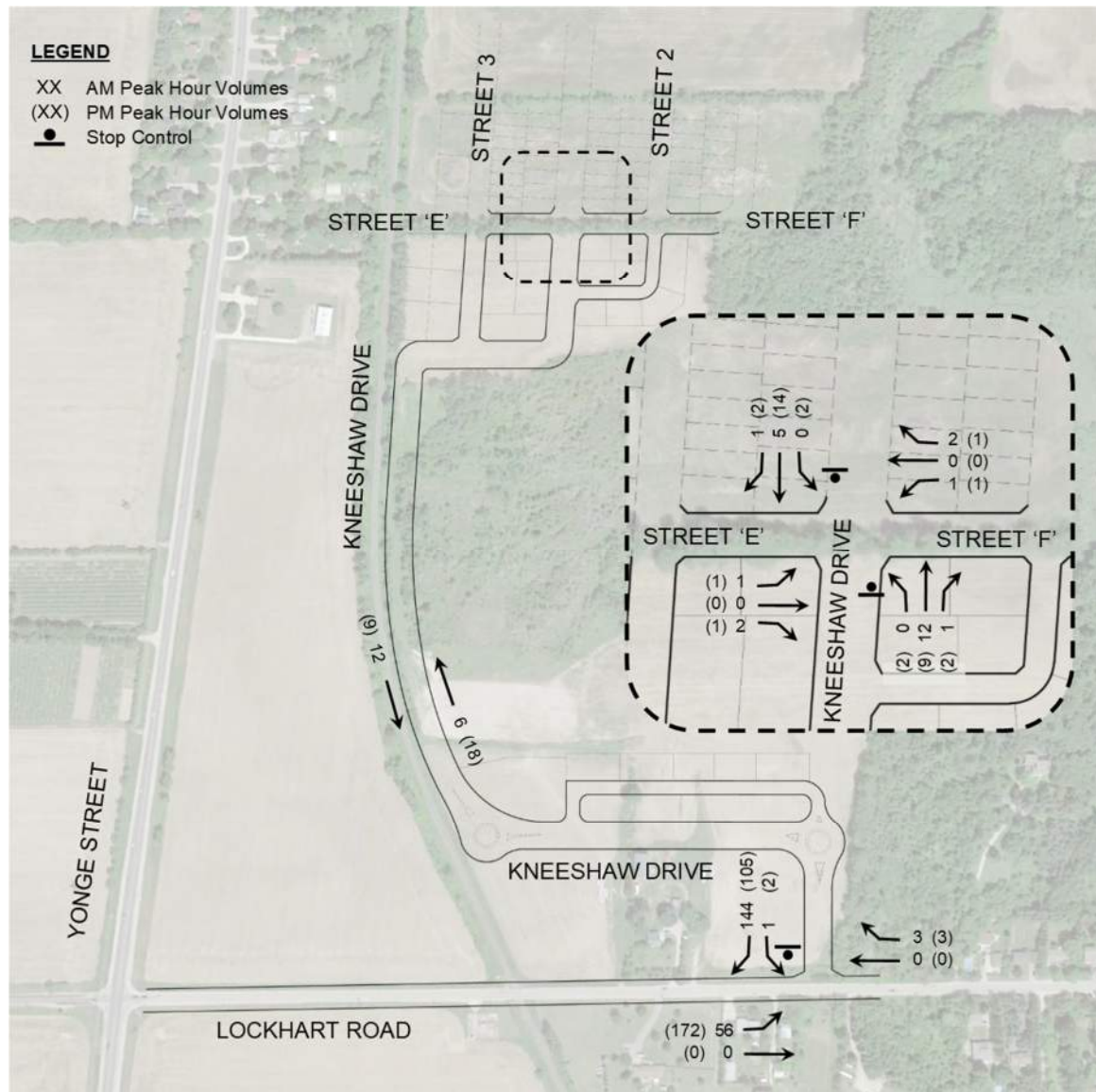


Figure 6-2 2031 Site Traffic Volumes



7 FUTURE TOTAL TRAFFIC

The future total traffic conditions for the peak study hours in the 2023 and 2031 planning horizon were derived by combining the projected 2023 and 2031 future background traffic with the estimated site generated trips.

Figures 7-1 and 7-2 summarize the future total traffic volumes for the 2023 and 2031 planning horizon during the weekday AM and PM peak hours.

Figure 7-1 Total 2023 Traffic Volumes

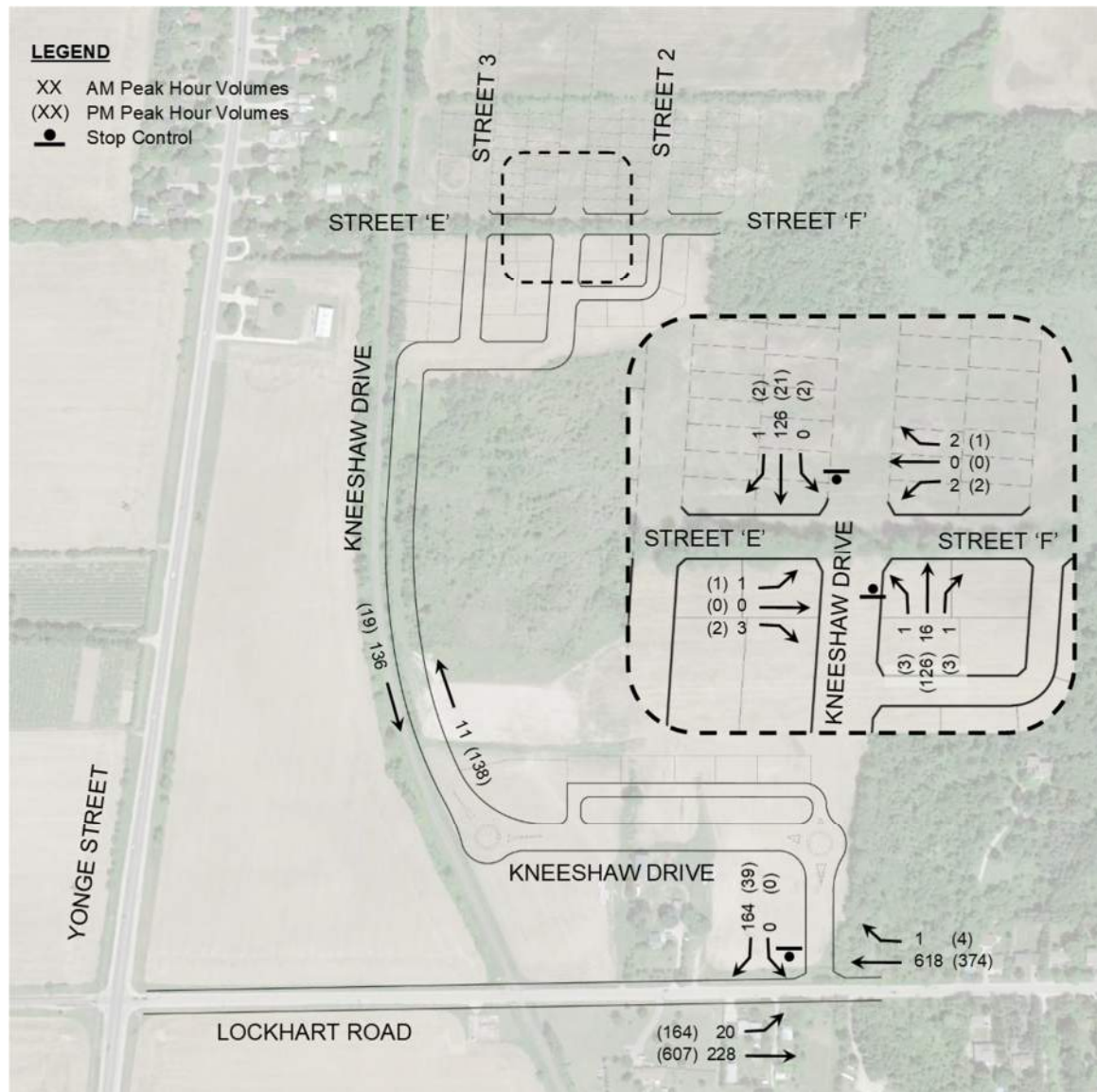
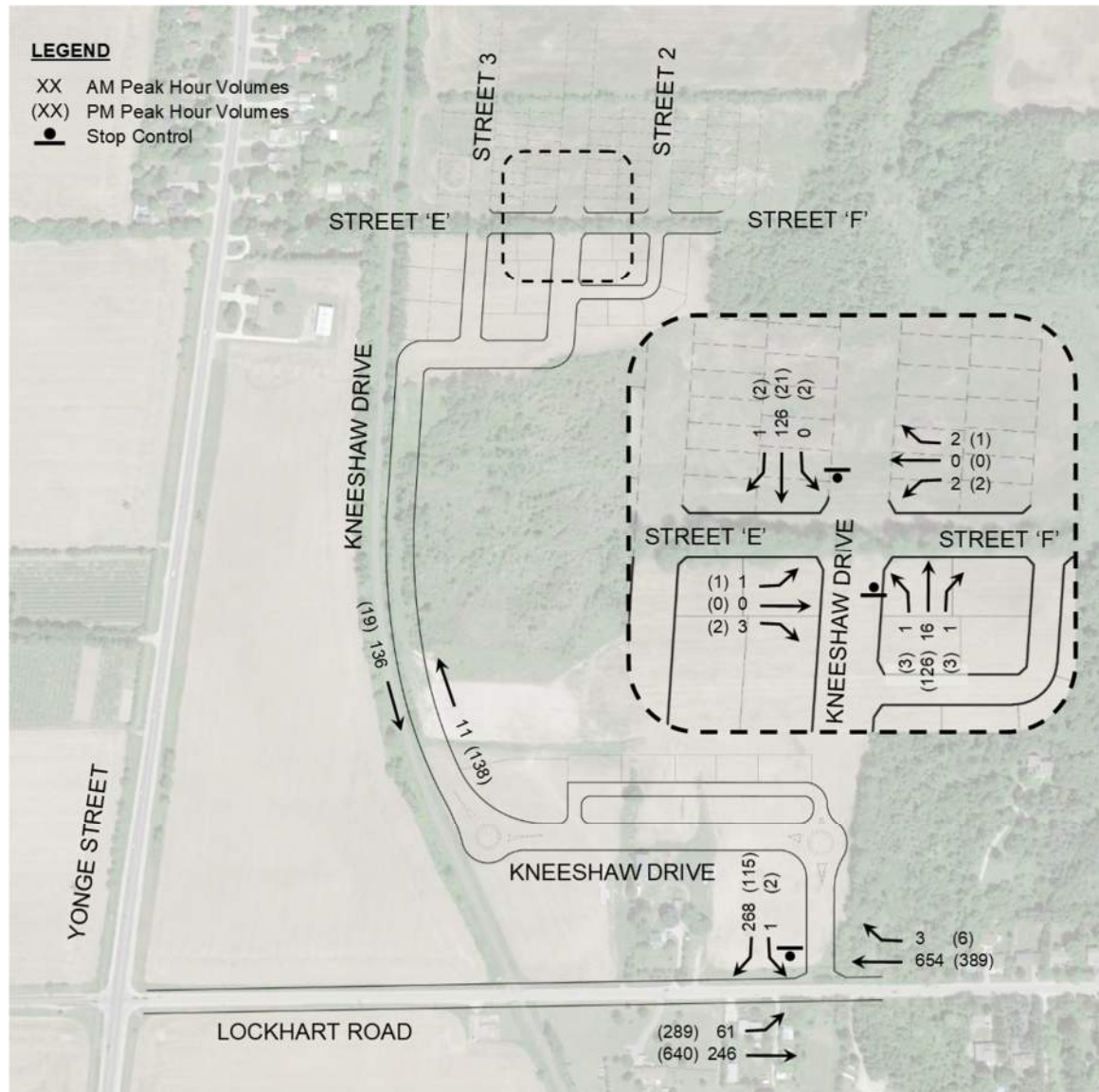


Figure 7-2 Total 2031 Traffic Volumes



8 CAPACITY ANALYSIS

8.1 Site Access Intersection Capacity Analysis

The results of the intersection capacity analysis at the study area intersections during the a.m. and p.m. peak hours are summarized in **Table 8-1 and 8-2** respectively. The tables only include the movements of interest with either a volume-to-capacity (V/C) ratio of 0.85 and higher, or a level of service (LOS) of E and higher. The detailed synchro output sheets are provided in **Appendix H**.

Table 8-1 2023 Capacity Analysis

Intersection	Movement	Weekday AM Peak				Weekday PM Peak			
		v/c	LOS	Delay (sec)	95 th Queue (m)	v/c	LOS	Delay (sec)	95 th Queue (m)
2023 Background									
Kneeshaw Drive & Lockhart Road	EBL	0.01	A	1	1 veh.	0.11	A	2	1 veh.
	SBLR	0.20	B	12	1 veh.	0.01	A	10	1 veh.
Kneeshaw Drive & Street E & F	EBLTR	0.00	A	9	0	0.00	A	9	0
	WBLTR	0.00	A	10	0	0.00	A	10	0
	NBLTR	0.00	A	2	0	0.00	A	1	0
	SBLTR	0.00	-	0	0	0.00	-	-	0
2023 Total									
Kneeshaw Drive & Lockhart Road	EBL	0.02	A	1	1 veh.	0.16	A	2	1 veh.
	SBLR	0.27	B	13	10	0.05	A	10	1 veh.
Kneeshaw Drive & Street E & F	EBLTR	0.00	A	10	1 veh.	0.00	A	9	1 veh.
	WBLTR	0.00	A	9	1 veh.	0.00	A	10	1 veh.
	NBLTR	0.00	A	1	0	0.00	A	1	0
	SBLTR	0.00	-	0	0	0.00	A	1	0

Under the future total 2023 traffic conditions, with the combination of background development, corridor growth, and Ballymore Phase 1 north parcel site traffic, the study intersections are expected to operate with excellent operational characteristics and substantial reserve capacity during both study peak hours.

Table 8-2 Ultimate Horizon (2031)

Intersection	Movement	Weekday AM Peak				Weekday PM Peak			
		v/c	LOS	Delay (sec)	95 th Queue (m)	v/c	LOS	Delay (sec)	95 th Queue (m)
2031 Background									
Kneeshaw Drive & Lockhart Road	EBL	0.01	A	1	1 veh.	0.11	A	9	3
	SBLR	0.21	B	12	1 veh.	0.01	A	10	0
Kneeshaw Drive & Street E & F	EBLTR	0.00	A	9	0	0.00	A	9	0
	WBLTR	0.00	A	10	0	0.00	A	10	0
	NBLTR	0.00	A	2	0	0.00	A	1	0
	SBLTR	0.00	-	0	0	0.00	-	0	0
2031 Total									
Kneeshaw Drive & Lockhart Road	EBL	0.07	A	2	1 veh.	0.28	A	3	10
	SBLR	0.46	C	16	20	0.18	B	12	1 veh.
Kneeshaw Drive & Street E & F	EBLTR	0.00	A	9	1 veh.	0.00	A	9	1 veh.
	WBLTR	0.00	A	9	1 veh.	0.00	A	10	1 veh.
	NBLTR	0.00	A	1	0	0.00	A	1	0
	SBLTR	0.00	-	0	0	0.00	A	1	0

Under the future total 2031 traffic conditions, the impact of the added site traffic is only marginally apparent, and the overall operations can be expected to remain excellent during both study peak hours.

9 CONCLUSION

Ballymore Building (Barrie) Corp. retained The Municipal Infrastructure Group (TMIG) to prepare this traffic impact study in support of the residential development located on the south half of Lot 16, Concession 11 of the Hewitt's Secondary Plan Area in the City of Barrie. The proposed Draft Plan is shown in **Appendix A**. This chapter summarizes the conclusions and recommendations from the study.

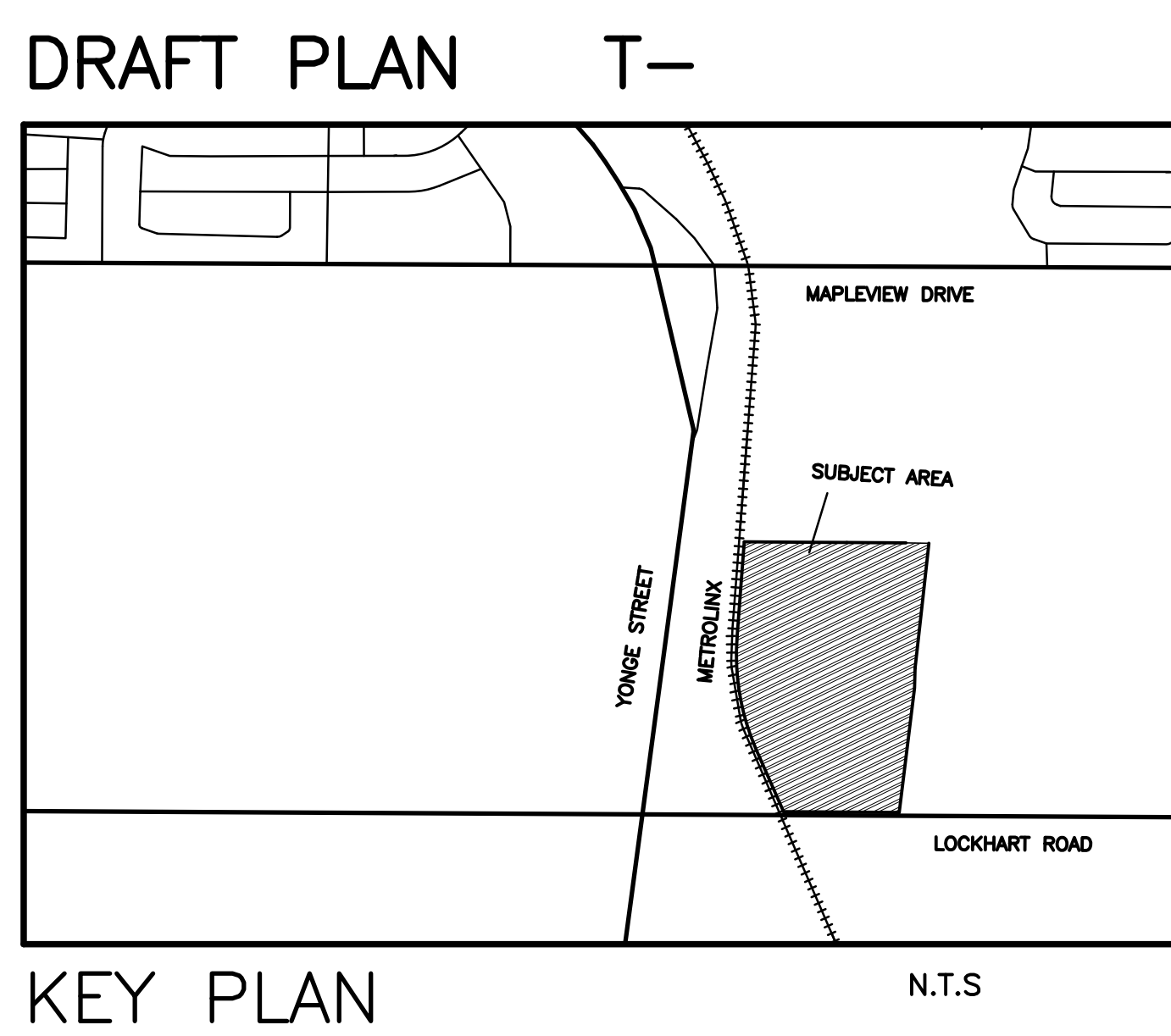
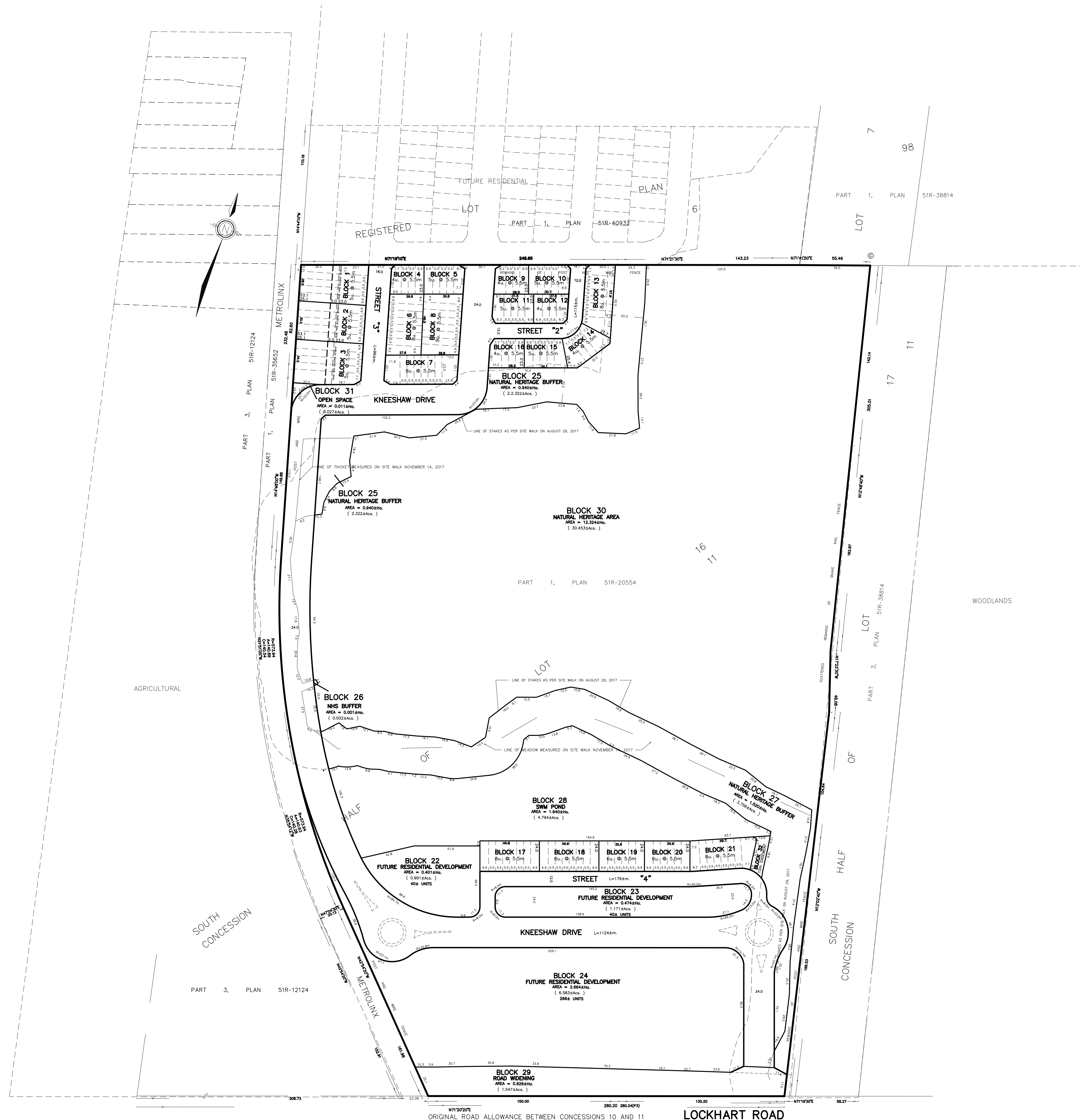
1. The subject site includes 123 townhouse units and 346 apartment units with a total of 469 units. Vehicular access to the development is proposed via two full-moves at the unsignalized intersection of Kneeshaw Drive and Maplevue Drive East and Kneeshaw Drive and Lockhart Road.
2. This Traffic Impact Study builds upon the LEA Master Transportation Study with a focus on the proposed Ballymore Barrie development, which is expected to be developed within Phase 3 of the Hewitt Secondary Plan Area development.
3. Based on development proposal, traffic scenarios for the Phase 1 buildout year (2023), and the Hewitt development full-buildout year (2031) were selected for analysis of traffic operations in the study area. The results and recommendations presented in this study correspond to that proposed for the Ultimate horizon in the Updated Master Transportation Study in order to maintain consistency and develop the lands for the full build-out of the Hewitt Lands.
4. The proposed development, during the 2023 planning horizon, is expected to generate a total of 59 vehicle trips during the AM peak hour consisting of 17 inbound and 42 outbound trips. During the PM peak hour, it is expected to generate 82 new vehicle trips consisting of 51 inbound and 31 outbound trips.
5. Full build-out of the development lands is expected within the 2031 planning horizon and is expected to generate a total of 225 vehicle trips during the AM peak hour consisting of 65 inbound and 160 outbound trips. During the PM peak hour, it is expected to generate 311 new vehicle trips consisting of 193 inbound and 118 outbound trips.
6. Traffic calming measures were reviewed for the minor collector road – Kneeshaw Drive, to promote increased pedestrian, cycle and transit usage in an effort to help reduce the negative effects of motor vehicles on the environment as well slower speeds.

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

APPENDIX A

DRAFT PLAN OF SUBDIVISION

DRAFT PLAN OF SUBDIVISION
PART OF THE SOUTH HALF OF LOT 16,
CONCESSION 11
(GEOGRAPHIC TOWNSHIP OF INNISFIL)
CITY OF BARRIE
COUNTY OF SIMCOE
SCALE 1:1000



SECTION 51, PLANNING ACT,
ADDITIONAL INFORMATION

A. AS SHOWN ON DRAFT PLAN
B. AS SHOWN ON DRAFT PLAN
C. AS SHOWN ON DRAFT PLAN
D. SEE SCHEDULE OF LAND USE
E. AS SHOWN ON DRAFT PLAN
F. AS SHOWN ON DRAFT PLAN
G. AS SHOWN ON DRAFT PLAN
H. MUNICIPAL PIPED WATER AVAILABLE AT TIME OF DEVELOPMENT
I. CLAY-LOAM
J. AS SHOWN ON DRAFT PLAN
K. SANITARY AND STORM SEWERS, GARBAGE COLLECTION, FIRE PROTECTION
L. AS SHOWN ON DRAFT PLAN

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED AS SHOWN ON THIS PLAN, AND THEIR RELATIONSHIP TO THE ADJACENT LAND ARE ACCURATELY AND CORRECTLY SHOWN.

DATE -----, 2018

PIER DE ROSA OLS
J.D. BARNES LTD.

OWNER'S CERTIFICATE

I AUTHORIZE KLM PLANNING PARTNERS INC. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE CITY OF BARRIE FOR APPROVAL.

OWNER

BALLYMORE BUILDING
(BARRIE) CORP.

12840 YONGE STREET
SUITE 200
RICHMOND HILL, ON
L4E 4H1

LOUIE MORRA A.S.O.

SCHEDULE OF LAND USE

TOTAL AREA OF LAND = 26.416±Ha. (65.275±Acs)

TOWNHOUSE DWELLINGS	BLOCKS	LOTS	UNITS	±Ha.	±Acs.
STREET TOWNHOUSES					
BLOCKS 1-21	21	123	2.153	5.320	
MIN. UNIT FRONTAGE = 5.5m.					
FUTURE RESIDENTIAL DEVELOPMENT					
BLOCKS 22-24	3	346*	3.544	8.758	
SUBTOTAL	24	469*	5.697	14.077	
BLOCKS 25-27 - NATURAL HERITAGE BUFFER 30m	3		2.461	6.081	
BLOCK 28 - SWM POND	1		1.940	4.794	
BLOCK 29 - ROAD WIDENING	1		0.626	1.547	
BLOCK 30 - NATURAL HERITAGE AREA	1		12.324	30.453	
BLOCK 31 - OPEN SPACE	1		0.011	0.027	
BLOCK 32 - 10m EASEMENT	1		0.030	0.074	
STREETS AND LANEWAYS			3.327	8.221	
24.0m WIDE TOTAL LENGTH= 1124±m. AREA=2.700±Ha.					
18.0m WIDE TOTAL LENGTH= 96±m. AREA=0.172±Ha.					
12.0m WIDE TOTAL LENGTH= 379±m. AREA=0.455±Ha.					
TOTAL LENGTH= 1599±m. AREA=3.327±Ha.					
TOTAL	32	469*	26.416	65.275	

NOTE — ELEVATIONS RELATED TO CANADIAN GEODETIC DATUM

NOTE —*SUBJECT TO FINAL CALCULATION

PROJECT No. P-3006

SCALE 1:1000 FEB. 1, 2019

(3006DES9) X-REF: (3006MAS1 & 3006TOPO)

KLM DWG. No. - 19:3

PLANNING PARTNERS INC. 64 JARDIN DRIVE - UNIT 1B, CONCORD ONTARIO L4K 3P3

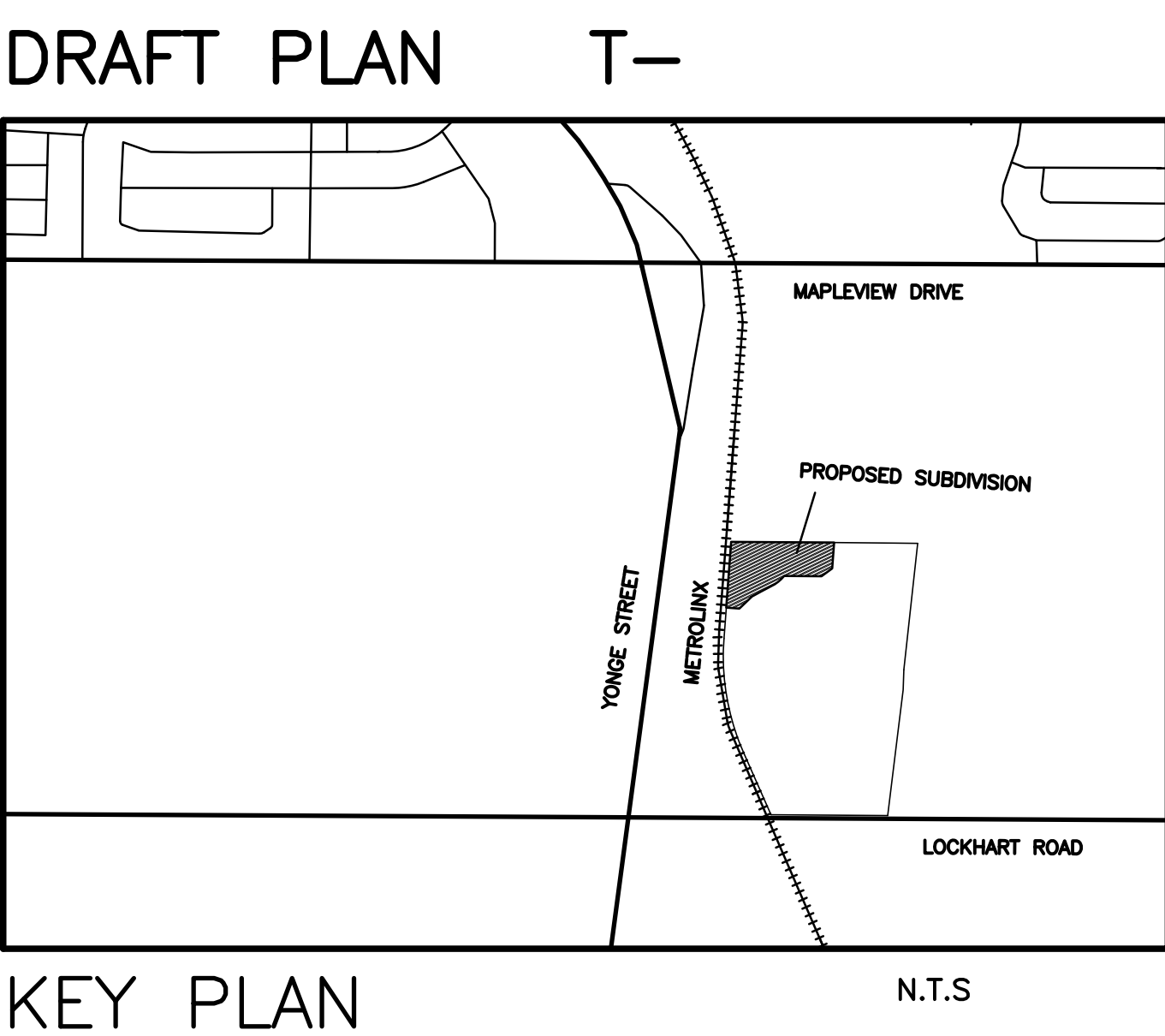
TEL: (905) 669-4055 FAX: (905) 669-0097 design@klmplanning.com

Planning • Design • Development

APPENDIX B

CONFORMITY SUBMISSION ROAD ALIGNMENT

DRAFT PLAN OF SUBDIVISION
PART OF THE SOUTH HALF OF LOT 16,
CONCESSION 11
(GEOGRAPHIC TOWNSHIP OF INNISFIL)
CITY OF BARRIE
COUNTY OF SIMCOE
SCALE 1:1000



SECTION 51, PLANNING ACT,
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DATE -----, 2018
PIER DE ROSA OLS
J.D. BARNES LTD.

OWNER’S CERTIFICATE

I AUTHORIZE KLM PLANNING PARTNERS INC. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE CITY OF BARRIE FOR APPROVAL.

OWNER
BALLYMORE (BARRIE)
BUILDING CORP.
12840 YONGE STREET
SUITE 200
RICHMOND HILL, ON
L4E 4H1
SHARON DIONNE A.S.O.

SCHEDULE OF LAND USE

TOTAL AREA OF LAND = 26.416±Ha. (65.275±Acs)
TOTAL AREA OF LAND TO BE SUBDIVIDED = 2.595±Ha. (6.412±Acs)

	BLOCKS	LOTS	UNITS	±Ha.	±Acs.
<u>TOWNHOUSE DWELLINGS</u>					
<u>STREET TOWNHOUSES</u>					
BLOCKS 1 - 17	17	80	1,386	3.425	
MIN. UNIT FRONTAGE = 5.5m.					
SUBTOTAL	17	80	1,386	3.425	
BLOCK 18 - RAILWAY BUFFER	1		0,363	0.897	
STREETS			0,846	2.091	
24.0m WIDE TOTAL LENGTH= 2188m. AREA=0.524±Ha.					
18.0m WIDE TOTAL LENGTH= 993m. AREA=0.178±Ha.					
12.0m WIDE TOTAL LENGTH= 1223m. AREA=0.146±Ha.					
TOTAL LENGTH= 4388m. AREA=0.846±Ha.					
TOTAL	18	80	2,595	6.412	

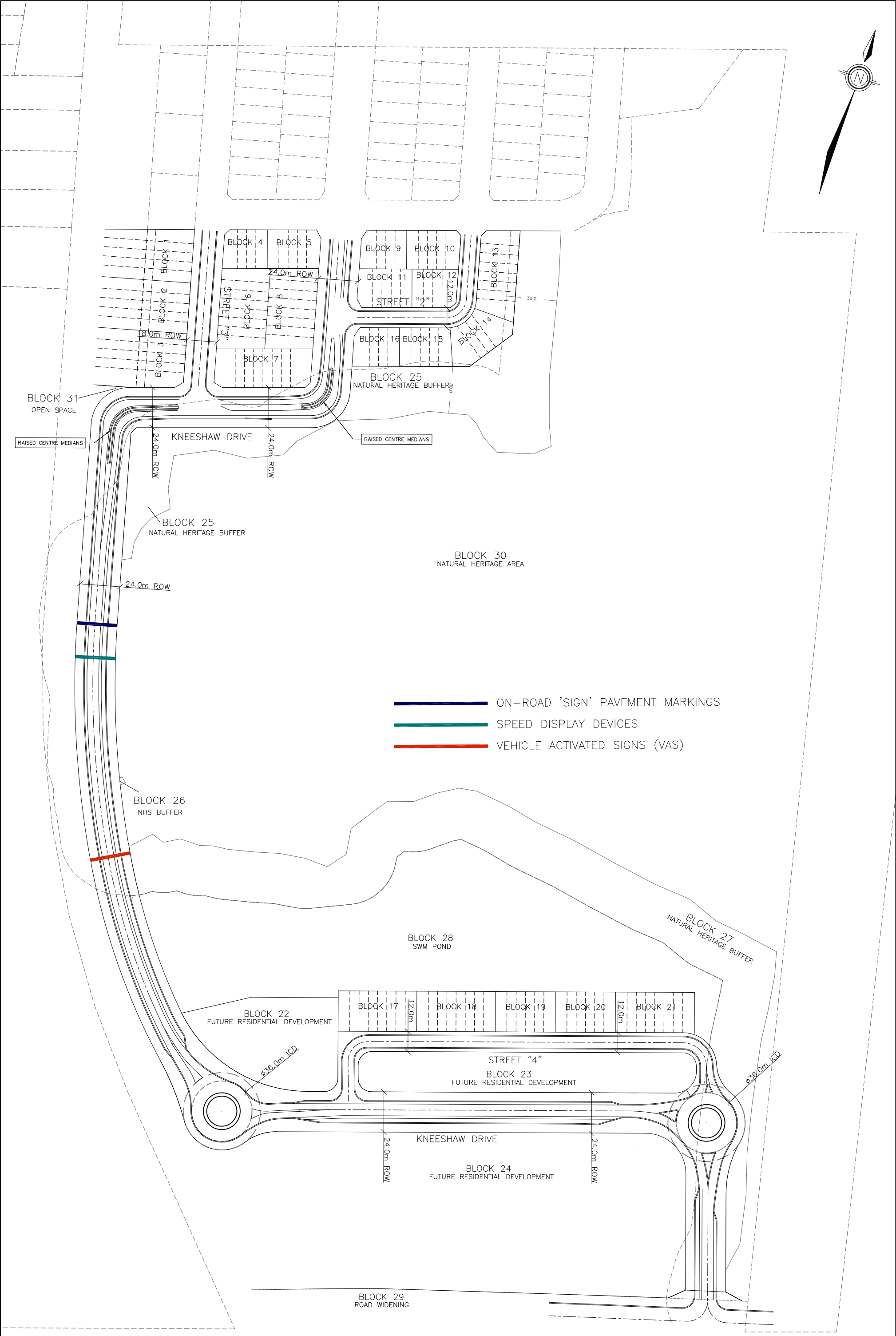
NOTE — ELEVATIONS RELATED TO CANADIAN GEODETIC DATUM

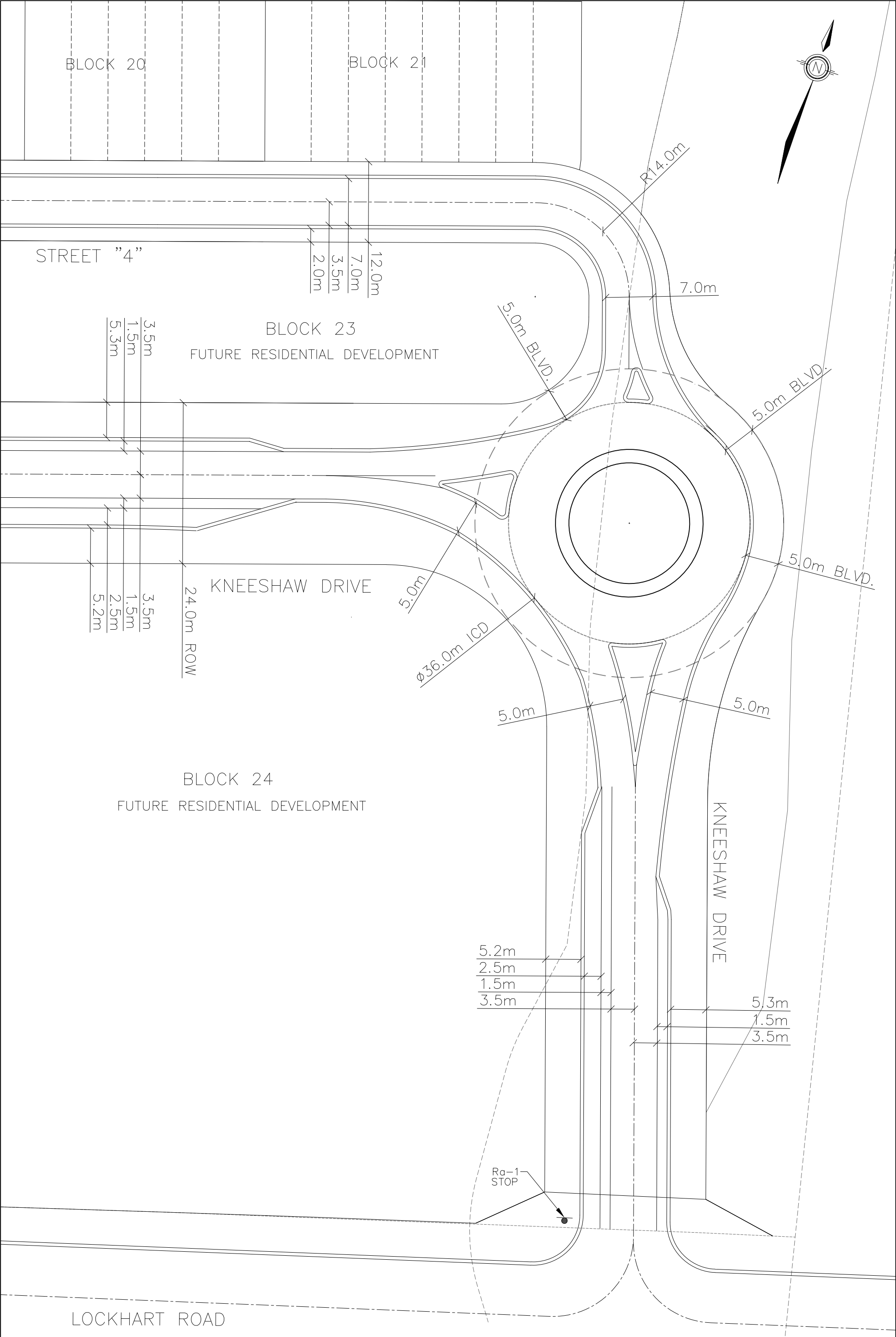
PROJECT No. P-3006
SCALE 1:1000 SEP. 10, 2018
(3006DES1) X-REF: (3006MAS1 & 3006TOPO)
KLM DWG. No. - 18:1
PLANNING PARTNERS INC. 64 JARDIN DRIVE - UNIT 1B, CONCORD ONTARIO L4K 3P3
TEL: (905) 669-4055 FAX: (905) 669-0097 design@klmplanning.com
Planning • Design • Development

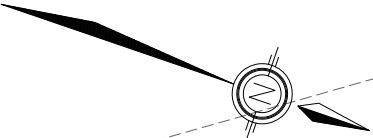


APPENDIX C

DRAFT PLAN FUNCTIONAL DESIGN (NEW COLLECTOR ROAD ALIGNMENT AND TRAFFIC CALMNG MEASURES)







3.5m
1.5m
5.3m

3.5m
1.5m
2.5m
5.3m

R12.0m

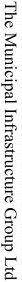
STREET "4"

5.0m BLVD.

R7.5m

$$\begin{array}{r} 12.0\text{m} \\ 7.0\text{m} \\ 3.5\text{m} \\ 2.0\text{m} \end{array}$$

24.0m ROW

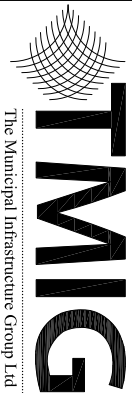
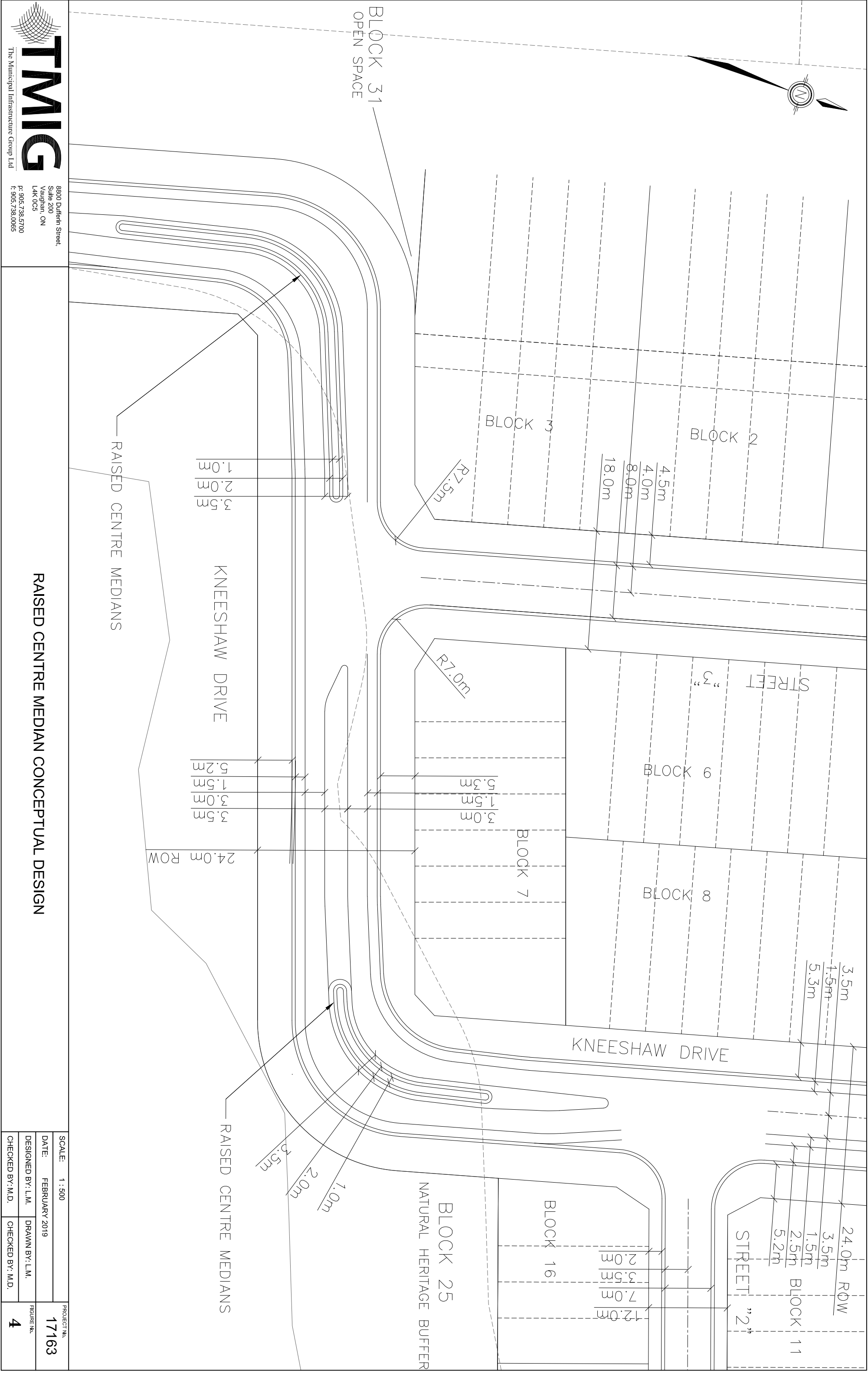


T: 905.738.0065

SCALE: 1 : 500	
DATE: FEBRUARY 2019	
DESIGNED BY: L.M.	DRAWN BY: L.M.
CHECKED BY: M.D.	CHECKED BY: M.D.

FIGURE No

3



8800 Dufferin Street,
Suite 200
Vaughan, ON
L4K 0C5
P: 905.738.5700
F: 905.738.0065

SCALE: 1 : 500		PROJECT No.
DATE: FEBRUARY 2019		17163
DESIGNED BY: L.M.	DRAWN BY: L.M.	FIGURE No.
CHECKED BY: M.D.	CHECKED BY: M.D.	4

APPENDIX D

BARRIE TRANSIT AND GO TRANSIT MAPS AND SCHEDULES

BARRIE TRANSIT SYSTEM MAP

ROUTE LEGEND

- 100**
A: Northbound - Express to GC
B: Southbound - Express to DT
C: Northbound - Express to GM Via GC
D: Southbound - Express to DT Via GC
○ Express Stop
- 1**
A: Northbound - Georgian Mall
B: Southbound - Welham
- 2**
A: Northbound - Dunlop
B: Southbound - Park Place
- 3**
A: Northbound - Georgian
B: Southbound - Painswick
- 4**
A: Northbound - East Bayfield
B: Southbound - South GO
- 5**
A: Eastbound - Blake
B: Westbound - Edgehill
- 6**
A: Clockwise - Letitia
B: Counter Clockwise - College
- 7**
A: Northbound - Bell Farm
B: Southbound - Bear Creek
- 8**
A: RVH/Yonge (Northbound & Southbound)
B: Park Place (Northbound & Southbound)
- 11**
A: Northbound - Allandale Rec.
B: Southbound - Lockhart
- 90**
A: Clockwise - Angus Border
B: Counter Clockwise - Peacekeepers Way

TRANSIT HUBS

GC	Georgian College	AG	Allandale GO
GM	Georgian Mall	PP	Park Place
DT	Downtown Terminal	BSG	Barrie South GO

DOWNTOWN INSERT



Map Date: 28/01/2019

ROUTE 90 INSERT

Route 90 • Barrie ↔ Base Borden



Looking for More Information?



Visit MyRideBarrie.ca for real-time bus arrival and trip planning.



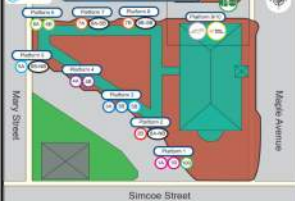
Visit barrie.ca/transit for schedule and fare information.



Contact us by email at ServiceBarrie@barrie.ca or by phone at (705) 726-4242.

PLATFORM MAPS

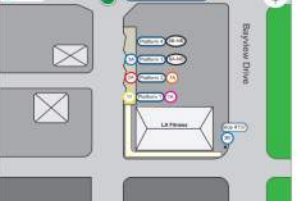
Barrie Downtown Terminal



Barrie Allandale GO Station



Barrie Park Place



Barrie Barrie South GO



CFB BORDEN

Map produced, in part, under license from ©The Corporation of the County of Simcoe & its suppliers

Sunday Schedule

Route 4A East Bayfield

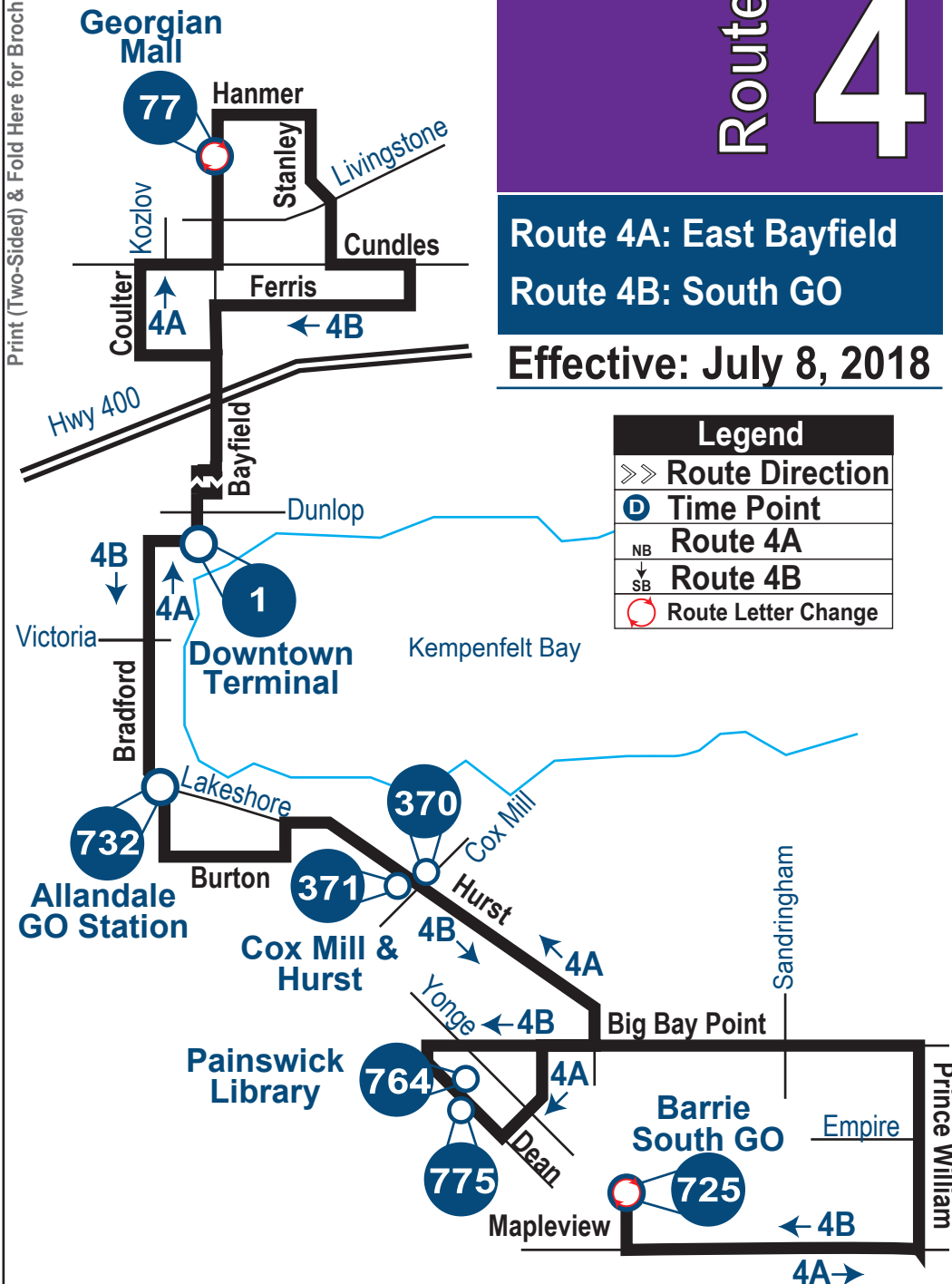
Barrie South GO (Depart)	Painswick Library	Cox Mill & Hurst	Allandale GO Station	Downtown Terminal	Georgian Mall (Arrive)
725	764	370	732	1	77
9:15 AM	9:30 AM	9:39 AM	9:51 AM	9:58 AM	10:18 AM
10:20 AM	10:35 AM	10:44 AM	10:56 AM	11:03 AM	11:23 AM
11:25 AM	11:40 AM	11:49 AM	12:01 PM	12:08 PM	12:28 PM
12:30 PM	12:45 PM	12:54 PM	1:06 PM	1:13 PM	1:33 PM
1:35 PM	1:50 PM	1:59 PM	2:11 PM	2:18 PM	2:38 PM
2:40 PM	2:55 PM	3:04 PM	3:16 PM	3:23 PM	3:43 PM
3:45 PM	4:00 PM	4:09 PM	4:21 PM	4:28 PM	4:48 PM
4:50 PM	5:05 PM	5:14 PM	5:26 PM	5:33 PM	5:53 PM
5:55 PM	6:10 PM	6:19 PM	6:31 PM	6:38 PM	6:58 PM
7:00 PM	7:15 PM	7:24 PM	7:36 PM	7:43 PM	8:03 PM
8:05 PM	8:20 PM	8:29 PM	8:41 PM	8:48 PM	9:08 PM
9:10 PM	9:25 PM	9:34 PM	9:46 PM	9:53 PM	10:13 PM

Route 4B South GO

Georgian Mall (Depart)	Downtown Terminal	Allandale GO Station	Cox Mill & Hurst	Painswick Library	Barrie South GO (Arrive)
77	1	732	371	775	725
9:17 AM	9:38 AM	9:45 AM	9:56 AM	10:05 AM	10:20 AM
10:22 AM	10:43 AM	10:50 AM	11:01 AM	11:10 AM	11:25 AM
11:27 AM	11:48 AM	11:55 AM	12:06 PM	12:15 PM	12:30 PM
12:32 PM	12:53 PM	1:00 PM	1:11 PM	1:20 PM	1:35 PM
1:37 PM	1:58 PM	2:05 PM	2:16 PM	2:25 PM	2:40 PM
2:42 PM	3:03 PM	3:10 PM	3:21 PM	3:30 PM	3:45 PM
3:47 PM	4:08 PM	4:15 PM	4:26 PM	4:35 PM	4:50 PM
4:52 PM	5:13 PM	5:20 PM	5:31 PM	5:40 PM	5:55 PM
5:57 PM	6:18 PM	6:25 PM	6:36 PM	6:45 PM	7:00 PM
7:02 PM	7:23 PM	7:30 PM	7:41 PM	7:50 PM	8:05 PM
8:07 PM	8:28 PM	8:35 PM	8:46 PM	8:55 PM	9:10 PM
9:12 PM	9:33 PM	9:40 PM	9:51 PM	10:00 PM	10:15 PM
10:17 PM	10:36 PM				

Frequently visit Barrie.ca/transit "Schedules & Maps" for changes in the schedule

Times are approximate. Riders should arrive at the bus stop at least 5 minutes before the scheduled time



Weekday Schedule

Route 4A East Bayfield

Barrie South GO (Depart)	Painwick Library	Cox Mill & Hurst	Allandale GO Station	Downtown Terminal	Georgian Mall (Arrive)
725	764	370	732	1	77
5:45 AM		5:58 AM	6:12 AM	6:20 AM	6:40 AM
6:15 AM		6:28 AM	6:42 AM	6:50 AM	7:10 AM
6:45 AM		6:58 AM	7:12 AM	7:20 AM	7:40 AM
7:20 AM	7:35 AM	7:44 AM	7:56 AM	8:03 AM	8:23 AM
7:55 AM	8:10 AM	8:19 AM	8:31 AM	8:38 AM	8:58 AM
8:30 AM	8:45 AM	8:54 AM	9:06 AM	9:13 AM	9:33 AM
9:05 AM	9:20 AM	9:29 AM	9:41 AM	9:48 AM	10:08 AM
9:40 AM	9:55 AM	10:04 AM	10:16 AM	10:23 AM	10:43 AM
10:15 AM	10:30 AM	10:39 AM	10:51 AM	10:58 AM	11:18 AM
10:50 AM	11:05 AM	11:14 AM	11:26 AM	11:33 AM	11:53 AM
11:25 AM	11:40 AM	11:49 AM	12:01 PM	12:08 PM	12:28 PM
12:00 PM	12:15 PM	12:24 PM	12:36 PM	12:43 PM	1:03 PM
12:35 PM	12:50 PM	12:59 PM	1:11 PM	1:18 PM	1:38 PM
1:10 PM	1:25 PM	1:34 PM	1:46 PM	1:53 PM	2:13 PM
1:45 PM	2:00 PM	2:09 PM	2:21 PM	2:28 PM	2:48 PM
2:20 PM	2:35 PM	2:44 PM	2:56 PM	3:03 PM	3:23 PM
2:55 PM	3:10 PM	3:19 PM	3:31 PM	3:38 PM	3:58 PM
3:30 PM	3:45 PM	3:54 PM	4:06 PM	4:13 PM	4:33 PM
4:05 PM	4:20 PM	4:29 PM	4:41 PM	4:48 PM	5:08 PM
4:40 PM	4:55 PM	5:04 PM	5:16 PM	5:23 PM	5:43 PM
5:15 PM	5:30 PM	5:39 PM	5:51 PM	5:58 PM	6:18 PM
5:50 PM	6:05 PM	6:14 PM	6:26 PM	6:33 PM	6:53 PM
6:25 PM	6:40 PM	6:49 PM	7:01 PM	7:08 PM	7:28 PM
7:00 PM	7:15 PM	7:24 PM	7:36 PM	7:43 PM	8:03 PM
8:05 PM	8:20 PM	8:29 PM	8:41 PM	8:48 PM	9:08 PM
9:10 PM	9:25 PM	9:34 PM	9:46 PM	9:53 PM	10:13 PM
10:15 PM	10:30 PM	10:39 PM	10:51 PM	10:58 PM	11:18 PM

Route 4B South GO

Georgian Mall (Depart)	Downtown Terminal	Allandale GO Station	Cox Mill & Hurst	Painwick Library	Barrie South GO (Arrive)
612	1	732	371	775	725
		5:15 AM	5:26 AM		5:40 AM
		5:45 AM	5:56 AM		6:10 AM
5:45 AM	6:05 AM	6:15 AM	6:26 AM		6:40 AM
6:15 AM	6:35 AM	6:45 AM	6:56 AM		7:10 AM
6:45 AM	7:05 AM	7:15 AM	7:26 AM		7:40 AM
7:22 AM	7:43 AM	7:50 AM	8:01 AM	8:10 AM	8:25 AM
7:57 AM	8:18 AM	8:25 AM	8:36 AM	8:45 AM	9:00 AM
8:32 AM	8:53 AM	9:00 AM	9:11 AM	9:20 AM	9:35 AM
9:07 AM	9:28 AM	9:35 AM	9:46 AM	9:55 AM	10:10 AM
9:42 AM	10:03 AM	10:10 AM	10:21 AM	10:30 AM	10:45 AM
10:17 AM	10:38 AM	10:45 AM	10:56 AM	11:05 AM	11:20 AM
10:52 AM	11:13 AM	11:20 AM	11:31 AM	11:40 AM	11:55 AM
11:27 AM	11:48 AM	11:55 AM	12:06 PM	12:15 PM	12:30 PM
12:02 PM	12:23 PM	12:30 PM	12:41 PM	12:50 PM	1:05 PM
12:37 PM	12:58 PM	1:05 PM	1:16 PM	1:25 PM	1:40 PM
1:12 PM	1:33 PM	1:40 PM	1:51 PM	2:00 PM	2:15 PM
1:47 PM	2:08 PM	2:15 PM	2:26 PM	2:35 PM	2:50 PM
2:22 PM	2:43 PM	2:50 PM	3:01 PM	3:10 PM	3:25 PM
2:57 PM	3:18 PM	3:25 PM	3:36 PM	3:45 PM	4:00 PM
3:32 PM	3:53 PM	4:00 PM	4:11 PM	4:20 PM	4:35 PM
4:07 PM	4:28 PM	4:35 PM	4:46 PM	4:55 PM	5:10 PM
4:42 PM	5:03 PM	5:10 PM	5:21 PM	5:30 PM	5:45 PM
5:17 PM	5:38 PM	5:45 PM	5:56 PM	6:05 PM	6:20 PM
5:52 PM	6:13 PM	6:20 PM	6:31 PM	6:40 PM	6:55 PM
6:27 PM	6:48 PM	6:55 PM	7:06 PM	7:15 PM	7:30 PM
7:02 PM	7:23 PM	7:30 PM	7:41 PM	7:50 PM	8:05 PM
7:32 PM	7:51 PM				
8:07 PM	8:28 PM	8:35 PM	8:46 PM	8:55 PM	9:10 PM
9:12 PM	9:33 PM	9:40 PM	9:51 PM	10:00 PM	10:15 PM
10:17 PM	10:38 PM	10:45 PM	10:56 PM	11:05 PM	11:20 PM
11:22 PM	11:41 PM				

Saturday Schedule

Route 4A East Bayfield

Barrie South GO (Depart)	Painwick Library	Cox Mill & Hurst	Allandale GO Station	Downtown Terminal	Georgian Mall (Arrive)
725	764	370	732	1	77
7:20 AM	7:35 AM	7:44 AM	7:56 AM	8:03 AM	8:23 AM
7:55 AM	8:10 AM	8:19 AM	8:31 AM	8:38 AM	8:58 AM
8:30 AM	8:45 AM	8:54 AM	9:06 AM	9:13 AM	9:33 AM
9:05 AM	9:20 AM	9:29 AM	9:41 AM	9:48 AM	10:08 AM
9:40 AM	9:55 AM	10:04 AM	10:16 AM	10:23 AM	10:43 AM
10:15 AM	10:30 AM	10:39 AM	10:51 AM	10:58 AM	11:18 AM
10:50 AM	11:05 AM	11:14 AM	11:26 AM	11:33 AM	11:53 AM
11:25 AM	11:40 AM	11:49 AM	12:01 PM	12:08 PM	12:28 PM
12:00 PM	12:15 PM	12:24 PM	12:36 PM	12:43 PM	1:03 PM
12:35 PM	12:50 PM	12:59 PM	1:11 PM	1:18 PM	1:38 PM
1:10 PM	1:25 PM	1:34 PM	1:46 PM	1:53 PM	2:13 PM
1:45 PM	2:00 PM	2:09 PM	2:21 PM	2:28 PM	2:48 PM
2:20 PM	2:35 PM	2:44 PM	2:56 PM	3:03 PM	3:23 PM
2:55 PM	3:10 PM	3:19 PM	3:31 PM	3:38 PM	3:58 PM
3:30 PM	3:45 PM	3:54 PM	4:06 PM	4:13 PM	4:33 PM
4:05 PM	4:20 PM	4:29 PM	4:41 PM	4:48 PM	5:08 PM
4:40 PM	4:55 PM	5:04 PM	5:16 PM	5:23 PM	5:43 PM
5:15 PM	5:30 PM	5:39 PM	5:51 PM	5:58 PM	6:18 PM
5:50 PM	6:05 PM	6:14 PM	6:26 PM	6:33 PM	6:53 PM
6:25 PM	6:40 PM	6:49 PM	7:01 PM	7:08 PM	7:28 PM
7:00 PM	7:15 PM	7:24 PM	7:36 PM	7:43 PM	8:03 PM
8:05 PM	8:20 PM	8:29 PM	8:41 PM	8:48 PM	9:08 PM
9:10 PM	9:25 PM	9:34 PM	9:46 PM	9:53 PM	10:13 PM
10:15 PM	10:30 PM	10:39 PM	10:51 PM	10:58 PM	11:18 PM

Route 4B South GO

Georgian Mall (Depart)	Downtown Terminal	Allandale GO Station	Cox Mill & Hurst	Painwick Library	Barrie South GO (Arrive)
612	1	732	371	775	725
7:22 AM	7:43 AM	7:50 AM	8:01 AM	8:10 AM	8:25 AM
7:57 AM	8:18 AM	8:25 AM	8:36 AM	8:45 AM	9:00 AM
8:32 AM	8:53 AM	9:00 AM	9:11 AM	9:20 AM	9:35 AM
9:07 AM	9:28 AM	9:35 AM	9:46 AM	9:55 AM	10:10 AM
9:42 AM	10:03 AM	10:10 AM	10:21 AM	10:30 AM	10:45 AM
10:17 AM	10:38 AM	10:45 AM	10:56 AM	11:05 AM	11:20 AM
10:52 AM	11:13 AM	11:20 AM	11:31 AM	11:40 AM	11:55 AM
11:27 AM	11:48 AM	11:55 AM	12:06 PM	12:15 PM	12:30 PM
12:02 PM	12:23 PM	12:30 PM	12:41 PM	12:50 PM	1:05 PM
12:37 PM	12:58 PM	1:05 PM	1:16 PM	1:25 PM	1:40 PM
1:12 PM	1:33 PM	1:40 PM	1:51 PM	2:00 PM	2:15 PM
1:47 PM	2:08 PM	2:15 PM	2:26 PM	2:35 PM	2:50 PM
2:22 PM	2:43 PM	2:50 PM	3:01 PM	3:10 PM	3:25 PM
2:57 PM	3:18 PM	3:25 PM	3:36 PM	3:45 PM	4:00 PM
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5:52 PM	6:13 PM	6:20 PM	6:31 PM	6:40 PM	6:55 PM
6:27 PM	6:48 PM	6:55 PM	7:06 PM	7:15 PM	7:30 PM
7:02 PM	7:23 PM	7:30 PM	7:41 PM	7:50 PM	8:05 PM
7:32 PM	7:51 PM				
8:07 PM	8:28 PM	8:35 PM	8:46 PM	8:55 PM	9:10 PM
9:12 PM	9:33 PM	9:40 PM	9:51 PM	10:00 PM	10:15 PM
10:17 PM	10:38 PM	10:45 PM	10:56 PM	11:05 PM	11:20 PM
11:22 PM	11:41 PM				

Sunday Schedule									
Route 8A-SB Park Place					Route 8A-NB RVH				
Georgian College (Depart)	Livingstone at Bayfield	Downtown Terminal	Barrie South GO Station	Park Plac (Arrive)	Park Place (Depart)	Holly Rec. Centre	Downtown Terminal	Georgian College (Arrive)	
330	442	1	725	777	777	487	1	330	
					8:35 AM	8:55 AM	8:50 AM	9:13 AM	
							9:20 AM		
							9:50 AM	10:13 AM	
					9:35 AM	9:55 AM	10:20 AM		
							10:50 AM	11:13 AM	
9:15 AM	9:31 AM	9:55 AM	10:22 AM	10:33 AM	10:35 AM	10:55 AM	11:20 AM		
							11:50 AM	12:13 PM	
10:15 AM	10:31 AM	10:55 AM	11:22 AM	11:33 AM	11:35 AM	11:55 AM	12:20 PM		
							12:50 PM	1:13 PM	
11:15 AM	11:31 AM	11:55 AM	12:22 PM	12:33 PM	12:35 PM	12:55 PM	1:20 PM		
							1:50 PM	2:13 PM	
12:15 PM	12:31 PM	12:55 PM	1:22 PM	1:33 PM	1:35 PM	1:55 PM	2:20 PM		
							2:50 PM	3:13 PM	
1:15 PM	1:31 PM	1:55 PM	2:22 PM	2:33 PM	2:35 PM	2:55 PM	3:20 PM		
							3:50 PM	4:13 PM	
2:15 PM	2:31 PM	2:55 PM	3:22 PM	3:33 PM	3:35 PM	3:55 PM	4:20 PM		
							4:50 PM	5:13 PM	
3:15 PM	3:31 PM	3:55 PM	4:22 PM	4:33 PM	4:35 PM	4:55 PM	5:20 PM		
							5:50 PM	6:13 PM	
4:15 PM	4:31 PM	4:55 PM	5:22 PM	5:33 PM	5:35 PM	5:55 PM	6:20 PM		
							6:50 PM	7:13 PM	
5:15 PM	5:31 PM	5:55 PM	6:22 PM	6:33 PM	6:35 PM	6:55 PM	7:20 PM		
							7:50 PM	8:13 PM	
6:15 PM	6:31 PM	6:55 PM	7:22 PM	7:33 PM	7:35 PM	7:55 PM	8:20 PM		
							8:50 PM	9:13 PM	
7:15 PM	7:31 PM	7:55 PM	8:22 PM	8:33 PM	8:35 PM	8:55 PM	9:20 PM		
8:15 PM	8:31 PM	8:55 PM	9:22 PM	9:33 PM	9:35 PM	9:55 PM	10:16 PM		
9:15 PM	9:31 PM	9:50 PM							



Route 8A

Route 8A-NB
Route 8A-SB } RVH/YONGE



Weekday Schedule

Route 8A-SB Park Place

Georgian College (Depart)	Livingstone at Bayfield	Downtown Terminal	Barrie South GO Station	Park Plac (Arrive)
330	442	1	725	777
		4:55 AM	5:22 AM	5:33 AM
		5:25 AM	5:52 AM	6:03 AM
		5:55 AM	6:22 AM	6:33 AM
		6:25 AM	6:52 AM	7:03 AM
6:15 AM	6:31 AM	6:55 AM	7:22 AM	7:33 AM
6:45 AM	7:01 AM	7:25 AM	7:52 AM	8:03 AM
7:15 AM	7:31 AM	7:55 AM	8:22 AM	8:33 AM
7:45 AM	8:01 AM	8:25 AM	8:52 AM	9:03 AM
8:15 AM	8:31 AM	8:55 AM	9:22 AM	9:33 AM
Every 30 Minutes				
3:45 PM	4:01 PM	4:25 PM	4:52 PM	5:03 PM
4:15 PM	4:31 PM	4:55 PM	5:22 PM	5:33 PM
4:45 PM	5:01 PM	5:25 PM	5:52 PM	6:03 PM
5:15 PM	5:31 PM	5:55 PM	6:22 PM	6:33 PM
5:45 PM	6:01 PM	6:25 PM	6:52 PM	7:03 PM
6:15 PM	6:31 PM	6:55 PM	7:22 PM	7:33 PM
6:45 PM	7:01 PM	7:20 PM		
7:15 PM	7:31 PM	7:55 PM	8:22 PM	8:33 PM
8:15 PM	8:31 PM	8:55 PM	9:22 PM	9:33 PM
9:15 PM	9:31 PM	9:55 PM	10:22 PM	10:33 PM
10:15 PM	10:31 PM	10:55 PM	11:22 PM	11:33 PM
11:15 PM	11:31 PM	11:50 PM		
12:15 AM	12:31 AM	12:50 AM		
2:15 AM	2:31 AM	2:50 AM		

Route 8A-NB RVH

Park Place (Depart)	Holly Rec. Centre	Downtown Terminal	Georgian College (Arrive)
777	487	1	330
		5:50 AM	6:13 AM
5:35 AM	5:55 AM	6:20 AM	6:43 AM
6:05 AM	6:25 AM	6:50 AM	7:13 AM
6:35 AM	6:55 AM	7:20 AM	7:43 AM
7:05 AM	7:25 AM	7:50 AM	8:13 AM
7:35 AM	7:55 AM	8:20 AM	8:43 AM
8:05 AM	8:25 AM	8:50 AM	9:13 AM
8:35 AM	8:55 AM	9:20 AM	9:43 AM
9:05 AM	9:25 AM	9:50 AM	10:13 AM
9:35 AM	9:55 AM	10:20 AM	10:43 AM
Every 30 Minutes			
5:05 PM	5:25 PM	5:50 PM	6:13 PM
5:35 PM	5:55 PM	6:20 PM	6:43 PM
6:05 PM	6:25 PM	6:50 PM	7:13 PM
6:35 PM	6:55 PM		
7:05 PM	7:25 PM	7:50 PM	8:13 PM
7:35 PM	7:55 PM	8:20 PM	
		8:50 PM	9:13 PM
8:35 PM	8:55 PM	9:16 PM	
		9:50 PM	10:13 PM
9:35 PM	9:55 PM	10:16 PM	
		10:50 PM	11:13 PM
10:35 PM	10:55 PM	11:16 PM	
		11:50 PM	12:13 AM
11:35 PM	11:55 PM	12:16 AM	
		1:50 AM	2:13 AM

Route Change Note:

to 8B-NB:



from 8B-NB:



Saturday Schedule

Route 8A-SB Park Place

Georgian College (Depart)	Livingstone at Bayfield	Downtown Terminal	Barrie South GO Station	Park Plac (Arrive)
330	442	1	725	777
		6:55 AM	7:22 AM	7:33 AM
		7:25 AM	7:52 AM	8:03 AM
7:15 AM	7:31 AM	7:55 AM	8:22 AM	8:33 AM
7:45 AM	8:01 AM	8:25 AM	8:52 AM	9:03 AM
8:15 AM	8:31 AM	8:55 AM	9:22 AM	9:33 AM
Every 30 Minutes				
3:45 PM	4:01 PM	4:25 PM	4:52 PM	5:03 PM
4:15 PM	4:31 PM	4:55 PM	5:22 PM	5:33 PM
4:45 PM	5:01 PM	5:25 PM	5:52 PM	6:03 PM
5:15 PM	5:31 PM	5:55 PM	6:22 PM	6:33 PM
5:45 PM	6:01 PM	6:25 PM	6:52 PM	7:03 PM
6:15 PM	6:31 PM	6:55 PM	7:22 PM	7:33 PM
6:45 PM	7:01 PM	7:20 PM		
7:15 PM	7:31 PM	7:55 PM	8:22 PM	8:33 PM
8:15 PM	8:31 PM	8:55 PM	9:22 PM	9:33 PM
9:15 PM	9:31 PM	9:55 PM	10:22 PM	10:33 PM
10:15 PM	10:31 PM	10:55 PM	11:22 PM	11:33 PM
11:15 PM	11:31 PM	11:50 PM		
12:15 AM	12:31 AM	12:50 AM		
2:15 AM	2:31 AM	2:50 AM		

Route 8A-NB RVH

Park Place (Depart)	Holly Rec. Centre	Downtown Terminal	Georgian College (Arrive)
777	487	1	330
7:05 AM	7:25 AM	7:50 AM	8:13 AM
7:35 AM	7:55 AM	8:20 AM	8:43 AM
8:05 AM	8:25 AM	8:50 AM	9:13 AM
8:35 AM	8:55 AM	9:20 AM	9:43 AM
9:05 AM	9:25 AM	9:50 AM	10:13 AM
9:35 AM	9:55 AM	10:20 AM	10:43 AM
Every 30 Minutes			
5:05 PM	5:25 PM	5:50 PM	6:13 PM
5:35 PM	5:55 PM	6:20 PM	6:43 PM
6:05 PM	6:25 PM	6:50 PM	7:13 PM
6:35 PM	6:55 PM		
7:05 PM	7:25 PM	7:50 PM	8:13 PM
7:35 PM	7:55 PM	8:20 PM	
		8:50 PM	9:13 PM
8:35 PM	8:55 PM	9:20 PM	
		9:50 PM	10:13 PM
9:35 PM	9:55 PM	10:20 PM	
		10:50 PM	11:13 PM
10:35 PM	10:55 PM	11:20 PM	
		11:50 PM	12:13 AM
11:35 PM	11:55 PM	12:16 AM	
		1:50 AM	2:13 AM

Late Night Loop:



(Friday & Saturday Nights Only)

Sunday Schedule

Route 8B-SB Park Place

Georgian College (Depart)	Downtown Terminal	Holly Rec. Centre	Park Place (Arrive)
330	1	487	777
	9:20 AM	9:40 AM	10:00 AM
9:57 AM	10:20 AM	10:40 AM	11:00 AM
10:57 AM	11:20 AM	11:40 AM	12:00 PM
11:57 AM	12:20 PM	12:40 PM	1:00 PM
12:57 PM	1:20 PM	1:40 PM	2:00 PM
1:57 PM	2:20 PM	2:40 PM	3:00 PM
2:57 PM	3:20 PM	3:40 PM	4:00 PM
3:57 PM	4:20 PM	4:40 PM	5:00 PM
4:57 PM	5:20 PM	5:40 PM	6:00 PM
5:57 PM	6:20 PM	6:40 PM	7:00 PM
6:57 PM	7:20 PM	7:40 PM	8:00 PM
7:57 PM	8:20 PM	8:40 PM	9:00 PM
8:57 PM	9:20 PM	9:40 PM	10:00 PM
9:57 PM	10:18 PM		

Route 8B-NB Park Place

Park Plac (Depart)	Barrie South GO Station	Downtown Terminal	Livingstone at Bayfield	Georgian College (Arrive)
777	725	1	442	330
		9:20 AM	9:39 AM	9:55 AM
		10:20 AM	10:39 AM	10:55 AM
10:02 AM	10:21 AM	10:46 AM		
		11:20 AM	11:39 AM	11:55 AM
11:02 AM	11:21 AM	11:46 AM		
		12:20 PM	12:39 PM	12:55 PM
12:02 PM	12:21 PM	12:46 PM		
		1:20 PM	1:39 PM	1:55 PM
1:02 PM	1:21 PM	1:46 PM		
		2:20 PM	2:39 PM	2:55 PM
2:02 PM	2:21 PM	2:46 PM		
		3:20 PM	3:39 PM	3:55 PM
3:02 PM	3:21 PM	3:46 PM		
		4:20 PM	4:39 PM	4:55 PM
4:02 PM	4:21 PM	4:46 PM		
		5:20 PM	5:39 PM	5:55 PM
5:02 PM	5:21 PM	5:46 PM		
		6:20 PM	6:39 PM	6:55 PM
6:02 PM	6:21 PM	6:46 PM		
		7:20 PM	7:39 PM	7:55 PM
7:02 PM	7:21 PM	7:46 PM		
		8:20 PM	8:39 PM	8:55 PM
8:02 PM	8:21 PM	8:46 PM		
		9:20 PM	9:39 PM	9:55 PM
9:02 PM	9:21 PM	9:46 PM		
10:02 PM	10:21 PM	10:46 PM		

Route Change Note: from 8A-NB: to 8A-NB:

**Frequently visit Barrie.ca/transit “Schedules & Maps”
for changes in the schedule**

Times are approximate. Riders should arrive at the bus stop at least 5 minutes before the scheduled time



Legend

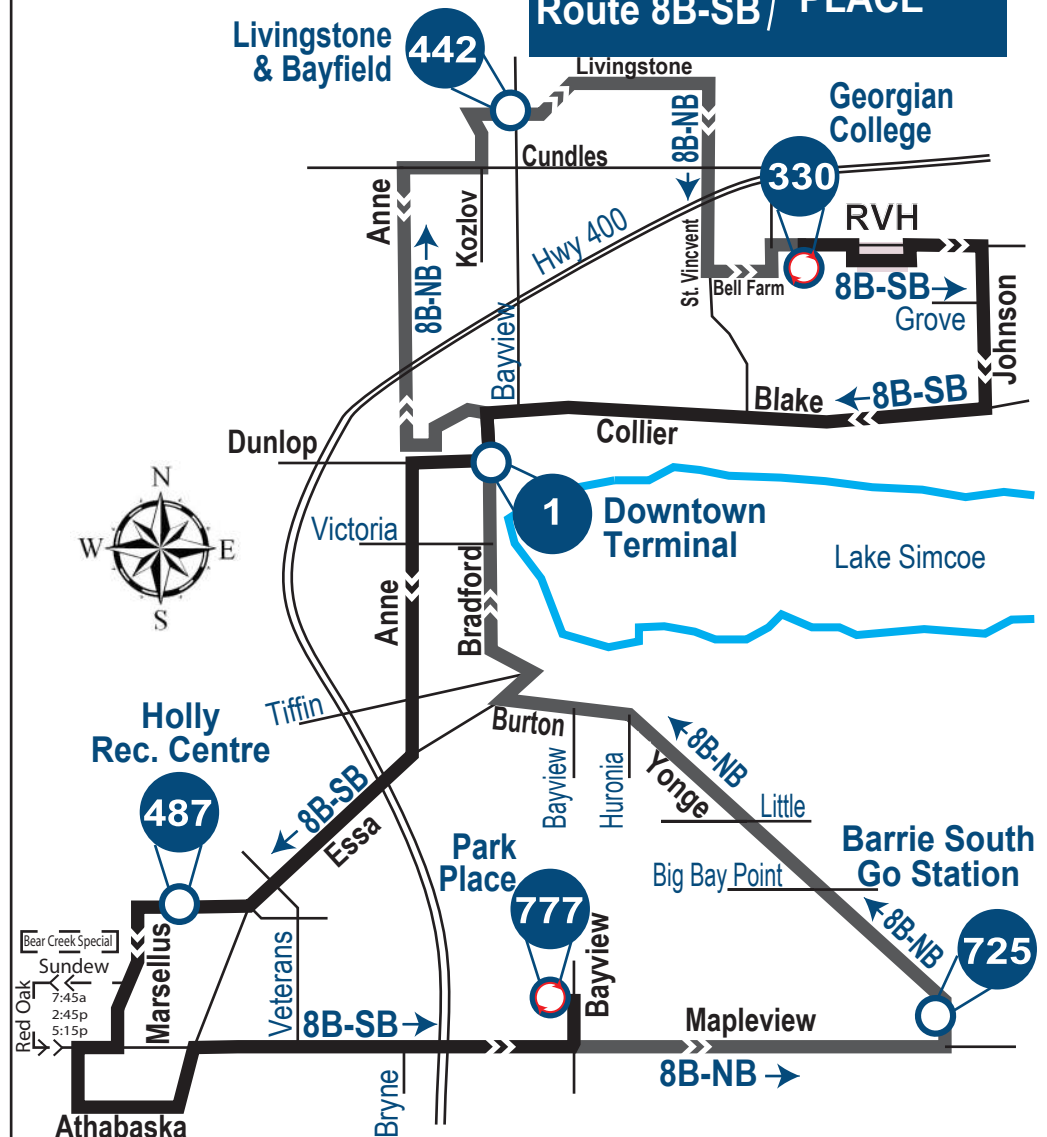
>> Route Direction

D Time Point

Route 8B - NB

Route 8B - SB

Route Letter Change



**Visit myridebarrie.ca for
real-time bus arrival information**



Weekday Schedule

Route 8B-SB Park Place

Georgian College (Depart)	Downtown Terminal	Holly Rec. Centre	Park Place (Arrive)
330	1	487	777
	4:20 AM	4:40 AM	5:00 AM
	4:50 AM	5:10 AM	5:30 AM
	5:20 AM	5:40 AM	6:00 AM
	5:50 AM	6:10 AM	6:30 AM
5:57 AM	6:20 AM	6:40 AM	7:00 AM
6:27 AM	6:50 AM	7:10 AM	7:30 AM
6:57 AM	7:20 AM	7:40 AM	8:00 AM
7:27 AM	7:50 AM	8:10 AM	8:30 AM
7:57 AM	8:20 AM	8:40 AM	9:00 AM
8:27 AM	8:50 AM	9:10 AM	9:30 AM
Every 30 Minutes			
3:27 PM	3:50 PM	4:10 PM	4:30 PM
3:57 PM	4:20 PM	4:40 PM	5:00 PM
4:27 PM	4:50 PM	5:10 PM	5:30 PM
4:57 PM	5:20 PM	5:40 PM	6:00 PM
5:27 PM	5:50 PM	6:10 PM	6:30 PM
5:57 PM	6:20 PM	6:40 PM	7:00 PM
6:27 PM	6:48 PM		
6:57 PM	7:20 PM	7:40 PM	8:00 PM
7:57 PM	8:20 PM	8:40 PM	9:00 PM
8:57 PM	9:20 PM	9:40 PM	10:00 PM
9:57 PM	10:20 PM	10:40 PM	11:00 PM
10:57 PM	11:20 PM	11:40 PM	12:00 AM
11:57 PM	12:18 AM		
1:27 AM	1:48 AM		

Route 8B-NB Park Place

Park Plac (Depart)	Barrie South GO Station	Downtown Terminal	Livingstone at Bayfield	Georgian College (Arrive)
777	725	1	442	330
5:02 AM	5:13 AM			
		5:20 AM	5:39 AM	5:55 AM
5:32 AM	5:43 AM			
		5:50 AM	6:09 AM	6:25 AM
6:02 AM	6:13 AM			
		6:20 AM	6:39 AM	6:55 AM
		6:50 AM	7:09 AM	7:25 AM
6:32 AM	6:51 AM	7:20 AM	7:39 AM	7:55 AM
7:02 AM	7:21 AM	7:50 AM	8:09 AM	8:25 AM
7:32 AM	7:51 AM	8:20 AM	8:39 AM	8:55 AM
8:02 AM	8:21 AM	8:50 AM	9:09 AM	9:25 AM
8:32 AM	8:51 AM	9:20 AM	9:39 AM	9:55 AM
9:02 AM	9:21 AM	9:50 AM	10:09 AM	10:25 AM
9:32 AM	9:51 AM	10:20 AM	10:39 AM	10:55 AM
Every 30 Minutes				
4:32 PM	4:51 PM	5:20 PM	5:39 PM	5:55 PM
5:02 PM	5:21 PM	5:50 PM	6:09 PM	6:25 PM
5:32 PM	5:51 PM	6:20 PM	6:39 PM	6:55 PM
6:02 PM	6:21 PM	6:46 PM		
6:32 PM	6:51 PM	7:20 PM	7:39 PM	7:55 PM
7:02 PM	7:21 PM	7:46 PM		
		8:20 PM	8:39 PM	8:55 PM
8:02 PM	8:21 PM	8:46 PM		
		9:20 PM	9:39 PM	9:55 PM
9:02 PM	9:21 PM	9:46 PM		
		10:20 PM	10:39 PM	10:55 PM
10:02 PM	10:21 PM	10:46 PM		
		11:20 PM	11:39 PM	11:55 PM
11:02 PM	11:21 PM	11:46 PM		
12:02 AM	12:21 AM	12:50 AM	1:09 AM	1:25 AM

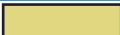
Saturday Schedule

Route 8B-SB Park Place

Georgian College (Depart)	Downtown Terminal	Holly Rec. Centre	Park Place (Arrive)
330	1	487	777
	6:50 AM	7:10 AM	7:30 AM
	7:20 AM	7:40 AM	8:00 AM
7:27 AM	7:50 AM	8:10 AM	8:30 AM
7:57 AM	8:20 AM	8:40 AM	9:00 AM
8:27 AM	8:50 AM	9:10 AM	9:30 AM
Every 30 Minutes			
3:27 PM	3:50 PM	4:10 PM	4:30 PM
3:57 PM	4:20 PM	4:40 PM	5:00 PM
4:27 PM	4:50 PM	5:10 PM	5:30 PM
4:57 PM	5:20 PM	5:40 PM	6:00 PM
5:27 PM	5:50 PM	6:10 PM	6:30 PM
5:57 PM	6:20 PM	6:40 PM	7:00 PM
6:27 PM	6:48 PM		
6:57 PM	7:20 PM	7:40 PM	8:00 PM
7:57 PM	8:20 PM	8:40 PM	9:00 PM
8:57 PM	9:20 PM	9:40 PM	10:00 PM
9:57 PM	10:20 PM	10:40 PM	11:00 PM
10:57 PM	11:20 PM	11:40 PM	12:00 AM
11:57 PM	12:18 AM		
1:27 AM	1:48 AM		

Route 8B-NB Park Place

Park Plac (Depart)	Barrie South GO Station	Downtown Terminal	Livingstone at Bayfield	Georgian College (Arrive)
777	725	1	442	330
7:32 AM	7:51 AM	8:20 AM	8:39 AM	8:55 AM
8:02 AM	8:21 AM	8:50 AM	9:09 AM	9:25 AM
8:32 AM	8:51 AM	9:20 AM	9:39 AM	9:55 AM
9:02 AM	9:21 AM	9:50 AM	10:09 AM	10:25 AM
9:32 AM	9:51 AM	10:20 AM	10:39 AM	10:55 AM
Every 30 Minutes				
4:32 PM	4:51 PM	5:20 PM	5:39 PM	5:55 PM
5:02 PM	5:21 PM	5:50 PM	6:09 PM	6:25 PM
5:32 PM	5:51 PM	6:20 PM	6:39 PM	6:55 PM
6:02 PM	6:21 PM	6:46 PM		
6:32 PM	6:51 PM	7:20 PM	7:39 PM	7:55 PM
7:02 PM	7:21 PM	7:46 PM		
		8:20 PM	8:39 PM	8:55 PM
8:02 PM	8:21 PM	8:46 PM		
		9:20 PM	9:39 PM	9:55 PM
9:02 PM	9:21 PM	9:46 PM		
		10:20 PM	10:39 PM	10:55 PM
10:02 PM	10:21 PM	10:46 PM		
		11:20 PM	11:39 PM	11:55 PM
11:02 PM	11:21 PM	11:46 PM		
12:02 AM	12:21 AM	12:50 AM	1:09 AM	1:25 AM

Route Change Note: from 8A-NB:  to 8A-NB: 

Late Night Loop:  (Friday & Saturday Nights Only)

63-65-68-69

Route numbers
Nombres d'itinéraire

Barrie



ALL GOOD TO GO

gotransit.com – Desktop and mobile website for everything you need to know about GO.

On The GO alerts – Customized service and delay updates sent right to your inbox. Sign up at gotransit.com/OnTheGO

PRESTO – Tap into convenience and savings with a PRESTO card. Get one at prestocard.ca

Triplinx – The official transit trip planner for the Greater Toronto & Hamilton area, at triplinx.ca

BON DÉPART EN TOUT TEMPS AVEC GO

gotransit.com – site Web accessible d'un ordinateur de bureau ou d'un appareil mobile fournissant tous les renseignements sur GO

Alertes On The GO – nouvelles personnalisées sur le service et les retards envoyées directement dans votre boîte de réception; inscrivez-vous sur gotransit.com/OnTheGOFR

PRESTO – économies et aspect pratique assurés avec une carte PRESTO; obtenez la vôtre sur prestocard.ca

Triplinx – planificateur de trajet de transport en commun officiel de la région du grand Toronto et de Hamilton, sur triplinx.ca

416 869 3200
1 888 GET ON GO (438 6646)
1 800 387 3652 TTY/ATS

gotransit.com/schedules



30-7-2018

Barrie

GO Train and Bus Schedule

Horaire des trains et des autobus GO

Barrie train - Allandale Waterfront - Barrie South - Bradford - East Gwillimbury - Newmarket - Aurora - King City - Maple - Rutherford - York U - Downsview Park - Union

Route 63 - King City - Maple - Rutherford - Union

Route 65 - East Gwillimbury - Newmarket - Aurora - Wellington @ Hwy 404 P&R - Union

Route 68 - Barrie Term. - Allandale Waterfront - Barrie South - Stroud - Churchill - Barrie @ Doctors Ln. - Bradford - Holland Landing - East Gwillimbury - Newmarket - Aurora

Route 69 - Newmarket GO Bus Term. - Aurora GO



Daily
Quotidiennement

GO Bus routes 63, 65 and 68
Les routes 63, 65 et 68 d'autobus GO

Effective/ À partir de:

1 SEPTEMBER
SEPTEMBRE 2018



METROLINX

How to read our schedules

Step 1

Find the station or terminal you are departing from. Stops are listed across the top in the order they are served.

Step 2

The top of the schedule tells you what day the schedule is for and the direction of travel.

Step 3

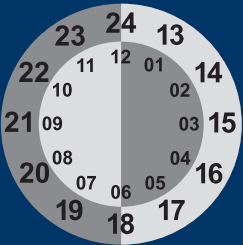
Look across the rows for available departure times.

Step 4

Not all trains or buses stop at every station. If you see → the train or bus will not stop at that station.

Schedule times shown in 24-hour clock

Midnight to noon
00 01 - 12 00
Noon to midnight
12 01 - 24 00



Legend

 Train trips

 Bus trips

→ Trip does not serve this location.

↓ Check below for connecting trips.

 GO Train service is accessible to passengers using mobility devices at this location.

 GO Bus service is accessible to passengers using mobility devices at this location.

 GO Train & GO Bus service is accessible to passengers using mobility devices at this location.

 Parking available.

For the latest schedule information and updates, please visit [gotransit.com/schedules](https://www.gotransit.com/schedules).

Notes

- k** Trip serves King City GO Station from a bus stop on Keele St. at Station Rd.
- D** Stops to discharge passengers on request ONLY.
- h** Trip holds for connection from bus.
- S** GO Bus services GO Station from bus stop on street.

Bicycles

1. Bicycles are not allowed in Union Station or on-board trains during morning rush hour (6:30-9:30) and evening rush hour (15:30-18:30), Monday to Friday.
2. Foldable bicycles are allowed on-board trains at all times.

Comment lire nos horaires

Étape 1

Trouvez votre gare ou terminus de départ. La liste des arrêts est donnée en haut dans l'ordre dans lequel ils sont desservis.

Étape 2

Le coin supérieur gauche vous indique le jour pour lequel l'horaire est donné et la direction de circulation.

Étape 3

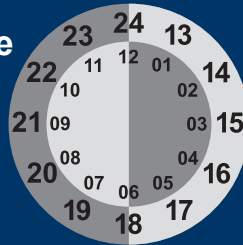
Regardez dans les rangées pour obtenir les heures de départ offertes.

Étape 4

Les trains ou les autobus ne s'arrêtent pas tous à chaque gare. Si vous voyez le symbole → le train ou l'autobus ne s'arrêtera pas à cette gare.

Indications selon un système horaire de 24 heures

De minuit à midi:
00 01 - 12 00
De midi à minuit:
12 01 - 24 00



Légende

 Horaire des trains

 Horaire des autobus

→ Trajet ne sert pas cette station.

↓ Vérifiez les trajets de correspondance ci-dessous.

 Service de trains GO accessible aux personnes utilisant des aides à la mobilité à cet endroit.

 Service d'autobus GO accessible aux personnes utilisant des aides à la mobilité à cet endroit.

 Les services de trains et d'autobus GO sont accessibles aux utilisateurs d'un appareil d'aide à la mobilité à cet endroit.

 Stationnement disponible.

Pour consulter les horaires les plus récents et les mises à jour, veuillez visiter [gotransit.com/schedules](https://www.gotransit.com/schedules).

Notes

- k** Les autobus desservent la gare GO King City à partir de l'arrêt situé à l'angle des rues Keele et Station.
- D** Arrêt sur demande SEULEMENT.
- h** Le départ de l'autobus est retardé pour assurer la connexion de l'autobus.
- S** Les autobus GO desservent la gare à partir de l'arrêt situé sur la rue.

Vélos

1. Les vélos ne sont pas autorisés dans la gare Union ou à bord des trains du lundi au vendredi, pendant l'heure de pointe (6:30-9:30) et pendant l'heure de pointe du soir (15:30-18:30).
2. Les vélos pliables sont permis à bord des trains en tout temps.

		Monday to Friday (except holidays) Du lundi au vendredi (sauf les jours fériés)																	
		SOUTHBOUND / EN DIRECTION SUD																	
Route Number Nombre d'itinéraire	Zone→ Trip Number N° du trajet	Barrie 69 Dp	Barrie 69 Dp	Barrie 68 Dp	Barrie 68 Dp	Barrie 68 Dp	Barrie 68 Dp	Barrie 68 Dp	Barrie 68 Dp	Barrie 68 Dp	Barrie 68 Dp	Barrie 68 Dp	Barrie 68 Dp	Barrie 68 Dp	Barrie 68 Dp	Barrie 68 Dp	Barrie 68 Dp	Barrie 68 Dp	Barrie 68 Dp
65	65060																		
63	63060																		
69	69020																		
65C	65072																		
65B	65070																		
68B	68130	04 09	04 14	04 26	04 30	04 37	04 51	04 55	05 04	05 14	→	04 20	→	04 25	04 40	04 46	→	04 55	05 20
	780							05 19	→	05 29	→	05 33	05 41	→	05 52	06 00	06 04	→	06 13
	782		05 18	05 26	→	→	→	05 47	→	05 57	→	06 01	06 09	→	06 20	06 28	06 32	06 39	06 43
68B	68150	05 07	05 12	05 24	05 28	05 35	05 49	05 53	06 02	06 12	→	06 17	→	06 27	→	06 31	06 39	→	06 50
	784		05 48	05 56	→	→	→	06 17	→	06 27	→	06 32	→	06 42	→	06 46	06 54	→	07 05
	786		06 03	06 11	→	→	→	06 32	→	06 42	→	06 46	06 54	→	07 05	07 13	07 17	07 23	07 27
	788		06 18	06 26	→	→	→	06 47	→	06 57	→	07 01	07 09	→	07 20	07 28	07 32	07 39	07 43
	790		06 33	06 41	→	→	→	07 02	→	07 12	→	07 16	07 24	→	07 35	07 43	07 47	07 53	07 57
68B	68220	06 02	06 07	06 19	06 23	06 30	06 45	06 49	06 58	07 12	→	07 17	→	07 27	→	07 31	07 39	→	07 50
	792		06 48	06 56	→	→	→	07 17	→	07 27	→	07 31	07 39	→	07 50	07 58	08 02	08 09	08 13
	794		07 18	07 26	→	→	→	07 47	→	07 57	→	08 01	08 09	→	08 20	08 28	08 32	08 39	08 43
68B	68350	07 02	07 07	07 19	07 23	07 30	07 45	07 49	07 58	08 12	→	08 17	→	08 27	→	08 31	08 39	→	08 50
	796							08 17	→	08 27	→	08 31	08 39	→	08 50	08 58	09 02	09 09	09 13
69	69240																		
68B	68420	08 04	08 09	08 21	08 25	08 32	08 47	08 51	09 00	09 14	→	09 19	→	09 29	→	09 33	09 41	→	09 52
	798							09 19	→	09 29	→	09 33	09 41	→	09 52	10 00	10 04	→	10 13
69	69280																		
68	68460	08 46	08 51	09 06	09 10	09 17	09 32	09 36	09 45	09 55	→	10 01	10 10	→	10 26	→	10 33	→	10 43
	800																		
69	69320																		
68	68500	09 46	09 51	10 06	10 10	10 17	10 32	10 36	10 45	10 55	→	11 01	11 10	→	11 26	→	11 33	→	11 43
	802																		
69	69360																		
68	68550	10 46	10 51	11 06	11 10	11 17	11 32	11 36	11 45	11 55	→	12 01	12 10	→	12 26	→	12 33	→	12 43
	804																		
69	69400																		
68	68580	11 46	11 51	12 06	12 10	12 17	12 32	12 36	12 45	12 55	→	13 01	13 10	→	13 26	→	13 33	→	13 43
	806																		
69	69440																		
68	68610	12 46	12 51	13 06	13 10	13 17	13 32	13 36	13 45	13 55	→	14 01	14 10	→	14 26	→	14 33	→	14 43
	808																		

		Monday to Friday (except holidays) Du lundi au vendredi (sauf les jours fériés)																	
		SOUTHBOUND / EN DIRECTION SUD																	
Route Number Nombre d'itinéraire	Zone→ Trip Number N° du trajet	Barrie 69 Dp	Barrie 69 Dp	Barrie 68 Dp	Barrie 68 Dp	Barrie 68 Dp	Barrie 68 Dp	Barrie 68 Dp	Barrie 68 Dp	Barrie 68 Dp	Barrie 68 Dp	Barrie 68 Dp	Barrie 68 Dp	Barrie 68 Dp	Barrie 68 Dp	Barrie 68 Dp	Barrie 68 Dp	Barrie 68 Dp	Barrie 68 Dp
68B	68640	13 45	13 50	14 05	14 09	14 16	14 31	14 35	14 44	14 55	→	15 00h	→	15 06	15 24	15 32	→	→	→
65	65550																		
69	69500																		
65	65580																		
65C	65622																		
68B	68680	14 45	14 50	15 05	15 09	15 16	15 31	15 35	15 44	15 55	→	16 00h	→	16 06	16 24	16 32	→	→	→
65	65620																		
69	69560																		
65	65650																		
68B	68730	15 40	15 45	16 00	16 04	16 11	16 26	16 30	16 42	16 55	→	17 00h	→	17 06	17 24	17 32	→	→	→
65	65670																		
69	69620																		
65	65690																		
68B	68760	16 40	16 45	17 00	17 04	17 11	17 26	17 30	17 42	17 55	→	18 00h	→	18 06	18 21	18 29	→	→	→
65	65710																		
69	69670																		
65	65730																		
68B	68810	17 45	17 50	18 05	18 09	18 16	18 31	18 35	18 44	18 55	→	19 00h	→	19 06	19 21	19 29	→	→	→
65	65750																		
69	69710																		
65	65770																		
69	69740																		
68	68840	18 56	19 01	19 13	19 17	19 24	19 38	19 42	19 51	20 00	→	20 06	→	20 12	20 26	20 34	→	→	→
	810																		
69	69780																		
68	68870	19 56	20 01	20 13	20 17	20 24	20 38	20 42	20 51	21 00	→	21 06	→	21 12	21 26	21 34	→	→	→
	812																		
69	69820																		
68	68900	20 56	21 01	21 13	21 17	21 24	21 38	21 42	21 51	22 00	→	22 06	→	22 12	22 26	22 34	→	→	→
	814																		
69	69830																		
68B	68930	21 55	22 00	22 12	22 16	22 23	22 37	22 41	22 50	23 00	→	23 05h	→	23 10	23 25	23 31	→	→	→
65	65880																		
65	65910																		

		Monday to Friday (except holidays) Du lundi au vendredi (sauf les jours fériés)																	
		NORTHBOUND / EN DIRECTION NORD																	
Route Number Nombre d'itinéraire	Trip Number N° du trajet	Zone→	Toronto 2	Dp 19	North York 19	North York 19	Vaughan 61	Vaughan 61	King City 62	Aurora 63	Dp 404	Aurora 63	Newmarket 64	Newmarket 64	Ar Terminal	East Gwillimbury 44	East Gwillimbury 65	Bradford 65	Ar 65
																			
																			
68	68021											06 10	06 22	→		06 30	06 36	06 46	06 50
65	65031	06 10	→	→	→	→	→	→	06 42	06 50	07 02	→				07 15↓			
68B	68031															07 40h	07 46	07 56	08 00
65	65111	06 40	→	→	→	→	→	→	07 12	0720↓		07 32	→			07 45			
69	69151									0725h		→	07 40						
65	65141	07 10	→	→	→	→	→	→	07 47	07 57	08 10	→				08 25↓			
68B	68101															08 30h	08 36	08 46	08 50
65	65171	07 40	→	→	→	→	→	→	08 22	0832↓		08 45	→			09 00			
69	69221									0837h		→	08 55						
65	65201	08 10	→	→	→	→	→	→	08 52	09 02	09 15	→				0930↓			
68B	68171															0935h	09 41	09 51	09 55
65	65241	08 40	→	→	→	→	→	→	09 17	0927↓		09 40	→			09 55			
69	69261									0932h		→	09 50						
	781	09 40	09 58	→	10 08	10 13	10 20	→	10 31										
68	68251									1039h	10 51	→	10 59			11 05	11 05	11 17	11 21
69	69301									1039h	→	10 57							
	783	10 40	10 58	→	11 08	11 13	11 20	→	11 31										
68	68291									1139h	11 51	→	11 59			12 05	12 05	12 17	12 21
69	69341									1139h	→	11 57							
	785	11 40	11 58	→	12 08	12 13	12 20	→	12 31										
68	68321									1239h	12 51	→	12 59			13 05	13 05	13 17	13 21
69	69381									1239h	→	12 57							
	787	12 40	12 58	→	13 08	13 13	13 20	→	13 31										
68	68351									1339h	13 51	→	13 59			14 05	14 05	14 17	14 21
69	69421									1339h	→	13 57							
	789	13 40	13 58	→	14 08	14 13	14 20	→	14 31										
68	68421									1439h	14 51	→	14 59			15 05	15 05	15 17	15 21
69	69461									1439h	→	14 57							
	791	14 40	14 58	→	15 08	15 13	15 20	→	15 31	15 39	→					15 43	→	15 51	
68B	68461															15 53h	16 01	16 11	16 15
69	69511																		
	793	15 40	15 58	16 02	16 11	16 16	16 25	→	16 36	16 44	→					16 48	→	16 57	→
68B	68491															16 58h	17 06	17 16	17 20

		Monday to Friday (except holidays) Du lundi au vendredi (sauf les jours fériés)																	
		NORTHBOUND / EN DIRECTION NORD																	
Route Number Nombre d'itinéraire	Trip Number N° du trajet	Zone→	Toronto 2	Dp 19	North York 19	North York 19	Vaughan 61	Vaughan 61	King City 62	Aurora 63	Dp 404	Aurora 63	Newmarket 64	Newmarket 64	Ar Terminal	East Gwillimbury 44	East Gwillimbury 65	Bradford 65	Ar 65
																			
																			
	795	16 10	16 28	16 32	16 41	16 46	16 55	→	17 06	17 14	→					17 18	→	17 27	→
	797	16 40	16 58	17 02	17 11	17 16	17 25	→	17 36	17 44	→					17 48	→	17 57	→
68B	68531															17 58h	18 06	18 16	18 20
	799	17 05	17 23	17 27	17 36	17 41	17 50	→	18 01	18 09	→					18 13	→	18 22	→
	801	17 35	17 53	17 57	18 06	18 11	18 20	→	18 31	18 39	→					18 43	→	18 52	→
68B	68601															18 53h	19 01	19 11	19 15
	803	18 05	18 23	18 27	18 36	18 41	18 50	→	19 01	19 09	→					19 13	→	19 22	→
	805	18 35	18 53	18 57	19 06	19 11	19 20	→	19 31	19 39	→					19 43	→	19 52	→
68B	68711															19 53h	19 59	20 09	20 13
	807	19 05	19 23	19 27	19 35	19 40	19 47	→	19 58	20 06	→					20 10	→	20 18	
	809	19 40	19 58	→	20 08	20 13	20 20	→	20 31										
68	68721									2039h	20 51	→				20 59	21 05	21 15	21 19
69	69761									2039h	→	20 57							
	811	20 40	20 58	→	21 08	21 13	21 20	→	21 31										
68	68761									2139h	21 51	→				21 59	22 05	22 15	22 18
69	69801									2139h	→	21 57							
	813	21 40	21 58	→	22 08	22 13	22 20	→	22 31										
68	68801									2239h	22 51	→				22 59	23 05	23 15	23 18
69	69831									2239h	→	22 57							
	815	22 40	22 58	→	23 08	23 13	23 20	→	23 31	23 39	→					23 43	→	23 51	
68B	68831															23 53h	23 59	00 09	00 12
69	69861									2341h	→	23 59							
65C	65841	23 10	→	→	→	→	→	→	23 42	23 55									
63	63861	23 20	→	→	23 50	24 00	k00 10												
65B	65861	23 30	→	→	→	→	→	→	→	→	00 10	→				00 25			
65C	65863	23 40	→	→	→	→	→	→	→	00 12	00 20								
65	65881	00 10	→	→	→	→	→	→	00 42	00 50	01 02	→				01 10			
63	63891	00 20	→	→	00 50	01 00	k01 10												
65	65911	01 10	→	→	→	→	→	→	01 42	01 50	02 02	→				02 10			
63	63921	01 20	→	→	01 50	02 00	k02 10												
65	65941	02 10	→	→	→	→	→	→	02 42	02 50	03 02	→				03 10			
63	63951	02 20	→	→	02 50	03 00	k03 10												

Saturday and Sunday Samedi et dimanche																		
SOUTHBOUND / EN DIRECTION SUD																		
Route Number Nombre d'itinéraire	Zone→ Trip Number N° du trajet	Barrie 69 Barrie Transit Terminal Dp	Barrie 69 Allandale Waterfront GO Dp	Barrie 68 Barrie South GO Dp	Inisfil 68 Yonge St. @ Victoria St.	Inisfil 67 Yonge St. @ 4th Line	Bradford 65 Barrie St. @ Holland St. W	Bradford 65 Bradford GO Dp	Bradford 65 Yonge St. @ Queen St.	East Gwillimbury 44 East Gwillimbury GO Dp	Newmarket 64 Newmarket GO Dp	Aurora 63 Aurora GO Dp	Aurora 63 Wellington St. E. @ Hwy. 404	King City 62 King City GO Dp	Vaughan 61 Maple GO Dp	Vaughan 61 Rutherford GO Dp	North York 19 Downsview Park GO Dp	Toronto 2 Union Station Ar
65	65130									05 50	05 55	06 10	06 16	→	→	→	→	06 50
63	63160													06 35	06 45	06 55	→	07 35
65	65190									06 50	06 55	07 10	07 16	→	→	→	→	07 50
63	63220													07 35	07 45	07 55	→	08 35
68	68240	06 40	06 45	06 57	07 01	07 08	07 22	07 26	07 35	07 45	07 50	08 05↓						
65C	65240											08 10h	08 16	→	→	→	→	08 55
63	63260													08 35	08 45	08 55	→	09 35
68	68260	07 40	07 45	07 57	08 01	08 08	08 22	08 26	08 35	08 45								
65	65260									0850h	08 55	09 10	09 16	→	→	→	→	09 55
68B	68300	08 28	08 33	08 45	08 49	08 56	09 10	09 14	09 23	09 33↓								
	800		09 10	09 18	→	→	→	09 39	→	09 48	09 52	10 00	→	10 11	10 18	10 22	10 31	10 53
68B	68330	09 28	09 33	09 45	09 49	09 56	10 10	10 14	10 23	10 33↓								
	802		10 10	10 18	→	→	→	10 39	→	10 48	10 52	11 00	→	11 11	11 18	11 22	11 31	11 53
68B	68380	10 28	10 33	10 45	10 49	10 56	11 10	11 14	11 23	11 33↓								
	804		11 10	11 18	→	→	→	11 39	→	11 48	11 52	12 00	→	12 11	12 18	12 22	12 31	12 53
68	68430	11 11	11 16	11 31	11 35	11 42	11 57	12 01	12 10	12 21	12 28	12 46↓						
	806											13 01	→	13 12	13 18	13 22	13 31	13 53
68	68490	12 11	12 16	12 31	12 35	12 42	12 57	13 01	13 10	13 21	13 28	1346↓						
	808											14 01	→	14 12	14 18	14 22	14 31	14 53
68	68560	13 11	13 16	13 31	13 35	13 42	13 57	14 01	14 10	14 21	14 28	1446↓						
	810											15 01	→	15 12	15 18	15 22	15 31	15 53

Saturday and Sunday Samedi et dimanche																		
SOUTHBOUND / EN DIRECTION SUD																		
Route Number Nombre d'itinéraire	Zone→ Trip Number N° du trajet	Barrie 69 Barrie Transit Terminal Dp	Barrie 69 Allandale Waterfront GO Dp	Barrie 68 Barrie South GO Dp	Inisfil 68 Yonge St. @ Victoria St.	Inisfil 67 Yonge St. @ 4th Line	Bradford 65 Barrie St. @ Holland St. W Dp	Bradford 65 Bradford GO Dp	Bradford 65 Yonge St. @ Queen St.	East Gwillimbury 44 East Gwillimbury GO Dp	Newmarket 64 Newmarket GO Dp	Aurora 63 Aurora GO Dp	Aurora 63 Wellington St. E. @ Hwy. 404 Dp	King City 62 King City GO Dp	Vaughan 61 Maple GO Dp	Vaughan 61 Rutherford GO Dp	North York 19 Downsview Park GO Dp	Toronto 2 Union Station Ar
68	68580	14 11	14 16	14 31	14 35	14 42	14 57	15 01	15 10	15 21	15 28	15 46						
	812											16 01	→	16 12	16 18	16 22	16 31	16 53
68	68640	15 11	15 16	15 31	15 35	15 42	15 57	16 01	16 10	16 21	16 28	16 46						
	814											17 01	→	17 12	17 18	17 22	17 33	17 55
68	68690	16 21	16 26	16 41	16 45	16 52	17 07	17 11	17 20	17 31	17 38	17 56↓						
	816											18 11	→	18 22	18 28	18 32	18 41	19 03
68	68740	17 26	17 31	17 43	17 47	17 54	18 08	18 12	18 21	18 31	18 38	1856↓						
	818											19 11	→	19 22	19 28	19 32	19 41	20 03
68	68790	18 26	18 31	18 43	18 47	18 54	19 08	19 12	19 21	19 31	19 38	1956↓						
	820											20 11	→	20 22	20 28	20 32	20 41	21 03
68	68820	19 31	19 36	19 48	19 52	19 59	20 13	20 17	20 26	20 36	20 41	2056↓						
	822											21 11	→	21 22	21 28	21 32	21 41	22 03
68	68850	20 31	20 36	20 48	20 52	20 59	21 13	21 17	21 26	21 36	21 41	2156↓						
	824											22 11	→	22 22	22 28	22 32	22 41	23 03
68B	68860	21 15	21 20	21 32	21 36	21 43	21 57	22 01	22 10	22 20								
65	65860									2225h	22 30	22 45	22 51	→	→	→	→	23 25
68B	68880	22 15	22 20	22 32	22 36	22 43	22 57	23 01	23 10	23 20								
65	65880									2325h	23 30	23 45	23 51	→	→	→	→	00 25
65	65910									00 25	00 30	00 45	00 51	→	→	→	→	01 25

Saturday and Sunday Samedi et dimanche																			
NORTHBOUND / EN DIRECTION NORD																			
Route Number Nombre d'itinéraire	Trip Number N° du trajet	Zone→	Toronto 2 Union Station	Dp North York 19 Downsview Park GO	61 Vaughan Rutherford GO	61 Vaughan Maple GO	62 King City King City GO	63 Aurora Wellington St. E. @ Hwy. 404	63 Aurora Aurora GO	64 Newmarket Newmarket GO	44 East Gwillimbury East Gwillimbury GO	65 East Gwillimbury Yonge St. @ Mount Albert Rd.	65 Bradford Bradford GO	Dp Bradford 65 Barrie St. @ John St. E.	67 Inisfil Yonge St. @ Kilarney Beach Rd.	68 Barrie Yonge St. @ Victoria St.	68 Barrie Barrie South GO	69 Barrie Allandale Waterfront GO	Dp Barrie 69 Barrie Transit Terminal
65C	65141		07 10	→	→	→	→	07 42	07 55										
68	68101								0800h	08 12	08 20	08 26	08 36	08 40	08 52	09 00	09 05	09 15	09 25
65C	65201		08 10	→	→	→	→	08 42	08 55↓										
68	68201								0900h	09 12	09 20	09 26	09 36	09 40	09 52	10 00	10 05	10 15	10 25
63	63231		08 50	→	09 30	09 40	09 50												
65C	65241		09 10	→	→	→	→	09 42	09 55										
68	68241								1000h	10 12	10 20	10 26	10 36	10 40	10 52	11 00	11 05	11 15	11 25
65C	65261		09 40	→	→	→	→	10 12	10 25										
63	63271		09 50	→	10 30	10 40	10 50												
65C	65281		10 10	→	→	→	→	10 42	10 55↓										
68	68281								1100h	11 12	11 20	11 26	11 38	11 42	11 54	12 02	12 07	12 20	12 30
65C	65301		10 40	→	→	→	→	11 12	11 25										
63	63331		10 50	→	11 30	11 40	11 50												
65C	65321		11 10	→	→	→	→	11 42	11 55										
68	68311								1200h	12 12	12 20	12 26	12 38	12 42	12 54	13 02	13 07	13 20	13 30
	801		12 00	12 18	12 28	12 33	12 40	→	1251↓										
68	68331								1259h	13 11	13 19	13 25	13 37	13 41	13 53	14 01	14 06	14 19	14 29
	803		13 00	13 18	13 28	13 33	13 40	→	1351↓										
68	68381								1359h	14 11	14 19	14 25	14 37	14 41	14 53	15 01	15 06	15 19	15 29
	805		14 00	14 18	14 28	14 33	14 40	→	14 51↓										
68	68431								1459h	15 11	15 19	15 25	15 37	15 41	15 53	16 01	16 06	16 19	16 29
	807		15 00	15 18	15 28	15 33	15 40	→	1551↓										
68	68491								1559h	16 11	16 19	16 25	16 37	16 41	16 53	17 01	17 06	17 19	17 29

Saturday and Sunday Samedi et dimanche																			
NORTHBOUND / EN DIRECTION NORD																			
Route Number Nombre d'itinéraire	Trip Number N° du trajet	Zone→	Toronto 2 Union Station	Dp North York 19 Downsview Park GO	61 Vaughan Rutherford GO	61 Vaughan Maple GO	62 King City King City GO	63 Aurora Wellington St. E. @ Hwy. 404	63 Aurora Aurora GO	64 Newmarket Newmarket GO	44 East Gwillimbury East Gwillimbury GO	65 East Gwillimbury Yonge St. @ Mount Albert Rd.	65 Bradford Bradford GO	65 Bradford Barrie St. @ John St. E.	67 Inisfil Yonge St. @ Kilarney Beach Rd.	68 Barrie Yonge St. @ Victoria St.	68 Barrie Barrie South GO	69 Dp Allandale Waterfront GO	69 Barrie Barrie Transit Terminal
68	809		16 00	16 18	16 28	16 33	16 40	→	1651↓										
	68501								1659h	17 11	17 19	17 25	17 37	17 41	17 53	18 01	18 06	18 19	18 29
68B	811		17 00	17 18	17 28	17 33	17 41	→	17 51	17 58	1802↓	→	18 10	→	→	→	18 30	18 40	
	68561										1812h	18 20	18 30	18 34	18 46	18 54	18 59	19 12	19 22
68	813		18 10	18 28	18 38	18 43	18 50	→	1901↓										
	68641								1909h	19 21	19 29	19 35	19 47	19 51	20 03	20 11	20 16	20 29	20 39
68	815		19 10	19 28	19 38	19 43	19 50	→	2001↓										
	68691								2009h	20 21	20 29	20 35	20 45	20 49	21 01	21 09	21 14	21 24	21 34
68	817		20 10	20 28	20 38	20 43	20 50	→	2101↓										
	68741								2109h	21 21	21 29	21 35	21 45	21 49	22 01	22 09	22 14	22 24	22 34
68	819		21 10	21 28	21 38	21 43	21 50	→	2201↓										
	68771								2209h	22 21	22 29	22 35	22 45	22 49	23 01	23 09	23 14	23 24	23 34
68B	821		22 10	22 28	22 38	22 43	22 51	→	23 01	23 08	2312↓	→	23 20	→	→	→	23 40	23 50	
	68811										2322h	23 28	23 38	23 41	23 52	23 59	00 03	00 13	00 22
68B	823		23 10	23 28	23 38	23 43	23 51	→	00 01	00 08	0012↓	→	00 20	→	→	→	00 40	00 50	
	68861										0022h	00 28	00 38	00 41	00 52	00 59	01 03	01 13	01 22
65	65871		23 40	→	→	→	→	00 12	00 20	00 32	00 40								
65	65881		00 10	→	→	→	→	00 42	00 50	01 02	01 10								
63	63891		00 20	→	00 55	01 05	01 15												
65	65911		01 10	→	→	→	→	01 42	01 50	02 02	02 10								
63	63921		01 20	→	01 55	02 05	02 15												
65	65941		02 10	→	→	→	→	02 42	02 50	03 02	03 10								
63	63951		02 20	→	02 55	03 05	03 15												

APPENDIX E

FUTURE SIDEWALK NETWORK PLAN

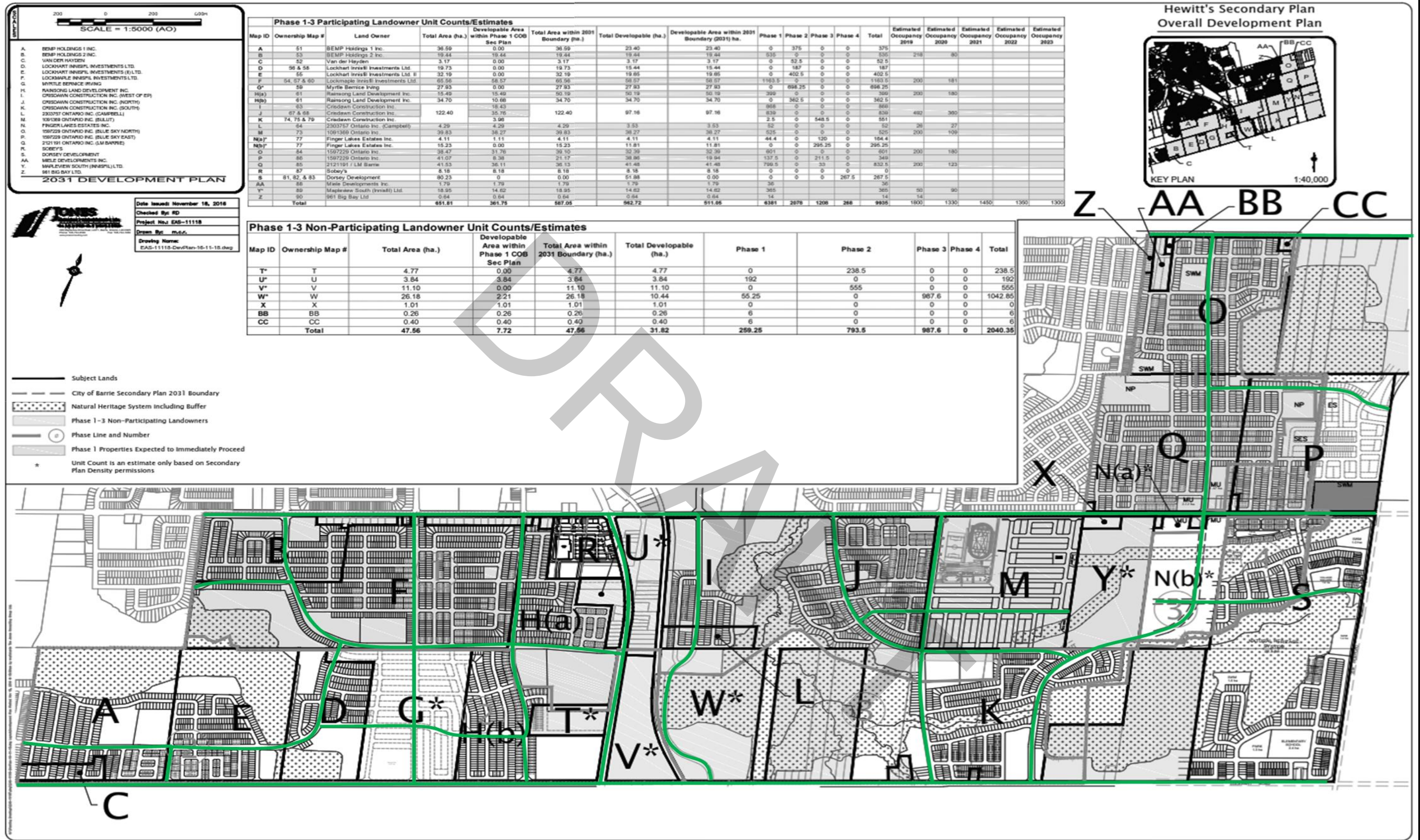


Figure ES-5
Proposed Future Sidewalk Network Plan
Hewitt Secondary Plan Area - Master Transportation Study

Legend

Sidewalks on Both Sides



*Not to scale



APPENDIX F

FUTURE CYCLE NETWORK PLAN

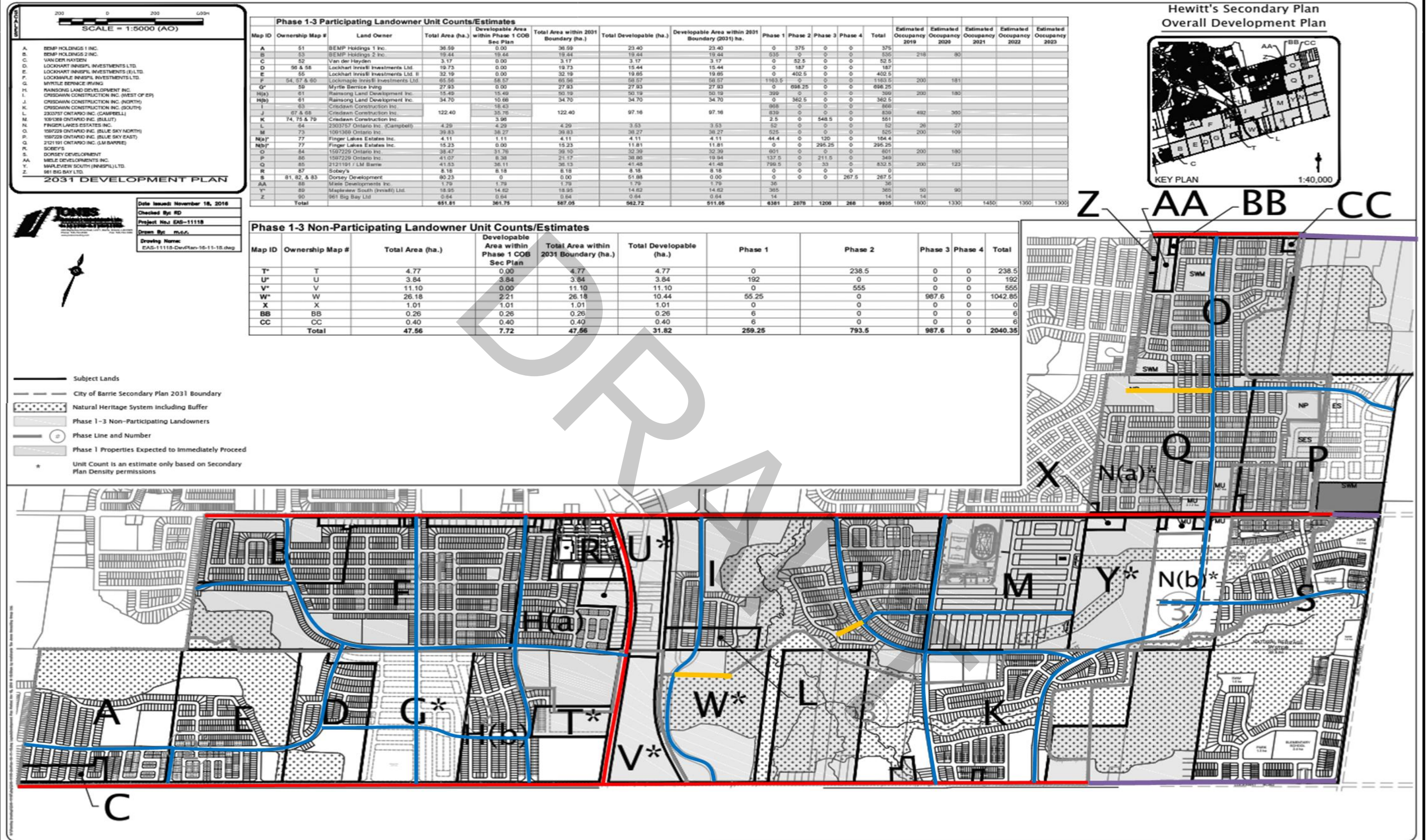


Figure ES-6
Proposed Future Cycle Network Plan
Hewitt Secondary Plan Area - Master Transportation Study

Legend

- Shared Bicycle Lanes
- Signed Route (Mixed Traffic)

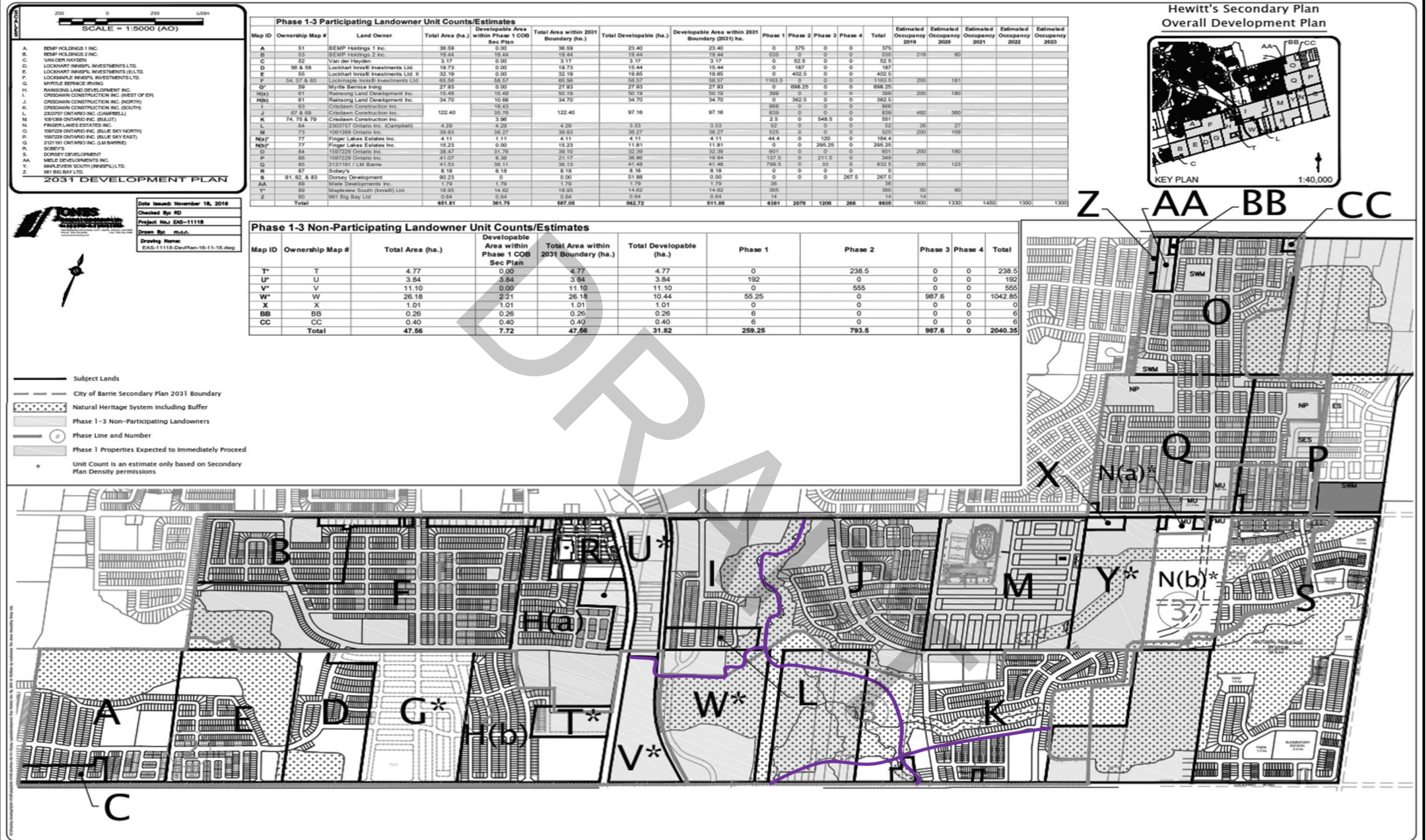


*Not to scale



APPENDIX G

FUTURE PATHWAY NETWORK PLAN



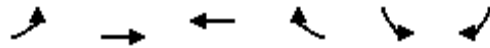
APPENDIX H

CAPACITY ANALYSIS

HCM Unsignalized Intersection Capacity Analysis

1: Lockhart Road & Kneeshaw Drive

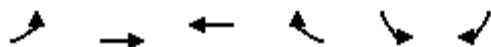
<2023 Background>AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	228	618	0	0	124
Future Volume (Veh/h)	5	228	618	0	0	124
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)	5	248	672	0	0	135
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	672				806	336
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	672				806	336
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				100	80
cM capacity (veh/h)	915				318	660
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	5	124	124	448	224	135
Volume Left	5	0	0	0	0	0
Volume Right	0	0	0	0	0	135
cSH	915	1700	1700	1700	1700	660
Volume to Capacity	0.01	0.07	0.07	0.26	0.13	0.20
Queue Length 95th (m)	0.1	0.0	0.0	0.0	0.0	6.1
Control Delay (s)	9.0	0.0	0.0	0.0	0.0	11.9
Lane LOS	A					B
Approach Delay (s)	0.2			0.0		11.9
Approach LOS						B
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			31.4%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 2: Kneeshaw Drive & Street 3

<2023 Background>AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↩	↩		↩	
Traffic Volume (veh/h)	0	5	123	0	0	1
Future Volume (Veh/h)	0	5	123	0	0	1
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)	0	5	134	0	0	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	134				139	134
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	134				139	134
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				100	100
cM capacity (veh/h)	1451				854	915
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	5	134	1			
Volume Left	0	0	0			
Volume Right	0	0	1			
cSH	1451	1700	915			
Volume to Capacity	0.00	0.08	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	8.9			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	8.9			
Approach LOS			A			
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			16.5%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Kneeshaw Drive & Street 2

<2023 Background>AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	5	0	0	123
Future Volume (Veh/h)	0	0	5	0	0	123
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	0	5	0	0	134
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	139	5			5	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	139	5			5	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	854	1078			1616	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	0	5	134			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1700	1616			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		0.0				
Intersection Capacity Utilization		16.5%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

4: Kneeshaw Drive & Street E/Street F

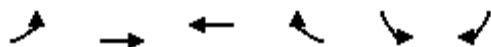
<2023 Background>AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	1	1	0	0	1	4	0	0	121	0
Future Volume (Veh/h)	0	0	1	1	0	0	1	4	0	0	121	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	1	1	0	0	1	4	0	0	132	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	138	138	132	139	138	4	132			4		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	138	138	132	139	138	4	132			4		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	832	752	917	830	752	1080	1453			1618		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	1	1	5	132								
Volume Left	0	1	1	0								
Volume Right	1	0	0	0								
cSH	917	830	1453	1618								
Volume to Capacity	0.00	0.00	0.00	0.00								
Queue Length 95th (m)	0.0	0.0	0.0	0.0								
Control Delay (s)	8.9	9.3	1.5	0.0								
Lane LOS	A	A	A									
Approach Delay (s)	8.9	9.3	1.5	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay			0.2									
Intersection Capacity Utilization			16.4%	ICU Level of Service						A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

1: Lockhart Road & Kneeshaw Drive

<2023 Background>PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	117	607	374	3	0	10
Future Volume (Veh/h)	117	607	374	3	0	10
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)	127	660	407	3	0	11
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	410				992	205
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	410				992	205
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	89				100	99
cM capacity (veh/h)	1145				216	802
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	127	330	330	271	139	11
Volume Left	127	0	0	0	0	0
Volume Right	0	0	0	0	3	11
cSH	1145	1700	1700	1700	1700	802
Volume to Capacity	0.11	0.19	0.19	0.16	0.08	0.01
Queue Length 95th (m)	3.0	0.0	0.0	0.0	0.0	0.3
Control Delay (s)	8.5	0.0	0.0	0.0	0.0	9.6
Lane LOS	A					A
Approach Delay (s)	1.4			0.0		9.6
Approach LOS						A
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			30.2%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 2: Kneeshaw Drive & Street 3

<2023 Background>PM Peak Hour

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	120	9	0	0	1
Future Volume (Veh/h)	0	120	9	0	0	1
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)	0	130	10	0	0	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	10				140	10
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	10				140	10
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				100	100
cM capacity (veh/h)	1610				853	1071
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	130	10	1			
Volume Left	0	0	0			
Volume Right	0	0	1			
cSH	1610	1700	1071			
Volume to Capacity	0.00	0.01	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	8.4			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	8.4			
Approach LOS			A			
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization		16.3%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

3: Kneeshaw Drive & Street 2

<2023 Background>PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	119	1	0	9
Future Volume (Veh/h)	0	0	119	1	0	9
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	0	129	1	0	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)						
pX, platoon unblocked						
vC, conflicting volume	140	130			130	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	140	130			130	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	854	920			1455	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	0	130	10			
Volume Left	0	0	0			
Volume Right	0	1	0			
cSH	1700	1700	1455			
Volume to Capacity	0.00	0.08	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			9.7%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

4: Kneeshaw Drive & Street E/Street F

<2023 Background>PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	1	1	0	0	1	117	1	0	7	0
Future Volume (Veh/h)	0	0	1	1	0	0	1	117	1	0	7	0
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	1	1	0	0	1	127	1	0	8	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	138	138	8	138	138	128	8				128	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	138	138	8	138	138	128	8				128	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	100	100	100	100				100	
cM capacity (veh/h)	833	752	1074	831	753	923	1612				1458	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	1	1	129	8								
Volume Left	0	1	1	0								
Volume Right	1	0	1	0								
cSH	1074	831	1612	1458								
Volume to Capacity	0.00	0.00	0.00	0.00								
Queue Length 95th (m)	0.0	0.0	0.0	0.0								
Control Delay (s)	8.4	9.3	0.1	0.0								
Lane LOS	A	A	A									
Approach Delay (s)	8.4	9.3	0.1	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay				0.2								
Intersection Capacity Utilization				17.0%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

1: Lockhart Road & Kneeshaw Drive

<2023 Total> AM Peak Hour

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	16	228	618	0	0	151
Future Volume (Veh/h)	16	228	618	0	0	151
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)	17	248	672	0	0	164
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	672				830	336
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	672				830	336
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				100	75
cM capacity (veh/h)	915				303	660
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	17	124	124	448	224	164
Volume Left	17	0	0	0	0	0
Volume Right	0	0	0	0	0	164
cSH	915	1700	1700	1700	1700	660
Volume to Capacity	0.02	0.07	0.07	0.26	0.13	0.25
Queue Length 95th (m)	0.5	0.0	0.0	0.0	0.0	7.8
Control Delay (s)	9.0	0.0	0.0	0.0	0.0	12.3
Lane LOS	A					B
Approach Delay (s)	0.6			0.0		12.3
Approach LOS						B
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			33.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 2: Kneeshaw Drive & Street 3

<2023 Total> AM Peak Hour

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	9	126	2	4	5
Future Volume (Veh/h)	2	9	126	2	4	5
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)	2	10	137	2	4	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	139				152	138
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	139				152	138
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				100	99
cM capacity (veh/h)	1445				839	910
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	12	139	9			
Volume Left	2	0	4			
Volume Right	0	2	5			
cSH	1445	1700	877			
Volume to Capacity	0.00	0.08	0.01			
Queue Length 95th (m)	0.0	0.0	0.2			
Control Delay (s)	1.3	0.0	9.1			
Lane LOS	A		A			
Approach Delay (s)	1.3	0.0	9.1			
Approach LOS			A			
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization		16.8%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis3: Kneeshaw Drive & Street 2

<2023 Total> AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	5	7	2	2	128
Future Volume (Veh/h)	5	5	7	2	2	128
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)	5	5	8	2	2	139
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	152	9			10	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	152	9			10	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	839	1073			1610	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	10	10	141			
Volume Left	5	0	2			
Volume Right	5	2	0			
cSH	941	1700	1610			
Volume to Capacity	0.01	0.01	0.00			
Queue Length 95th (m)	0.3	0.0	0.0			
Control Delay (s)	8.9	0.0	0.1			
Lane LOS	A		A			
Approach Delay (s)	8.9	0.0	0.1			
Approach LOS	A					
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			18.3%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

4: Kneeshaw Drive & Street E/Street F

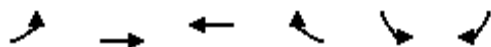
<2023 Total> AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	0	3	2	0	2	1	16	1	0	126	1
Future Volume (Veh/h)	1	0	3	2	0	2	1	16	1	0	126	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	0	3	2	0	2	1	17	1	0	137	1
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None								None			
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	159	158	138	160	158	18	138			18		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	159	158	138	160	158	18	138			18		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	805	734	911	802	734	1061	1446			1599		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	4	4	19	138								
Volume Left	1	2	1	0								
Volume Right	3	2	1	1								
cSH	882	914	1446	1599								
Volume to Capacity	0.00	0.00	0.00	0.00								
Queue Length 95th (m)	0.1	0.1	0.0	0.0								
Control Delay (s)	9.1	9.0	0.4	0.0								
Lane LOS	A	A	A									
Approach Delay (s)	9.1	9.0	0.4	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay			0.5									
Intersection Capacity Utilization			16.7%	ICU Level of Service						A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

1: Lockhart Road & Kneeshaw Drive

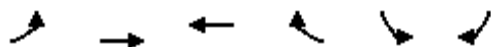
<2023 Total> PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	150	607	374	3	0	30
Future Volume (Veh/h)	150	607	374	3	0	30
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)	163	660	407	3	0	33
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	410				1064	205
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	410				1064	205
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	86				100	96
cM capacity (veh/h)	1145				187	802
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	163	330	330	271	139	33
Volume Left	163	0	0	0	0	0
Volume Right	0	0	0	0	3	33
cSH	1145	1700	1700	1700	1700	802
Volume to Capacity	0.14	0.19	0.19	0.16	0.08	0.04
Queue Length 95th (m)	4.0	0.0	0.0	0.0	0.0	1.0
Control Delay (s)	8.7	0.0	0.0	0.0	0.0	9.7
Lane LOS	A					A
Approach Delay (s)	1.7			0.0		9.7
Approach LOS						A
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			32.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 2: Kneeshaw Drive & Street 3

<2023 Total> PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	5	133	11	5	3	4
Future Volume (Veh/h)	5	133	11	5	3	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	145	12	5	3	4
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	17				170	14
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	17				170	14
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				100	100
cM capacity (veh/h)	1600				818	1065
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	150	17	7			
Volume Left	5	0	3			
Volume Right	0	5	4			
cSH	1600	1700	943			
Volume to Capacity	0.00	0.01	0.01			
Queue Length 95th (m)	0.1	0.0	0.2			
Control Delay (s)	0.3	0.0	8.8			
Lane LOS	A		A			
Approach Delay (s)	0.3	0.0	8.8			
Approach LOS			A			
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			21.0%		ICU Level of Service	
Analysis Period (min)			15		A	

HCM Unsignalized Intersection Capacity Analysis

3: Kneeshaw Drive & Street 2

<2023 Total> PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	4	4	126	7	6	16
Future Volume (Veh/h)	4	4	126	7	6	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)	4	4	137	8	7	17
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	172	141			145	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	172	141			145	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	814	907			1437	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	8	145	24			
Volume Left	4	0	7			
Volume Right	4	8	0			
cSH	858	1700	1437			
Volume to Capacity	0.01	0.09	0.00			
Queue Length 95th (m)	0.2	0.0	0.1			
Control Delay (s)	9.2	0.0	2.2			
Lane LOS	A		A			
Approach Delay (s)	9.2	0.0	2.2			
Approach LOS	A					
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			17.1%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

4: Kneeshaw Drive & Street E/Street F

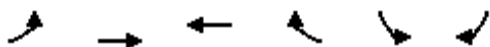
<2023 Total> PM Peak Hour

																				
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR								
Lane Configurations																				
Traffic Volume (veh/h)	1	0	2	2	0	1	3	126	3	2	21	2								
Future Volume (Veh/h)	1	0	2	2	0	1	3	126	3	2	21	2								
Sign Control	Stop			Stop			Free			Free										
Grade	0%			0%			0%			0%										
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92								
Hourly flow rate (vph)	1	0	2	2	0	1	3	137	3	2	23	2								
Pedestrians																				
Lane Width (m)																				
Walking Speed (m/s)																				
Percent Blockage																				
Right turn flare (veh)																				
Median type							None			None										
Median storage veh																				
Upstream signal (m)																				
pX, platoon unblocked																				
vC, conflicting volume	174	174	24	174	174	138	25				140									
vC1, stage 1 conf vol																				
vC2, stage 2 conf vol																				
vCu, unblocked vol	174	174	24	174	174	138	25				140									
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1									
tC, 2 stage (s)																				
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2									
p0 queue free %	100	100	100	100	100	100	100				100									
cM capacity (veh/h)	787	717	1052	785	717	910	1589				1443									
Direction, Lane #	EB 1	WB 1	NB 1	SB 1																
Volume Total	3	3	143	27																
Volume Left	1	2	3	2																
Volume Right	2	1	3	2																
cSH	946	822	1589	1443																
Volume to Capacity	0.00	0.00	0.00	0.00																
Queue Length 95th (m)	0.1	0.1	0.0	0.0																
Control Delay (s)	8.8	9.4	0.2	0.6																
Lane LOS	A	A	A	A																
Approach Delay (s)	8.8	9.4	0.2	0.6																
Approach LOS	A	A																		
Intersection Summary																				
Average Delay				0.5																
Intersection Capacity Utilization				17.5%	ICU Level of Service				A											
Analysis Period (min)				15																

HCM Unsignalized Intersection Capacity Analysis

1: Lockhart Road & Kneeshaw Drive

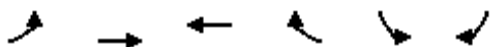
<2031 Background>AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	246	654	0	0	124
Future Volume (Veh/h)	5	246	654	0	0	124
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)	5	267	711	0	0	135
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	711				854	356
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	711				854	356
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				100	79
cM capacity (veh/h)	884				296	641
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	5	134	134	474	237	135
Volume Left	5	0	0	0	0	0
Volume Right	0	0	0	0	0	135
cSH	884	1700	1700	1700	1700	641
Volume to Capacity	0.01	0.08	0.08	0.28	0.14	0.21
Queue Length 95th (m)	0.1	0.0	0.0	0.0	0.0	6.3
Control Delay (s)	9.1	0.0	0.0	0.0	0.0	12.1
Lane LOS	A					B
Approach Delay (s)	0.2			0.0		12.1
Approach LOS						B
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			32.4%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 2: Kneeshaw Drive & Street 3

<2031 Background>AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↩	↩		↩	
Traffic Volume (veh/h)	0	5	123	0	0	1
Future Volume (Veh/h)	0	5	123	0	0	1
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)	0	5	134	0	0	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	134				139	134
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	134				139	134
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				100	100
cM capacity (veh/h)	1451				854	915
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	5	134	1			
Volume Left	0	0	0			
Volume Right	0	0	1			
cSH	1451	1700	915			
Volume to Capacity	0.00	0.08	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	8.9			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	8.9			
Approach LOS			A			
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			16.5%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Kneeshaw Drive & Street 2

<2031 Background>AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	5	0	0	123
Future Volume (Veh/h)	0	0	5	0	0	123
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	0	5	0	0	134
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	139	5			5	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	139	5			5	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	854	1078			1616	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	0	5	134			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1700	1616			
Volume to Capacity	0.00	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		0.0				
Intersection Capacity Utilization		16.5%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

4: Kneeshaw Drive & Street E/Street F

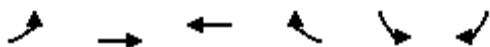
<2031 Background>AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	1	1	0	0	1	4	0	0	121	0
Future Volume (Veh/h)	0	0	1	1	0	0	1	4	0	0	121	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	1	1	0	0	1	4	0	0	132	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	138	138	132	139	138	4	132			4		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	138	138	132	139	138	4	132			4		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	832	752	917	830	752	1080	1453			1618		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	1	1	5	132								
Volume Left	0	1	1	0								
Volume Right	1	0	0	0								
cSH	917	830	1453	1618								
Volume to Capacity	0.00	0.00	0.00	0.00								
Queue Length 95th (m)	0.0	0.0	0.0	0.0								
Control Delay (s)	8.9	9.3	1.5	0.0								
Lane LOS	A	A	A									
Approach Delay (s)	8.9	9.3	1.5	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay			0.2									
Intersection Capacity Utilization			16.4%	ICU Level of Service						A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

1: Lockhart Road & Kneeshaw Drive

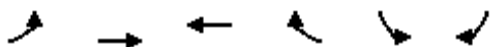
<2031 Background>PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	117	640	389	3	0	10
Future Volume (Veh/h)	117	640	389	3	0	10
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)	127	696	423	3	0	11
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	426				1026	213
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	426				1026	213
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	89				100	99
cM capacity (veh/h)	1130				205	792
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	127	348	348	282	144	11
Volume Left	127	0	0	0	0	0
Volume Right	0	0	0	0	3	11
cSH	1130	1700	1700	1700	1700	792
Volume to Capacity	0.11	0.20	0.20	0.17	0.08	0.01
Queue Length 95th (m)	3.0	0.0	0.0	0.0	0.0	0.3
Control Delay (s)	8.6	0.0	0.0	0.0	0.0	9.6
Lane LOS	A					A
Approach Delay (s)	1.3			0.0		9.6
Approach LOS						A
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			30.7%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 2: Kneeshaw Drive & Street 3

<2031 Background>PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	120	9	0	0	1
Future Volume (Veh/h)	0	120	9	0	0	1
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)	0	130	10	0	0	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	10				140	10
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	10				140	10
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				100	100
cM capacity (veh/h)	1610				853	1071
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	130	10	1			
Volume Left	0	0	0			
Volume Right	0	0	1			
cSH	1610	1700	1071			
Volume to Capacity	0.00	0.01	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	8.4			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	8.4			
Approach LOS			A			
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			16.3%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Kneeshaw Drive & Street 2

<2031 Background>PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	119	1	0	9
Future Volume (Veh/h)	0	0	119	1	0	9
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	0	129	1	0	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)						
pX, platoon unblocked						
vC, conflicting volume	140	130			130	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	140	130			130	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	854	920			1455	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	0	130	10			
Volume Left	0	0	0			
Volume Right	0	1	0			
cSH	1700	1700	1455			
Volume to Capacity	0.00	0.08	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			9.7%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

4: Kneeshaw Drive & Street E/Street F

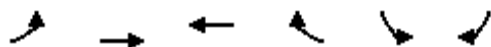
<2031 Background>PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	1	1	0	0	1	117	1	0	7	0
Future Volume (Veh/h)	0	0	1	1	0	0	1	117	1	0	7	0
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	1	1	0	0	1	127	1	0	8	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	138	138	8	138	138	128	8				128	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	138	138	8	138	138	128	8				128	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	100	100	100	100				100	
cM capacity (veh/h)	833	752	1074	831	753	923	1612				1458	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	1	1	129	8								
Volume Left	0	1	1	0								
Volume Right	1	0	1	0								
cSH	1074	831	1612	1458								
Volume to Capacity	0.00	0.00	0.00	0.00								
Queue Length 95th (m)	0.0	0.0	0.0	0.0								
Control Delay (s)	8.4	9.3	0.1	0.0								
Lane LOS	A	A	A									
Approach Delay (s)	8.4	9.3	0.1	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay				0.2								
Intersection Capacity Utilization				17.0%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

1: Lockhart Road & Kneeshaw Drive

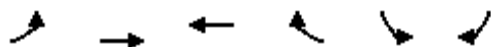
<2031 Total> AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	61	246	654	3	1	268
Future Volume (Veh/h)	61	246	654	3	1	268
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)	66	267	711	3	1	291
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	714				978	357
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	714				978	357
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				100	54
cM capacity (veh/h)	882				229	639
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	66	134	134	474	240	292
Volume Left	66	0	0	0	0	1
Volume Right	0	0	0	0	3	291
cSH	882	1700	1700	1700	1700	636
Volume to Capacity	0.07	0.08	0.08	0.28	0.14	0.46
Queue Length 95th (m)	1.9	0.0	0.0	0.0	0.0	19.3
Control Delay (s)	9.4	0.0	0.0	0.0	0.0	15.4
Lane LOS	A					C
Approach Delay (s)	1.9			0.0		15.4
Approach LOS						C
Intersection Summary						
Average Delay			3.8			
Intersection Capacity Utilization			48.2%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 2: Kneeshaw Drive & Street 3

<2031 Total> AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	2	9	126	2	4	5
Future Volume (Veh/h)	2	9	126	2	4	5
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)	2	10	137	2	4	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	139				152	138
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	139				152	138
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				100	99
cM capacity (veh/h)	1445				839	910
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	12	139	9			
Volume Left	2	0	4			
Volume Right	0	2	5			
cSH	1445	1700	877			
Volume to Capacity	0.00	0.08	0.01			
Queue Length 95th (m)	0.0	0.0	0.2			
Control Delay (s)	1.3	0.0	9.1			
Lane LOS	A		A			
Approach Delay (s)	1.3	0.0	9.1			
Approach LOS			A			
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			16.8%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Kneeshaw Drive & Street 2

<2031 Total> AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	5	7	2	2	128
Future Volume (Veh/h)	5	5	7	2	2	128
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)	5	5	8	2	2	139
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	152	9			10	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	152	9			10	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	839	1073			1610	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	10	10	141			
Volume Left	5	0	2			
Volume Right	5	2	0			
cSH	941	1700	1610			
Volume to Capacity	0.01	0.01	0.00			
Queue Length 95th (m)	0.3	0.0	0.0			
Control Delay (s)	8.9	0.0	0.1			
Lane LOS	A		A			
Approach Delay (s)	8.9	0.0	0.1			
Approach LOS	A					
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			18.3%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

4: Kneeshaw Drive & Street E/Street F

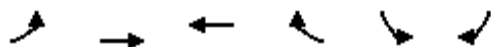
<2031 Total> AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	0	3	2	0	2	1	16	1	0	126	1
Future Volume (Veh/h)	1	0	3	2	0	2	1	16	1	0	126	1
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	0	3	2	0	2	1	17	1	0	137	1
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	159	158	138	160	158	18	138				18	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	159	158	138	160	158	18	138				18	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.2	
p0 queue free %	100	100	100	100	100	100	100				100	
cM capacity (veh/h)	805	734	911	802	734	1061	1446				1599	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	4	4	19	138								
Volume Left	1	2	1	0								
Volume Right	3	2	1	1								
cSH	882	914	1446	1599								
Volume to Capacity	0.00	0.00	0.00	0.00								
Queue Length 95th (m)	0.1	0.1	0.0	0.0								
Control Delay (s)	9.1	9.0	0.4	0.0								
Lane LOS	A	A	A									
Approach Delay (s)	9.1	9.0	0.4	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay				0.5								
Intersection Capacity Utilization				16.7%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

1: Lockhart Road & Kneeshaw Drive

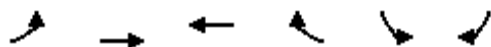
<2031 Total> PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	289	640	389	6	2	115
Future Volume (Veh/h)	289	640	389	6	2	115
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)	314	696	423	7	2	125
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	430				1402	215
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	430				1402	215
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	72				98	84
cM capacity (veh/h)	1126				94	790
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	314	348	348	282	148	127
Volume Left	314	0	0	0	0	2
Volume Right	0	0	0	0	7	125
cSH	1126	1700	1700	1700	1700	708
Volume to Capacity	0.28	0.20	0.20	0.17	0.09	0.18
Queue Length 95th (m)	9.2	0.0	0.0	0.0	0.0	5.2
Control Delay (s)	9.4	0.0	0.0	0.0	0.0	11.2
Lane LOS	A					B
Approach Delay (s)	2.9			0.0		11.2
Approach LOS						B
Intersection Summary						
Average Delay			2.8			
Intersection Capacity Utilization			44.2%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 2: Kneeshaw Drive & Street 3

<2031 Total> PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	5	133	11	5	3	4
Future Volume (Veh/h)	5	133	11	5	3	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	145	12	5	3	4
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	17				170	14
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	17				170	14
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				100	100
cM capacity (veh/h)	1600				818	1065
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	150	17	7			
Volume Left	5	0	3			
Volume Right	0	5	4			
cSH	1600	1700	943			
Volume to Capacity	0.00	0.01	0.01			
Queue Length 95th (m)	0.1	0.0	0.2			
Control Delay (s)	0.3	0.0	8.8			
Lane LOS	A		A			
Approach Delay (s)	0.3	0.0	8.8			
Approach LOS			A			
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			21.0%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 3: Kneeshaw Drive & Street 2

<2031 Total> PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	4	4	126	7	6	16
Future Volume (Veh/h)	4	4	126	7	6	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)	4	4	137	8	7	17
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	172	141			145	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	172	141			145	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	814	907			1437	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	8	145	24			
Volume Left	4	0	7			
Volume Right	4	8	0			
cSH	858	1700	1437			
Volume to Capacity	0.01	0.09	0.00			
Queue Length 95th (m)	0.2	0.0	0.1			
Control Delay (s)	9.2	0.0	2.2			
Lane LOS	A		A			
Approach Delay (s)	9.2	0.0	2.2			
Approach LOS	A					
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			17.1%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

4: Kneeshaw Drive & Street E/Street F

<2031 Total> PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	0	2	2	0	1	3	126	3	2	21	2
Future Volume (Veh/h)	1	0	2	2	0	1	3	126	3	2	21	2
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	0	2	2	0	1	3	137	3	2	23	2
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	174	174	24	174	174	138	25			140		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	174	174	24	174	174	138	25			140		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	787	717	1052	785	717	910	1589			1443		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	3	3	143	27								
Volume Left	1	2	3	2								
Volume Right	2	1	3	2								
cSH	946	822	1589	1443								
Volume to Capacity	0.00	0.00	0.00	0.00								
Queue Length 95th (m)	0.1	0.1	0.0	0.0								
Control Delay (s)	8.8	9.4	0.2	0.6								
Lane LOS	A	A	A	A								
Approach Delay (s)	8.8	9.4	0.2	0.6								
Approach LOS	A	A										
Intersection Summary												
Average Delay				0.5								
Intersection Capacity Utilization				17.5%	ICU Level of Service				A			
Analysis Period (min)				15								