

TOWN OF CALEDON
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Transportation Impact Study Update

PROPOSED RESIDENTIAL DEVELOPMENT

13656 & 13668 Emil Kolb Parkway
Town of Caledon, ON

February 28, 2025
Project No: NT-20-113

520 Industrial Parkway South, Suite 201
Aurora ON L4G 6W8
Phone: 905-503-2563
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February 28, 2025

Camcos
28 Wellington Street East, Suite 100
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Attention: James Circosta

**Re: Engineering Service – Transportation Impact Study Update
Proposed Residential Development
13656 & 13668 Emil Kolb Parkway, Town of Caledon
Our Project No. NT-20-113**

Nextrans Consulting Engineers (a Division of NextEng Consulting Group Inc.) is pleased to present the enclosed Transportation Impact Study Update in support of the Zoning By-law Amendment and Site Plan Approval applications for the above noted property.

The subject lands are located at the northwest corner of the Emil Kolb Parkway and Harvest Moon Drive intersection, in the Town of Caledon and the subject lands are currently vacant. Our previously submitted Transportation Impact Study was prepared in accordance with a site plan that illustrated 45 stacked townhouse dwelling units and 45 vehicle parking spaces. Vehicular access to the site was envisioned via a full movement entrance onto Harvest Moon Drive.

Subsequent to the submission of our initial study, new ownership has taken over the site and has purchased additional neighbouring property. Based on the site plan used to prepare this TIS Update, the development proposal is to construct two (2) townhouse buildings with a total of 22 dwelling units and an eight (8)-storey mid-rise residential building with 102 dwelling units. A total of 172 vehicle parking spaces are envisioned on-site. Vehicular access is envisioned via a full movement driveway onto Harvest Moon Drive.

This study provides an update to our previous reporting in accordance with the latest development proposal.

We trust the enclosed sufficiently addresses your needs. Should you have any questions, please do not hesitate to contact the undersigned.

Yours truly,

NEXTRANS CONSULTING ENGINEERS

Prepared by:

A handwritten signature in black ink, reading "Kristian Aviles".

Kristian Aviles, B.Eng.
Transportation Analyst

Reviewed & Approved by:

A handwritten signature in black ink, reading "R. P. Pernicky".

Richard Pernicky, MITE
Principal

Issues and Revisions Registry

Identification	Date	Description of issued and/or revision
Transportation Impact Study	August 21, 2021	1 st Submission
Transportation Impact Study Update	February 10, 2024	2 nd Submission

EXECUTIVE SUMMARY

Nextrans Consulting Engineers (a Division of NextEng Consulting Group Inc.) is pleased to present the enclosed Transportation Impact Study Update in support of Rezoning and Site Plan Approval application for a site located at the northwest corner of Harvest Moon Drive and Emil Kolb Parkway.

Development Proposal

The development proposal is to construct two (2) townhouse buildings with a total of 22 dwelling units and an eight (8)-storey mid-rise residential building with 102 dwelling units. A total of 172 vehicle parking spaces are envisioned on-site. Vehicular access is envisioned via a full movement driveway onto Harvest Moon Drive.

Capacity Analysis

Based on the trip generation calculations, the proposed development is projected to generate a total of 71 new two-way trips (21 inbound and 50 outbound) and 80 new two-way trips (47 inbound and 33 outbound) during the weekday AM peak hour and PM peak hour, respectively.

Based on the analysis of existing traffic volumes, the study area intersection currently operates with residual capacity, with acceptable levels of service, and with manageable delay and queue lengths.

Based on the results of the capacity analysis under future background traffic conditions, the study area intersection is projected to operate with residual capacity, with acceptable levels of service, with manageable delays and queue lengths during weekday AM and PM peak hours.

Based on the results of the capacity analysis of future total traffic volumes, the study area intersection and proposed site access are projected to operate with residual capacity, with excellent levels of service and with acceptable delay and queue lengths.

Parking Review

Based on the rates prescribed in the Town's Zoning By-law, a total of 229 vehicle parking spaces are required (197 resident spaces and 32 visitor spaces). In comparing the technical parking requirement with the proposed parking supply of 172 spaces, there is an overall shortfall of 57 spaces (25% reduction), composed of a shortfall of 51 resident spaces and a shortfall of six (6) visitor spaces.

Based on the justifications provided in this study, it is Nextrans' opinion that the parking reduction proposed for the mid-rise residential building is appropriate and the proposed parking supply is adequate to accommodate the future demands of the proposed development.

Loading Review

AutoTURN analysis demonstrates that a Peel Region waste collection vehicle will be able to access the site.

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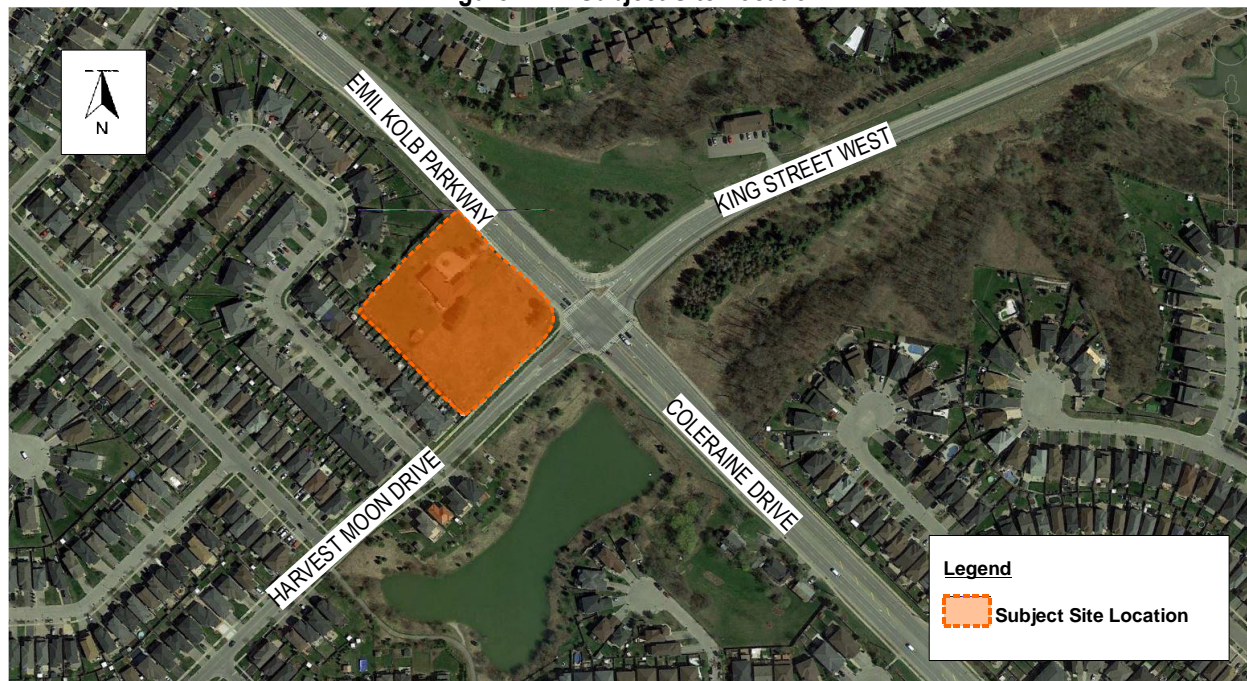
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1.0 INTRODUCTION

Nextrans Consulting Engineers (A Division of NextEng Consulting Group Inc.) was retained through Camcos (the 'Client') to undertake a Transportation Impact Study Update in support of a Site Plan Approval application for a residential development. The subject lands are located at the northwest corner of the intersection of Harvest Moon Drive and Emil Kolb Parkway, municipally addressed as 13656 & 13668 Emil Kolb Parkway, in the Town of Caledon (the 'Town').

The location of the proposed development is illustrated in **Figure 1-1**.

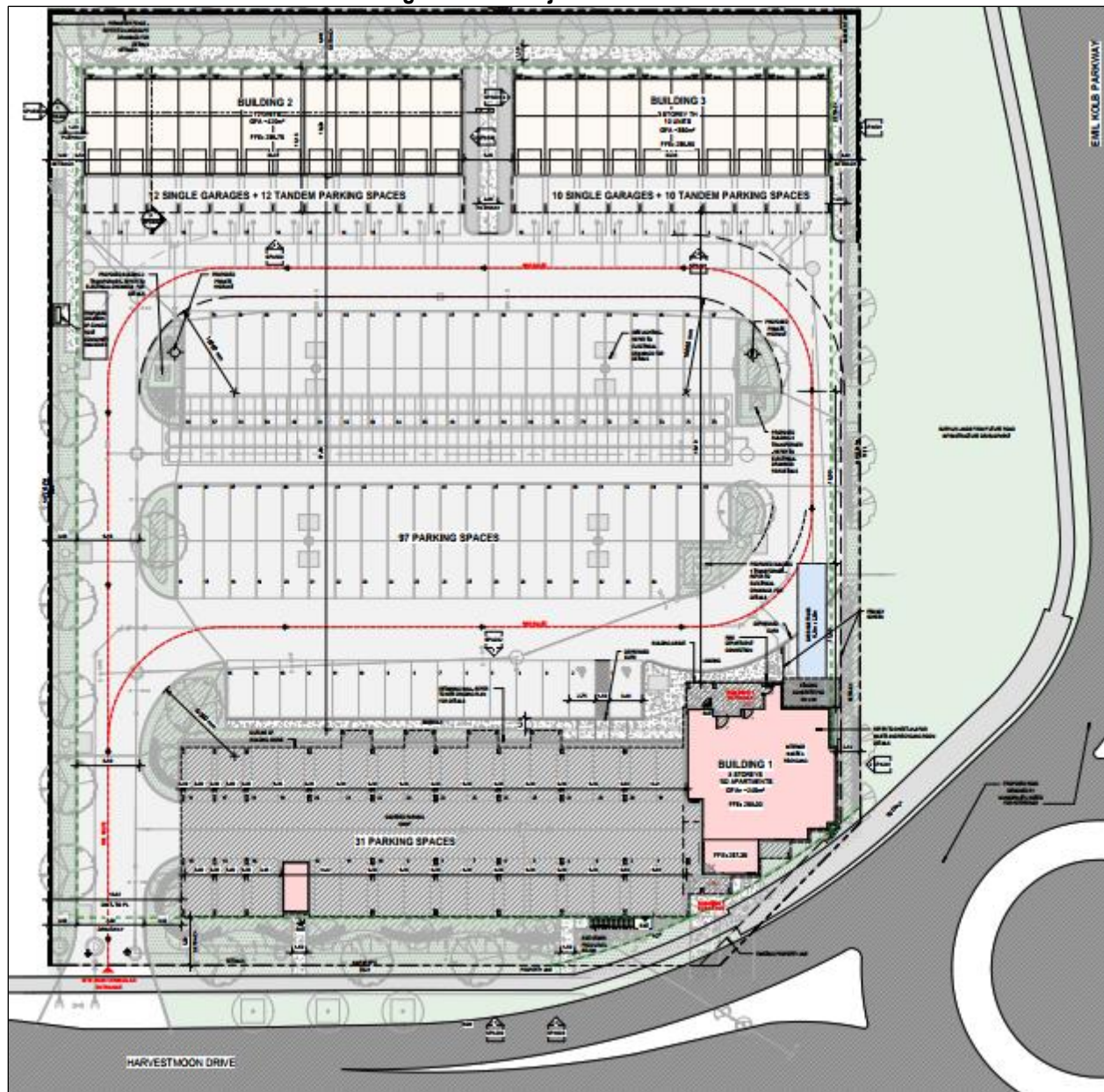
Figure 1-1 – Subject Site Location



The development proposal is to construct two (2) townhouse buildings with a total of 22 dwelling units and an eight (8)-storey mid-rise residential building with 102 dwelling units. A total of 172 vehicle parking spaces are envisioned on-site. Vehicular access is envisioned via a full movement driveway onto Harvest Moon Drive.

The proposed site plan is illustrated in **Figure 1-2** and is enclosed in full detail in **Appendix A**.

Figure 1-2 – Subject Site Location



1.1. Study Approach

A Terms of Reference was submitted to municipal and regional staff outlining the proposed work plan. At the time of preparing this Study, only municipal staff have provided feedback regarding the submitted Terms of Reference. The Terms of Reference is enclosed in **Appendix B**.

In accordance with the Terms of Reference provided to staff, weekday morning (AM) and weekday afternoon (PM) peak traffic periods were assessed. Traffic data was collected in 2024 and as such, 2024 was selected as the baseline year for existing conditions. An opening year of 2026 was assumed for the development and a five (5)-year horizon from opening was assessed (2031).

2.0 EXISTING TRAFFIC CONDITIONS

2.1. Existing Road Network

The existing subject lands are located on the northwestern quadrant of the Harvest Moon Drive / King Street West and Coleraine Drive / Emil Kolb Parkway intersection, in the Town of Caledon. The existing road network is described as follows:

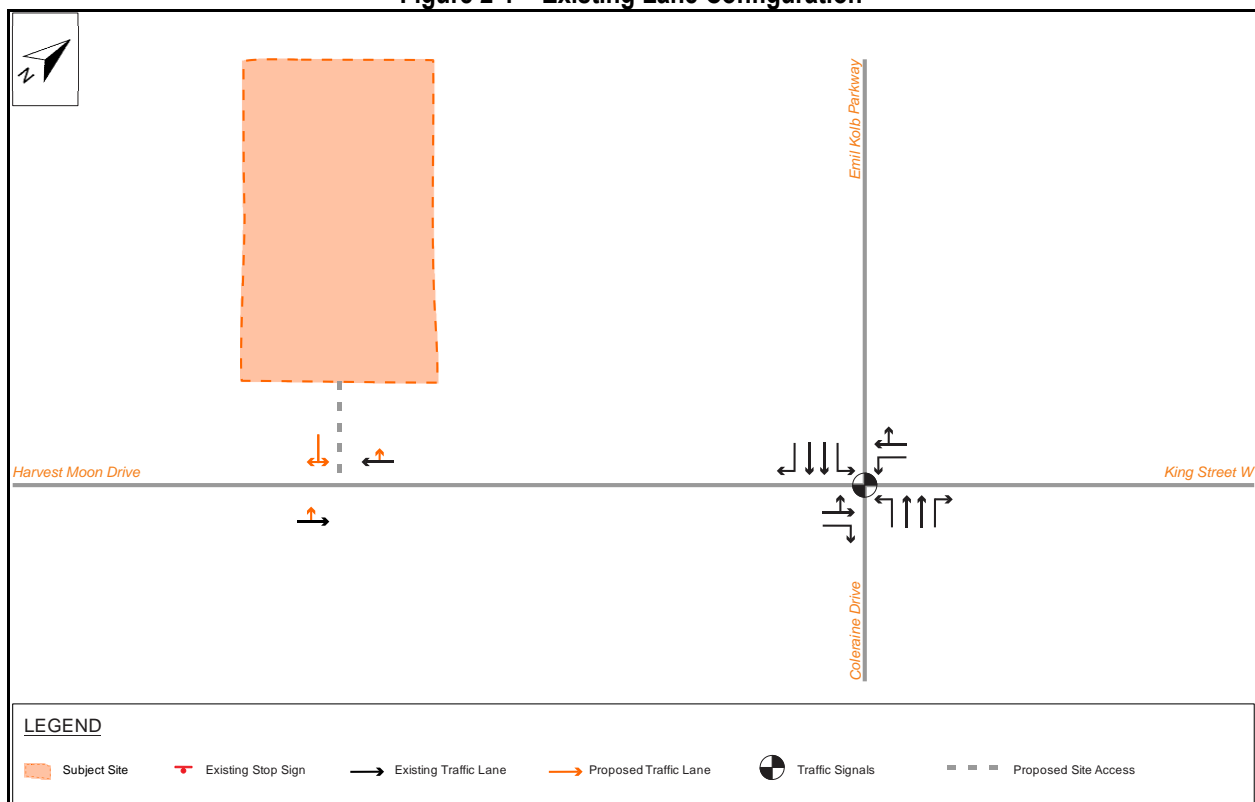
Harvest Moon Drive is a local road under the jurisdiction of the Town of Caledon and travels generally in the east-west directions. Harvest Moon Drive has a two (2)-lane cross section (one (1) lane per direction) and there is posted speed limit of 40 km/h near the subject site.

King Street West is a regional road under the jurisdiction of Peel Region and is also known as Regional Road 9. King Street West travels generally in the east-west directions and has a two (2)-lane cross section (one (1) lane per direction) and there is a posted speed limit of 60 km/h near the subject site.

Coleraine Drive / Emil Kolb Parkway is a regional road under the jurisdiction of Peel Region and is also known as Regional Road 150. Coleraine Drive / Emil Kolb Parkway travels generally in the north-south directions and has a four (4)-lane cross section (two (2) lanes per direction). There is a posted speed limit of 60 km/h near the subject site.

The existing lane configurations relevant to the study area are illustrated in **Figure 2-1**.

Figure 2-1 – Existing Lane Configuration



2.2. Existing Transit Network

The subject site is situated in an area with limited transit availability. It is noted that the Town of Caledon does not have a municipal transit system. As such, the only transit route available within the vicinity of the subject site is Brampton Transit Route #41. Based on the January 2025 Brampton Transit Rider guide, Brampton Transit Route #41 operates between Queen Street E in Brampton and Columbia Way in Caledon. The transit stops closest to the subject site are located at the intersection of Coleraine Drive and Holland Drive. Based on the January 2025 Route Frequency Guide, Route #41 operates during AM and PM peak periods from Monday to Friday with a frequency of 110 minutes.

It is to be noted that based on our review of publicly available information regarding the Bolton Go Station Area Dry Industrial Lands Review, a future GO station is contemplated near the subject site. Additional discussion is provided in Section 3.2 of this report.

2.3. Existing Active Transportation Network

The area surrounding the proposed development is serviced with dedicated walkways. Currently, sidewalks are available as follows:

- Both sides of Harvest Moon Drive
- Both sides of Coleraine Drive
- West side of Emil Kolb Parkway
- Throughout the nearby residential neighbourhoods
- Multi-use path on the east side of Emil Kolb Parkway and on the north side of King Street W.

The existing walking facilities are illustrated in **Figure 2-2**.

Figure 2-2 – Existing Walking Facilities

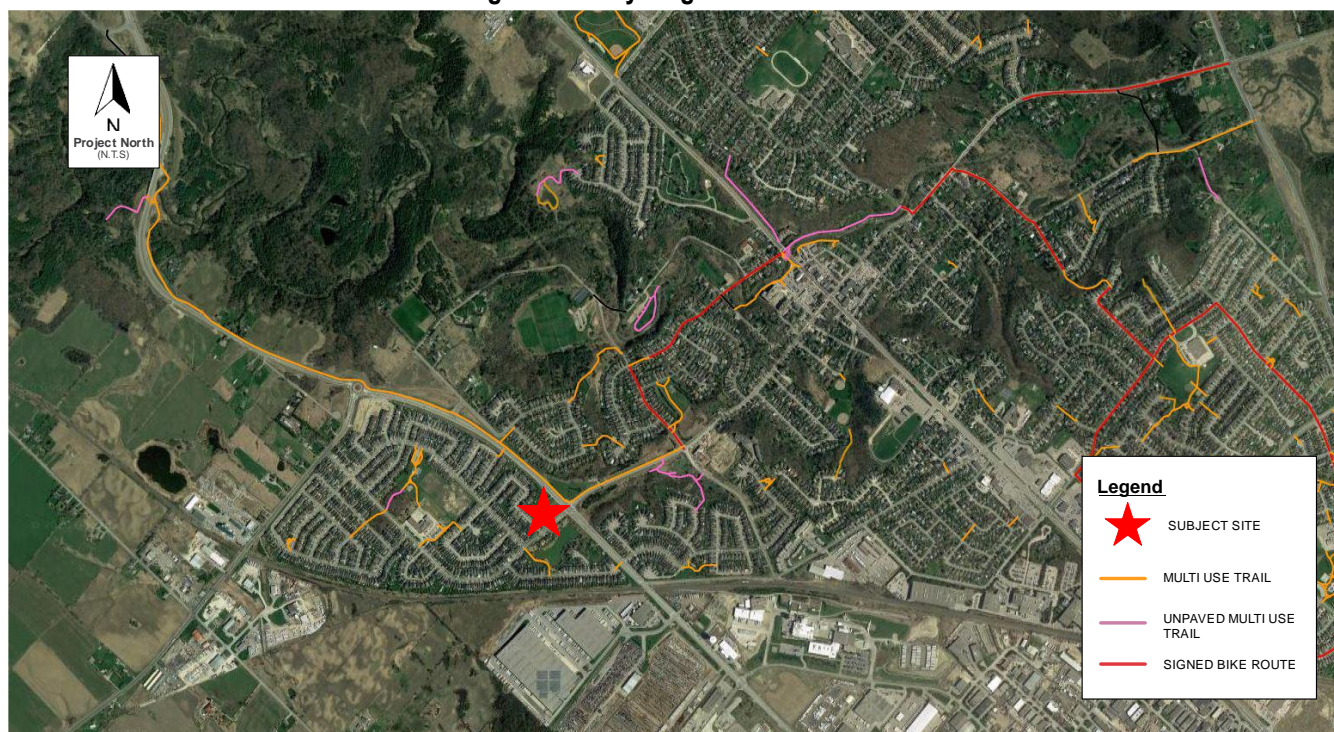


Cycling

According to the Peel Walk + Roll interactive map, the east side of Emil Kolb Parkway and the north side of King Street West, near the proposed development, is serviced with a paved multi use trail. In addition, there are also unpaved multi use trails and signed bike routes that are connected to the paved multi use trail that services the subject site.

The cycling lane provision is illustrated in **Figure 2-2**.

Figure 2-2 – Cycling Network



2.4. Existing Traffic Volumes

Weekday morning and afternoon peak period turning movement counts (TMC) were undertaken by Spectrum Traffic for all study area intersection during the weekday AM and PM peak periods. Existing traffic data, including TMC data and signal timing plans provided by Peel Region, are enclosed in **Appendix C**. A summary of traffic data collection is provided in **Table 2.1**.

Table 2.1: Traffic Data Collection Summary

Intersection	Source	Survey Date
TMC Data		
Coleraine Drive/Emil Kolb Parkway & Harvest Moon Drive/King Street W	Spectrum Traffic Inc.	June 20, 2024
Signal Timing Plans		
Coleraine Drive/Emil Kolb Parkway & Harvest Moon Drive/King Street W	Peel Region	June 28, 2024

2.5. Existing Traffic Assessment

The methodology of the software follows the procedures described and outlined in the highway capacity manual, HCM 2000, published by the Transportation Research Board.

It is noted that the peak hour factor (PHF) was calculated for each of the study area intersections for both AM and PM peak hours. The calculated PHF was carried forward in all future scenarios as well.

Peak hour factors were calculated and applied per intersection using the following equation:

$$PHF = \frac{\text{total peak hour volume}}{4 * \text{peak 15 minute volume}}$$

The existing traffic volumes are illustrated in **Figure 2-3** and were analyzed using Synchro 10 software. The detailed results are provided in **Appendix D** and summarized in **Table 2.2**.

Figure 2-3 - Existing Traffic Volumes

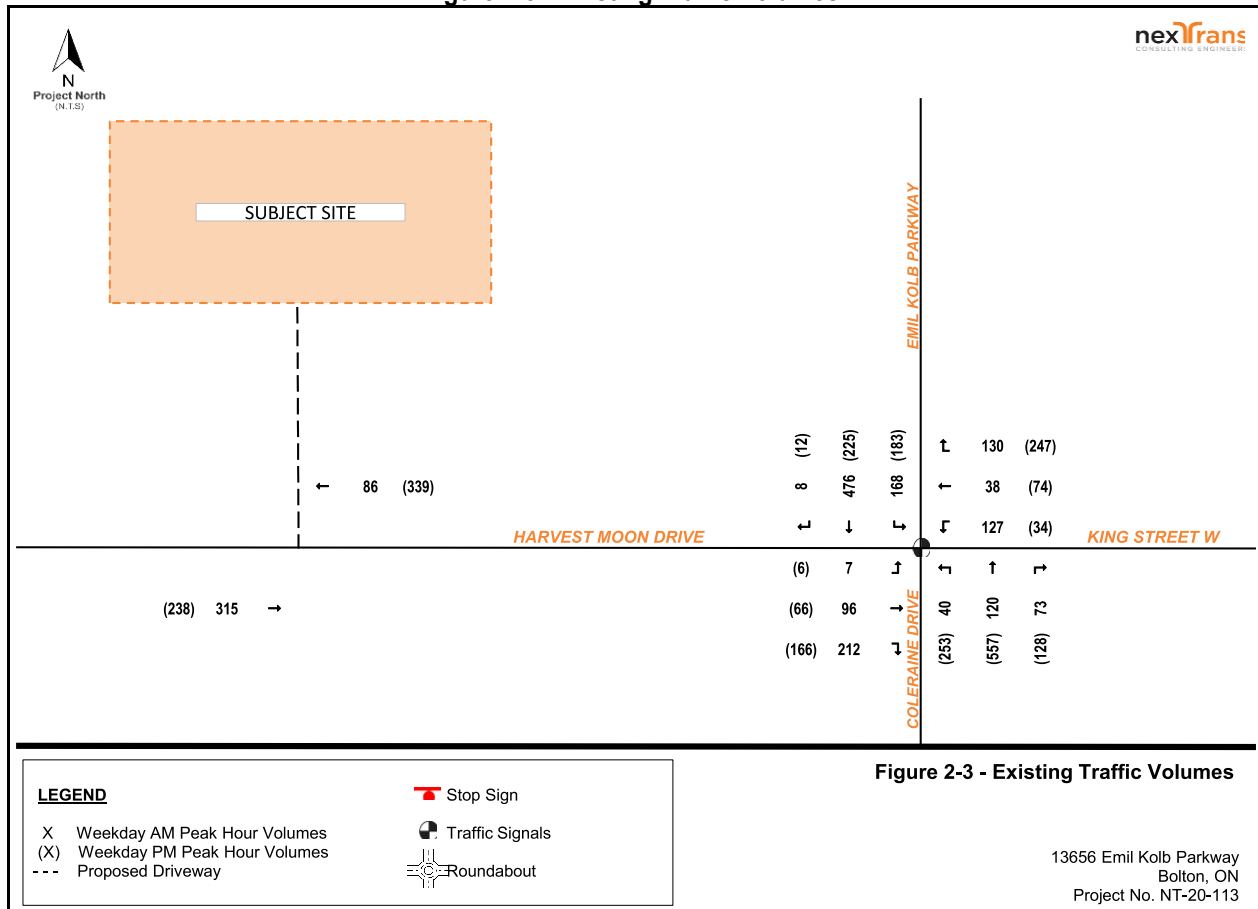


Table 2.2: Level of Service – Existing Traffic Assessments

Table 2.12: Level of Service - Existing Traffic Assessments											
Intersection	Movement	Weekday AM Peak Hour					Weekday PM Peak Hour				
		v/c	Delay (s)	LOS	Queue		v/c	Delay (s)	LOS	Queue	
					50 th	95 th				50 th	95 th
Signalized Intersections											
Coleraine Drive/Emil Kolb Parkway & Harvest Moon Drive/King Street West	Overall	0.46	15.8	B	-	-	0.49	16.7	B	-	-
	EBT	0.36	22.0	C	10.8	26.1	0.28	22.9	C	9.8	21.8
	EBR	0.21	21.1	C	1.8	19.1	0.13	22.0	C	0.0	13.7
	WBL	0.32	14.2	B	8.5	21.6	0.12	16.8	B	3.1	9.0
	WBT	0.07	13.0	B	2.9	9.6	0.17	17.1	B	8.0	18.1
	WBR	0.10	13.1	B	0.0	10.4	0.22	17.5	B	1.8	15.3
	NBL	0.14	15.6	B	2.5	7.5	0.48	10.5	B	20.1	33.2
	NBT	0.22	19.2	B	6.4	13.5	0.59	18.3	B	39.2	53.0
	NBR	0.05	18.4	B	0.0	6.0	0.10	14.6	B	0.0	9.7
	SBL	0.39	12.6	B	11.4	25.0	0.38	14.7	B	8.5	16.7
SBT	0.47	13.4	B	23.6	39.2	0.44	15.7	B	14.7	22.4	

Based on the results of the capacity analysis under existing traffic conditions, the study area intersection is currently operating with residual capacity, with acceptable levels of service, and with manageable delays and queues lengths during weekday AM and PM peak hours.

3.0 FUTURE BACKGROUND CONDITIONS

As noted previously in this study, the assumed build-out year for the proposed development is 2026. A five (5)-year horizon from the assumed build-out year was analyzed for future background traffic volumes (2031).

3.1. Future Corridor Growth

ADT data was provided by Town staff for Harvest Moon Drive to determine an appropriate growth rate. Data was available for the years 2015, 2016, 2017, 2019 and 2022. Given the gaps in the ADT data, it was determined that this was insufficient to determine an appropriate growth rate to project future traffic volumes. Peel Region AADT data was also reviewed to determine an appropriate growth rate to project future traffic volumes; however, the available data was also insufficient to determine an appropriate growth rate.

As a conservative approach, a standard 2% growth rate per annum was applied to existing traffic volumes to project future traffic growth along Coleraine Drive, Emil Kolb Parkway, Harvest Moon Drive and King Street West.

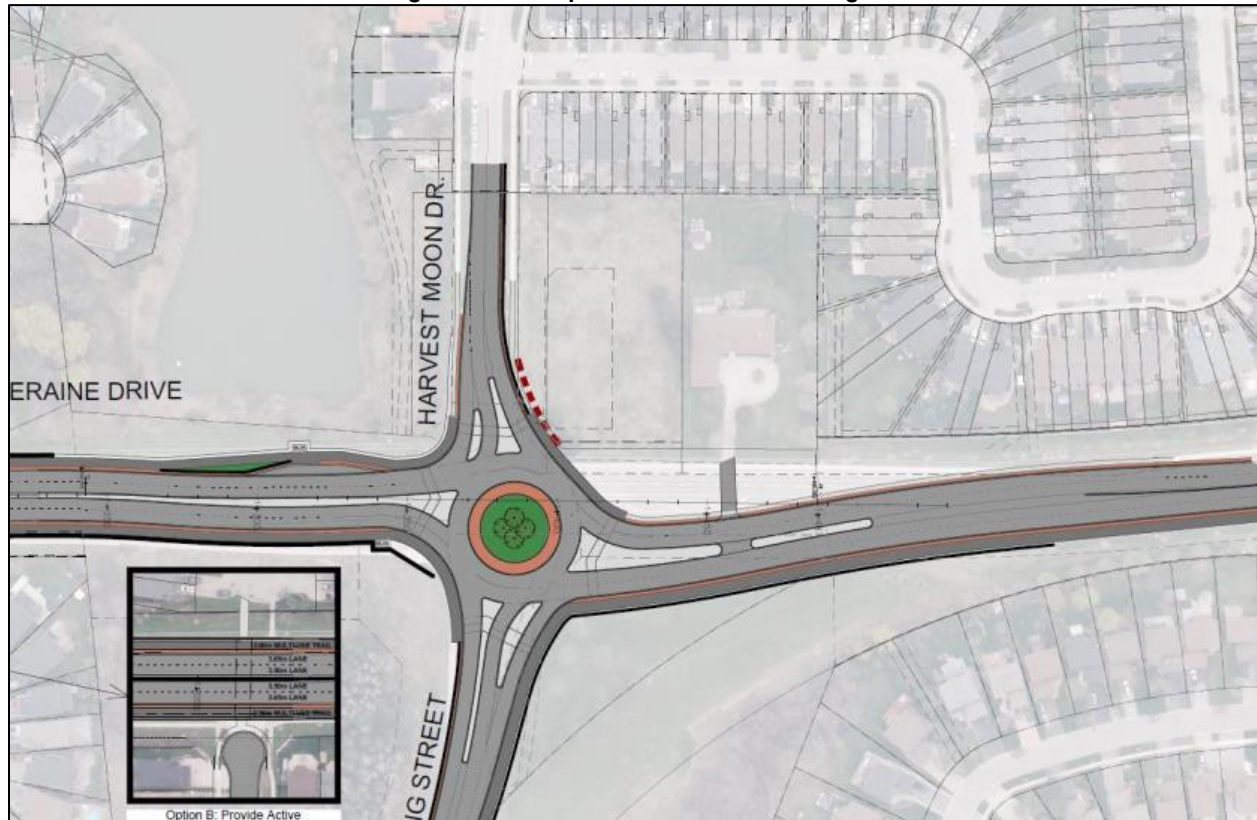
3.2. Planned Transportation Infrastructure Improvements

3.2.1. Proposed Roundabout

The Coleraine Drive Grade Separation Municipal Class Environmental Assessment Study Environmental Study Report (ESR), prepared by CIMA+ in 2024, was reviewed to determine future road improvements within the study area. Based on our review of the ESR, it is noted that the intersection of Harvest Moon Drive/King Street West and Coleraine Drive/Emil Kolb Parkway was identified as in need of improvements to accommodate future traffic needs. It was further noted that the preferred alternative to improve the intersection is to convert the existing intersection into a roundabout.

The alternative roundabout design includes a two-lane roundabout, with channelized right-turn lanes at the King Street W and Harvest Moon Drive approaches. An excerpt of the proposed roundabout design is illustrated in **Figure 3-1**.

Figure 3-1 – Proposed Roundabout Design



In accordance with the Region's plans to implement a roundabout at this intersection, the future traffic scenarios will model this intersection as a roundabout.

3.2.2. Proposed Transit Network Improvements

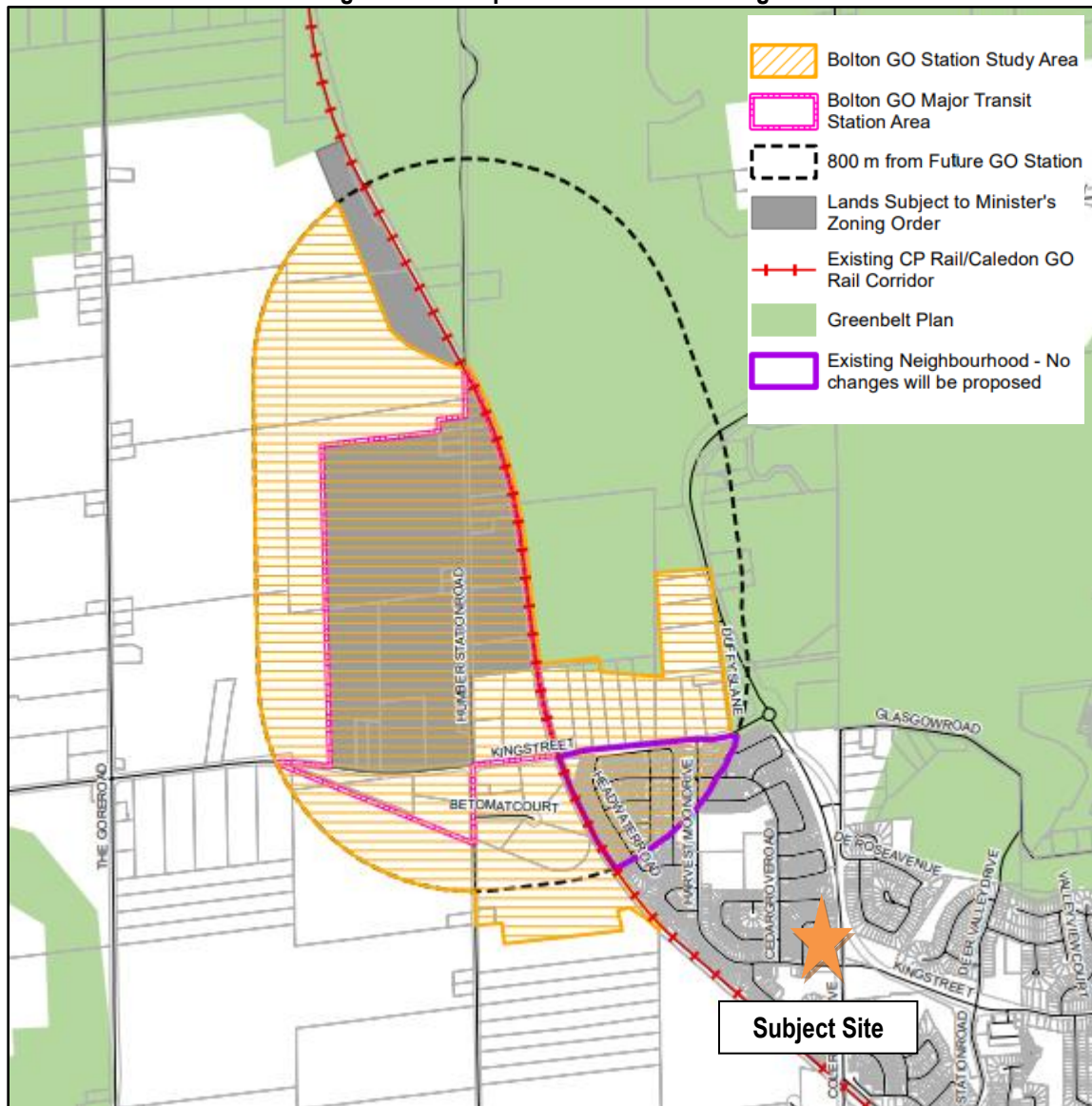
Based on our review of the Town of Caledon's Multi-Modal Transportation Master Plan, there is a need for higher-order transit to support growth in southern Caledon. Furthermore, the Province's 2022 Greater Golden Horseshoe Transportation Plan identified the need for the Province, Metrolinx and the Town to monitor transit demand and improve transit connectivity. To address the projected transit needs for southern Caledon, the Caledon GO Station has been proposed which will provide a rail line to the Town. The proposed GO station is located at Humber Station Road and King Street, which is approximately 1km west of the subject lands. The Caledon GO Station area has been designated as a planned Major Transit Station Area (MTSA) by Peel Region.

Additionally, a second potential GO Station and MTSA has been identified along Highway 50 and Queen Street in the Town's Multi-Modal Transportation Master Plan. The second GO Station was identified to support a new transit-oriented community through intensification in the form of high density mixed-use and residential areas.

Furthermore, the Town's Transportation Master Plan proposes that King Street West and Emil Kolb Parkway be designated as a transit corridor to provide services to residents in north Bolton and to provide connections to the planned GO station and key points of interest along Highway 50.

The Bolton GO Station Study Area is illustrated in **Figure 3-2**.

Figure 3-2 – Proposed Roundabout Design



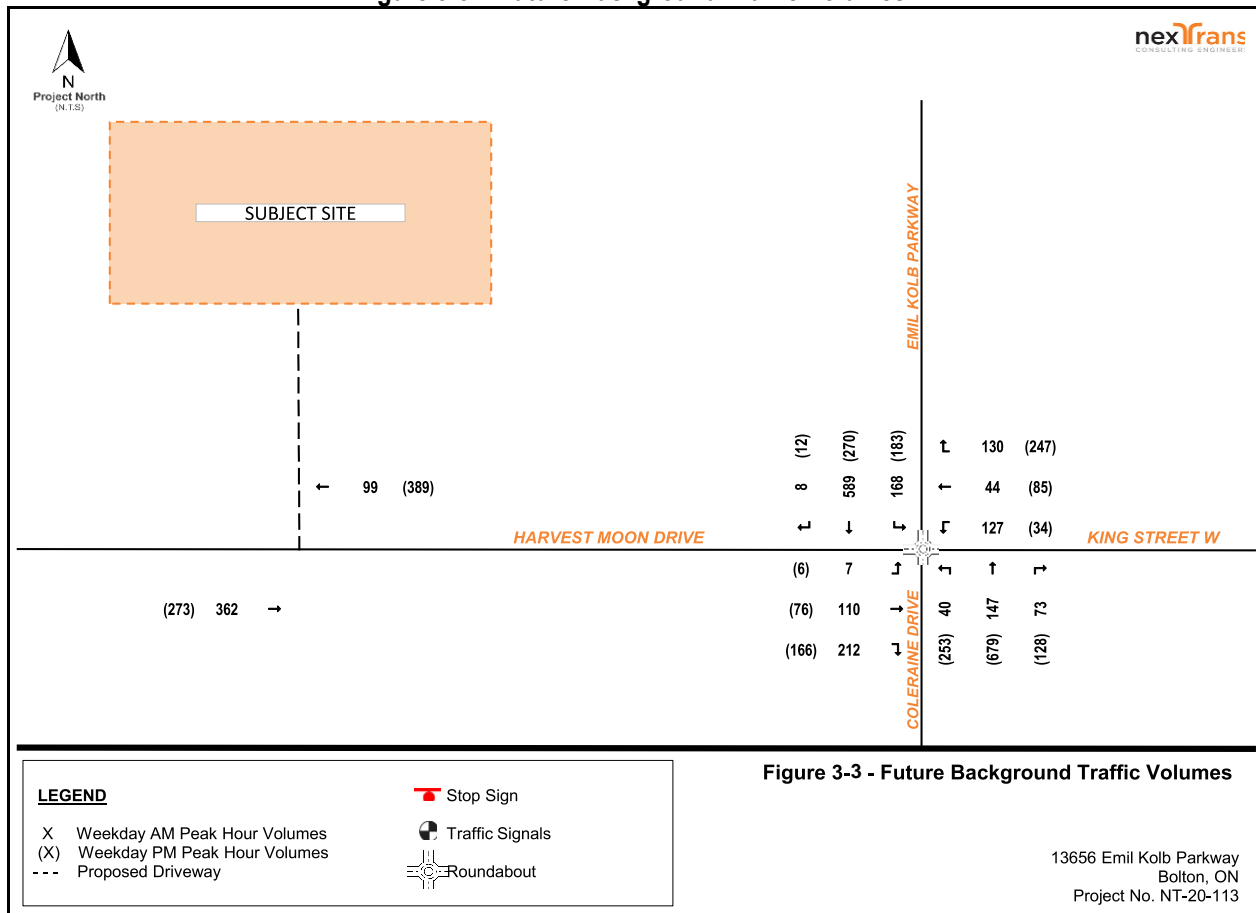
3.3. Background Developments

A comprehensive review of background developments in the subject area was conducted to identify future traffic contributors within the study area. Based on our review, one (1) background development within the area will contribute to future traffic volumes. The background development included in our analysis is municipally addressed as located at the northern terminus of Chickadee Lane, and the development is known as the Chickadee Grove Community. The development proposal includes 151 residential townhouse units and one (1) single-family detached residential unit. An excerpt of the Traffic Impact Study prepared by GHD (May, 2022) is enclosed in **Appendix E**.

3.4. Future Background Traffic Assessment

The estimated future background traffic volumes (i.e., future background growth volumes + background development site traffic volumes) are illustrated in **Figure 3-3**.

Figure 3-3 – Future Background Traffic Volumes



As previously noted in this Study, a roundabout is envisioned at the intersection of Emil Kolb Parkway/Coleraine Drive and Harvest Moon Drive/King Street West. As such, this condition was modelled in Synchro and the future background traffic volumes were analyzed accordingly.

The methodology used for the future background traffic analysis follows the procedures described and outlined in HCM 2010 Roundabout, published by the Transportation Research Board. The detailed calculations are enclosed in **Appendix F** and **Table 3.1** summarizes the level of service at the study area intersections under future background traffic conditions.

Table 3.1: Level of Service – Future Background Traffic Assessments

Intersection	Movement	Weekday AM Peak Hour				Weekday PM Peak Hour			
		v/c	Delay (s)	LOS	95 th Queue (veh)	v/c	Delay (s)	LOS	95 th Queue (veh)
Coleraine Drive/Emil Kolb Parkway & Harvest Moon Drive/King Street West	Overall	-	10.6	B	-	-	17.9	C	-
	EBLT	0.26	11.1	B	1	0.14	6.5	A	0
	EBR	0.40	12.3	B	2	0.24	6.8	A	1
	WBLT	0.21	6.1	A	1	0.28	11.5	B	1
	WBR	0.16	5.6	A	1	0.48	13.6	B	3
	NBLT	0.20	7.6	A	1	0.75	20.7	C	7
	NBTR	0.23	8	A	1	0.85	28.5	D	10
	SBLT	0.51	12	B	3	0.40	11.2	B	2
	SBTR	0.58	13.7	B	4	0.45	12.3	B	2

Based on the results of the capacity analysis under future background traffic conditions, the study area intersection is projected to operate with residual capacity, with acceptable levels of service, with manageable delays and queue lengths during weekday AM and PM peak hours.

4.0 SITE TRAFFIC

4.1. Trip Generation

As previously identified, the development proposal is to construct two (2) townhouse buildings with a total of 22 dwelling units and an eight (8)-storey mid-rise residential building with 102 dwelling units. Trip rates and site generated trips were derived from the information contained in the *Trip Generation Manual, 11th Edition* published by the Institute of Transportation Engineers (ITE) for “Multifamily Housing (Mid-Rise) Not Close to Rail Transit” (LUC 221) and “Multifamily Housing (Low-Rise) Not Close to Rail Transit” (LUC 820).

The trip generation summary is detailed in **Table 4.1**.

Table 4.1 – Site Traffic Trip Generation

ITE Land Use	Morning Peak Hour			Afternoon Peak Hour		
	In	Out	Total	In	Out	Total
LUC 821	14	27	41	28	22	50
LUC 820	7	23	30	19	11	30
Total	21	50	71	47	33	80

Based on the trip generation calculations, the proposed development is projected to generate a total of 71 new two-way trips (21 inbound and 50 outbound) and 80 new two-way trips (47 inbound and 33 outbound) during the weekday AM peak hour and PM peak hour, respectively.

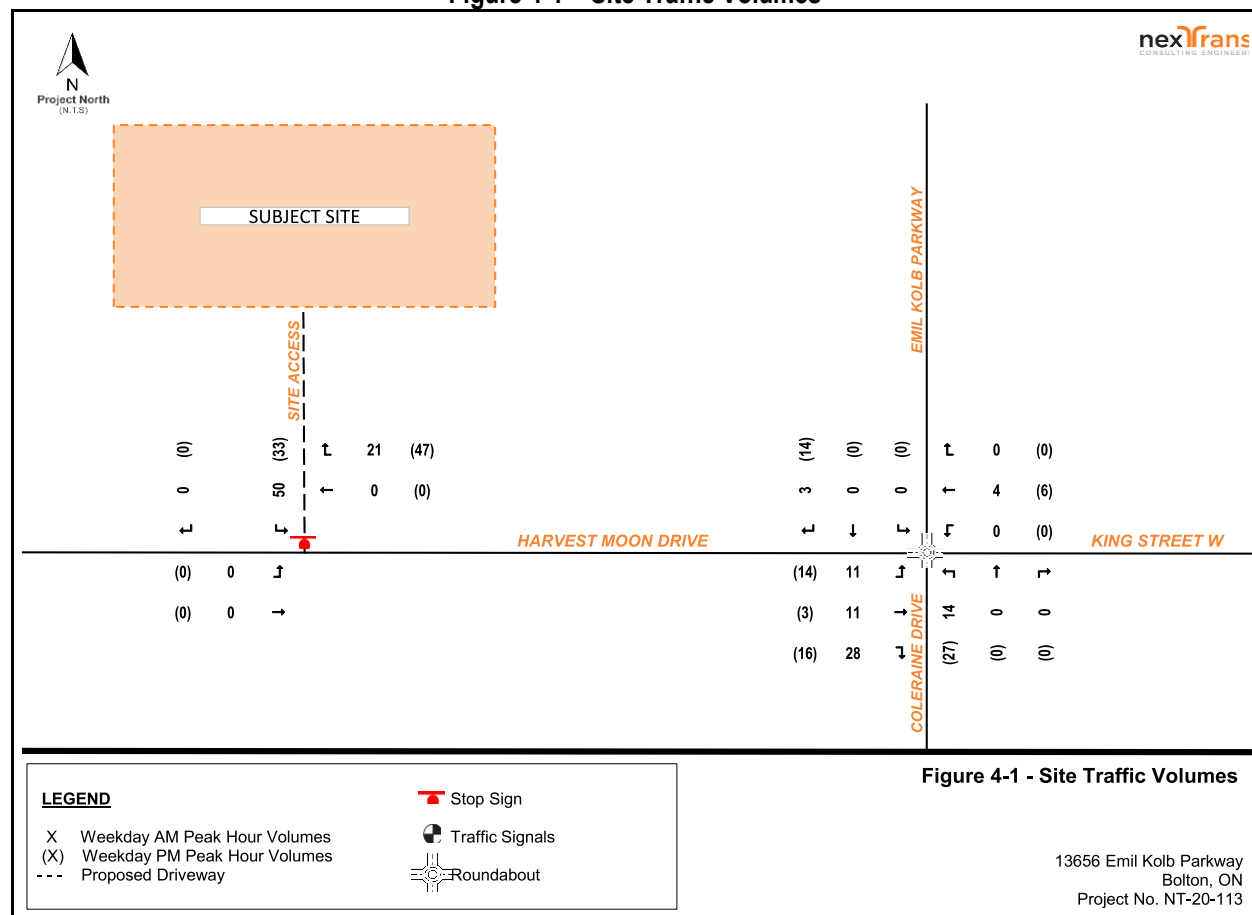
4.2. Trip Distribution

The distribution of residential site-generated traffic was estimated using data extracted from the 2016 Transportation Tomorrow Survey (TTS) for traffic zone 3153, as well as assumptions based on existing road configuration and routes that travellers would be likely to take when accessing the subject site. Trip distribution is summarized in **Table 4.2** and TTS data extraction is provided in **Appendix G**.

Table 4.2 – Site Traffic Trip Distribution

Corridor	Direction	AM		PM	
		Inbound	Outbound	Inbound	Outbound
Emil Kolb Parkway	North	16%	23%	30%	44%
Coleraine Drive	South	66%	55%	57%	48%
King Street W	East	18%	22%	13%	8%
Total		100%	100%	100%	100%

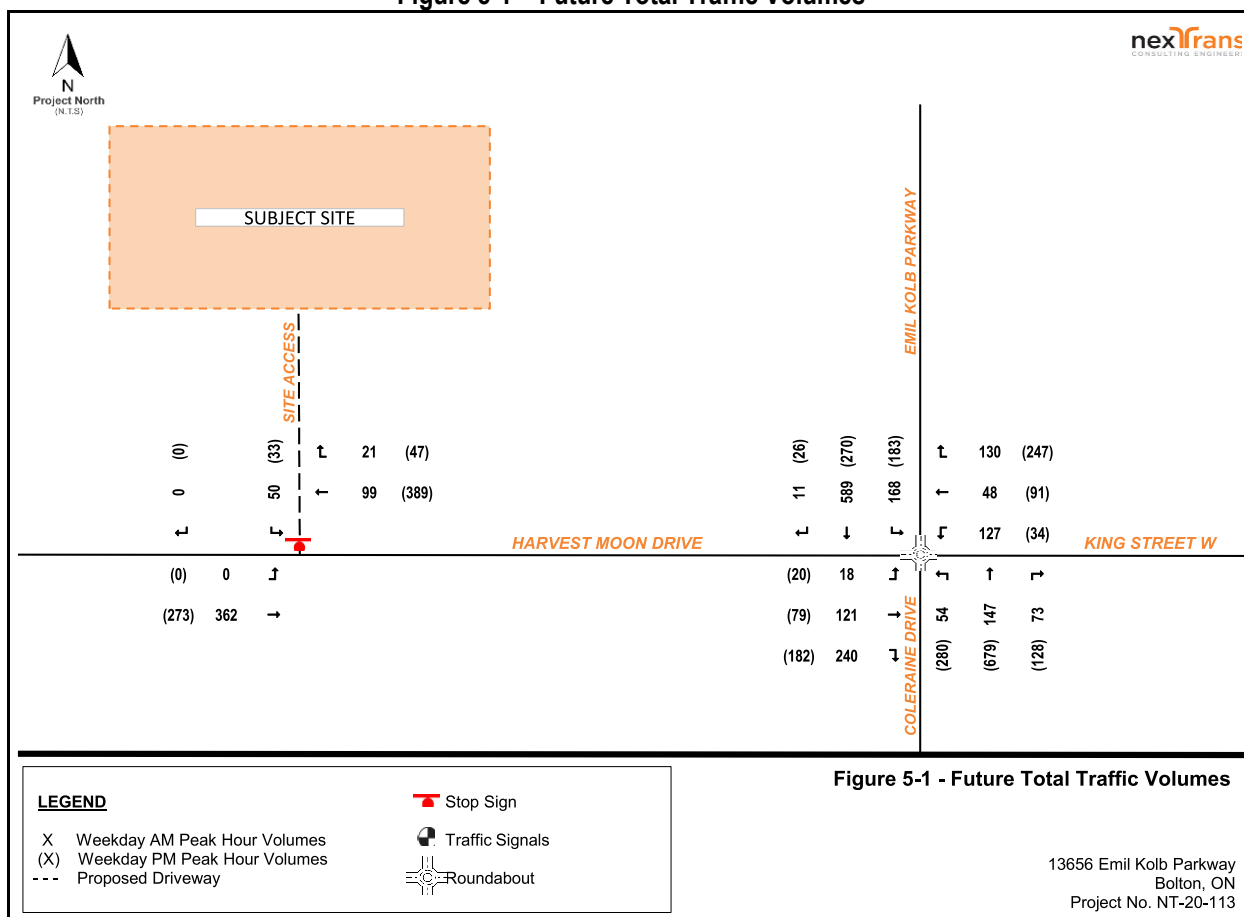
Trip assignment for all site generated traffic is illustrated in **Figure 4-1**.

Figure 4-1 – Site Traffic Volumes


5.0 FUTURE TOTAL ANALYSIS

The forecasted future total traffic volumes (future background traffic volumes plus site generated traffic volumes) are illustrated in **Figure 5-1** and were analyzed using Synchro 10 software. Procedures outlined in HCM 2010 Roundabout were used for the operational assessment of the proposed roundabout at the intersection of Emil Kolb Parkway/ Coleraine Drive and Harvest Moon Drive/King Street W, whereas procedures outlined in HCM 2000 were used at the unsignalized site access.

Figure 5-1 – Future Total Traffic Volumes



The detailed calculations are provided in **Appendix H** and are summarized in **Table 5.1**.

Table 5.1 – Level of Service – Future Total Traffic Assessment

Intersection	Movement	Weekday AM Peak Hour				Weekday PM Peak Hour			
		v/c	Delay (s)	LOS	95 th Queue (veh)	v/c	Delay (s)	LOS	95 th Queue (veh)
Coleraine Drive/Emil Kolb Parkway & Harvest Moon Drive/King Street West	Overall	-	10.6	B	-	-	20.2	C	-
	EBLT	0.26	11.1	B	1	0.17	7.1	A	1
	EBR	0.40	12.3	B	2	0.26	7.1	A	1
	WBLT	0.21	6.1	A	1	0.31	12.4	B	1
	WBR	0.16	5.6	A	1	0.49	14	B	3
	NBLT	0.20	7.6	A	1	0.79	23.6	C	8
	NBTR	0.23	8	A	1	0.89	34.1	D	12
	SBLT	0.51	12	B	3	0.43	12.1	B	2
Harvest Moon Drive & Site Access	SBTR	0.58	13.7	B	4	0.48	13.4	B	3
	WBR	0.06	0	A	0	0.28	0	C	0
	SBL	-	-	-	-	0.1	16	C	2.6m

Based on the results of the capacity analysis of future total traffic volumes, the study area intersection and proposed site access are projected to operate with residual capacity, with excellent levels of service and with acceptable delay and queue lengths. **On this basis, the site traffic generated by the proposed development is projected to have a negligible impact on the future traffic operations of the surrounding road network.**

6.0 PARKING ASSESSMENT

6.1. Parking Requirements

6.1.1. Vehicle Parking Requirements

The proposed development is zoned A1 and is subject to the Town of Caledon's Zoning By-law 2006-50. The parking requirements for each of the proposed land uses are detailed in **Table 6.1**.

Table 6.1: Vehicle Parking Requirements

Land Use	Parameter	No. of Units / GFA (m²)	Minimum Rate	Minimum Requirement	Parking Supply	Difference
Building, Apartment	Resident	102 units	1.5 spaces/unit	153	102	-51
	Visitor		0.25 spaces/unit	26	21	-5
Dwelling, Townhouse	Resident	22 units	2 spaces/unit	44	44	-
	Visitor		0.25 spaces/unit	6	5	-1
Total				229 spaces	172 spaces	-57 spaces

Based on the rates prescribed in the Town's Zoning By-law, a total of 229 vehicle parking spaces are required (197 resident spaces and 32 visitor spaces). In comparing the technical parking requirement with the proposed parking supply of 172 spaces, there is an overall shortfall of 57 spaces (25% reduction), composed of a shortfall of 51 resident spaces and a shortfall of six (6) visitor spaces.

It is to be noted that the shortfall in resident parking supply is from the apartment building, whereas the proposed parking supply for the townhouse dwelling units is compliant with the Zoning By-law requirements. Furthermore, the six (6) spaces shortfall in visitor parking supply is mainly from the apartment building as there is only a one (1) space shortfall in visitor parking supply for the townhouse dwelling units, which in Nextrans' opinion is negligible.

6.1.2. Barrier Free Parking Requirements

According to the accessible parking requirements outlined in Zoning By-law 2015-058, the total number of accessible spaces required for an overall parking requirement of 229 standard vehicle parking spaces, is 2 accessible spaces + 2% of the overall parking supply. On this basis, the minimum requirement for the proposed development is seven (7) accessible parking spaces, composed of three (3) Type A spaces and four (4) Type B spaces. The site plan used to prepare this report provides a supply of two (2) accessible parking spaces, resulting in a technical shortfall of five (5) accessible parking spaces.

Notwithstanding the technical shortfall in accessible parking spaces, it is Nextrans' opinion that the rates used to calculate these requirements are overly conservative since its based on the total number of standard vehicle spaces required on-site. In the case of the proposed development, the overall parking requirement is also inclusive of the proposed townhouse dwelling units, whereas it is not typical for accessible parking to be required for this type of built form as each unit is provided with a single garage and tandem outdoor parking space.

As illustrated on the site plan, there are two (2) accessible parking spaces located nearest to the principal entrance of Building 1. Additionally, there is a pick-up/drop-off (PUDO) area at the principal entrance of Building 1 and the pedestrian walkways accommodate accessible travel and also provide connection to the existing sidewalk network. As such, it is Nextrans' opinion that the proposed accessible vehicle parking supply of two (2) spaces is adequate.

6.2. Parking Justification

The following justifications are provided to support the proposed parking reduction in comparison to the Zoning By-law requirements:

1. Proxy Site Parking Utilization Survey Rates
2. Provincial Policies
3. Town of Caledon Official Plan
4. Transportation Demand Management

6.2.1. Proxy Site Parking Utilization Surveys

A review of parking survey data from previous parking utilization surveys completed by Nextrans was undertaken to determine the appropriateness of the proposed parking reduction of the proposed development.

The proxy sites considered were comparable in built form to the proposed development (i.e., mid-rise apartment building) and similar in density. Parking utilization surveys were conducted on typical (i.e., non-holiday) Fridays and Saturdays, with survey times varying per site but typically conducted in the evening when residents would be home, and their vehicles would be able to be accounted for. A summary of peak utilization rates at each of the selected proxy sites are detailed in **Table 6.2**, as well as general information of each site.

Table 6.2: Peak Proxy Site Parking Utilization Rates

Municipal Address	Description	Peak Resident Rate (spaces/unit)	Peak Visitor Rate (spaces/unit)
1315 Silver Spear Road, Mississauga	<ul style="list-style-type: none"> 8-storey apartment building 93 dwelling units 98 resident spaces 10 visitor spaces 	0.81	0.10
1015 Roosevelt & 1020 Shaw, Mississauga	<ul style="list-style-type: none"> 2 8-storey apartment buildings 152 units (each building has 76 units) 86 tenant spaces 14 visitor spaces 	0.36	0.04
480 Lakeshore Road East, Mississauga	<ul style="list-style-type: none"> 7-storey apartment building 82 dwelling units 80 resident spaces 7 visitor spaces 	0.85	0.06
3122 Hurontario Street, Mississauga	<ul style="list-style-type: none"> 12-storey apartment building 89 dwelling units 92 tenant spaces 10 visitor spaces 	0.64	0.05
111 Civic Square Gate, Aurora	<ul style="list-style-type: none"> 7-storey apartment building 157 dwelling units 	0.60	0.05
7 Albert Street, Whitchurch-Stouffville	<ul style="list-style-type: none"> 4-storey apartment building 63 dwelling units 77 resident spaces 4 visitor spaces 	0.90	0.03

Based on our review of previously collected parking survey data at the noted proxy sites, the peak observed resident rate was 0.90 spaces/unit whereas the peak observed visitor rate was 0.10 spaces/unit. It is critical to note that the

proxy sites selected are located nearby existing transit facilities; however, as noted in Section 3.2.2 of this Study, there are significant transit improvements planned within the vicinity of the subject site. With access to the future Caledon GO station and with access to the future transit lines that will be available along the King Street W and Emil Kolb Parkway corridors, the proposed development will have ample transit connections. As such, it is our opinion that the rates noted in the table above are appropriate for a development of this nature.

On this basis, it is our opinion that the proposed resident parking rate of 1.0 spaces/unit and proposed visitor rate of 0.21 spaces/unit is appropriate for the proposed mid-rise residential building and the proposed parking supply is adequate to accommodate the future demands of the proposed development..

6.2.2. Provincial Policies

At the time that this report was prepared, it is to be noted that the Province of Ontario introduced a new legislative proposal named Bill 185, Cutting Red Tape to Build More Homes Act, 2024. Bill 195 would prohibit minimum parking standards around MTSA's and an excerpt from the bill proposes the following:

"No official plan may contain any policy that has the effect of requiring an owner or occupant of a building or structure to provide and maintain parking facilities, other than parking facilities for bicycles, on land that is not part of a highway and this is located within,"

As of June 6th, 2024, Bill 185 received Royal Assent and includes amendments to s.34 of the Planning Act to add a new subsection (1.1) as follows:

- (1.1) *Despite paragraph 6 of subsection (1), a zoning by-law may not require an owner or occupant of a building or structure to provide and maintain parking facilities, other than parking facilities for bicycles, on land that is not part of a highway and that is located within,*
- (a) *A protected major transit station identified in accordance with subsection 16(15) or (16)*
 - (b) *An area delineated in the official plan of the municipality surrounding and including an existing or planned higher order transit station or stop, within which area the official plan policies identify the minimum number of residents and jobs, collectively, per hectare that are planned to be accommodated, but only if those policies are required to be included in the official plan to conform with a provincial plan or be consistent with a policy statement under subsection 3(1); or*
 - (c) *Any other area prescribed for the purposes of clause 16(22)(c)*

While the subject site falls just outside of MTSA designated lands according to the Bolton GO Station Study Area, the linear distance between the subject lands and the MTSA lands is just over 1km. As such, the reduced parking standards proposed on-site are compliant with the goals of Bill 185 and will assist in encouraging future residents to consider alternative modes of transportation. T

6.3. Town of Caledon Official Plan (2018)

The Town of Caledon's Official Plan states that one of the Town's main objectives is to promote an integrated transportation system which supports the provision of improved transportation options to residents. In Section 5.9.3.4 and Section 5.9.3.5 of the Town of Caledon's Official Plan, one of the Town's goals in regards to transportation is *"To support the planning and development of pedestrian and bicycle facilities and their linkages with open space areas. To support energy conservation and reduced transportation costs by advocating an expanded role of a public transit system and other sustainable modes of transportation."*

Our review of the Town of Caledon's Official Plan Transportation Objectives indicates that there is a need to reduce single-occupant-vehicle trips and to support other modes of transportation such as public transit and active transportation.

6.4. Transportation Demand Management

The main objective of the Transportation Demand Management (TDM) is to encourage residents to take alternative modes of transportation such as public transit, walking, cycling and carpooling. Based on NexTrans' experience in conducting parking justification studies in various jurisdictions in the Greater Toronto and Hamilton Area (GTHA), parking management is the best Transportation Demand Management measure that helps reducing the number single-occupant vehicle trips to and from the proposed development, which is consistent with the Town of Caledon's Official Plan policies and sustainability objectives. NexTrans provides additional recommendations for the TDM measures in Section 8 of this Study, to support the recommended parking rates reduction for the proposed development.

7.0 SITE PLAN REVIEW

7.1. Vehicle Maneuverability Assessment

AutoTURN software was used to generate a vehicular turning template to confirm and demonstrate the accessibility of the proposed study area. The AutoTURN analysis demonstrates that a Peel Region front-loading waste collection vehicle can access the loading space without conflict. The AutoTURN analysis is provided in **Figure 7-1**.

8.0 TRANSPORTATION DEMAND MANAGEMENT

The primary objectives of this TDM plan are as follows:

- Provision of facilities / operations to promote behavioural change for reduced automobile uses and encourage the use of alternative sustainable transportation modes aside from single-occupancy vehicle (SOV).
- Maximize average auto occupancies, with the intent of a net minimization of site-related auto trips.
- Create and support opportunities for an inclusive transportation system to accommodate and facilitate all potential road users in a safe and efficient manner.

TDM refers to a variety of strategies to reduce congestion, minimize the number of single-occupant vehicle trips, encourage non-auto modes of travel, and reduce vehicle dependency to create a sustainable transportation system. In short, TDM works to change how, when, where, and why people travel.

TDM strategies have multiple benefits including the following:

- Reduced auto-related emissions to improve air quality.
- Decreased traffic congestion to reduce travel time.
- Increased travel options.
- Reduced personal transportation costs and energy consumption.
- Support Provincial smart growth objectives.

Based on our review, the following TDM measures are recommended for the proposed development:

Transit:

Public transit includes various services using shared vehicles to provide mobility to the public, these generally include:

- Heavy rail – relatively large, higher-speed trains, operating entirely on separate rights-of-way, with infrequent stops, providing service between communities;
- Light Rail Transit – moderate size, medium-speed trains, operating mainly on separate rights-of-way, with variable distances between stations, providing service between urban neighborhoods and commercial centers;
- Streetcars – relatively small, lower-speed trains, operating primarily on urban streets, with frequent stops which provide service along major urban corridors;
- Conventional bus transit - full-size buses on fixed routes and schedules;
- Bus Rapid Transit – premium quality bus service with features that typically include grade separation, frequent service, attractive stations, quick loading, and attractive vehicles; and,

- Express commuter bus – direct bus service from residential to employment areas.

The subject site will be located in an area that will eventually be serviced by the future Bolton GO Station and future transit routes.

To encourage future transit usage, it is recommended that a pre-loaded PRESTO card be provided to new residents on a demand basis.

Walkability:

Walkability reflects overall walking conditions in an area. It considers the quality of pedestrian facilities, roadway conditions, land use patterns, community support, security and comfort for walking.

Generally, walkability can be evaluated at various scales:

- Site scale – affected by the quality of pathways, building accessways and related facilities;
- Street or neighborhood level – affected by the existence of sidewalks and crosswalks, and roadway conditions (road widths, traffic volumes and speeds); and,
- Community level – affected by land use accessibility, such as the relative location of common destinations and the quality of connections between them.

Pedestrian pathway is incorporated into the site design providing a safe and convenient connections to the adjacent public sidewalk system.

Cycling:

There are many specific ways to improve bicycle transportation, including the following:

- Improving paths and bike lanes;
- Correcting specific roadway hazards (potholes, cracks, narrow lanes, etc.);
- Improving road, road shoulder and path management and maintenance;
- Improving bicycling parking facilities;
- Develop a more connected street network and clustered development;
- Establish public bike systems that provide convenient rental bicycles for short utilitarian trips;
- Safety education, law enforcement and encouragement programs; and,
- Integration with transit.

We have also reviewed the Bicycle Parking Guidelines, 2nd Edition, published by the Association of Pedestrian & Bicycle Professionals (APBP) and the following should be considered:

Short-term and Long-term Bicycle Parking:

- “Short-term parking usually consists of bicycle racks located on the sidewalk or street in front of a building or destination. The site planning focus is on convenience, utility, and the attempt to improve security for the rack and the parked bicycle; and,
- Long-term parking uses a wider variety of fixture types and site plan layouts. It includes racks in cages and bicycle rooms, as well as lockers located in a variety of different settings, indoors and outdoors. Because long-term parking areas are frequently located in low pedestrian traffic areas or out-of-the-way locations, site design focus is on ensuring the safety of users while maintaining exclusive access to these areas.”

Bicycle Rack:

- “Supports the bicycle in at least two places, preventing it from falling over;
- Allows locking of the frame and one or both wheels with a U-lock;
- Is securely anchored to ground; and,
- Resists cutting, rusting and bending or deformation.”

The Town of Caledon’s Zoning By-law does not prescribe general requirements for bicycle parking; however, it is our opinion that the provision of bicycle parking would be an effective means to reduce single-occupant vehicle trips and would be a means to reduce the minimum vehicle parking requirement. As such, it is our recommendation that bicycle parking be considered for the proposed development to encourage cycling as an alternative mode of transportation.

9.0 CONCLUSION / FINDINGS

9.1. Study Findings

The findings and conclusions of our analysis are as follows:

- The development proposal is to construct two (2) townhouse buildings with a total of 22 dwelling units and an eight (8)-storey mid-rise residential building with 102 dwelling units. A total of 172 vehicle parking spaces are envisioned on-site. Vehicular access is envisioned via a full movement driveway onto Harvest Moon Drive.
- Based on the analysis of existing traffic volumes, the study area intersection currently operates with residual capacity, with acceptable levels of service, and with manageable delay and queue lengths.
- Based on the results of the capacity analysis under future background traffic conditions, the study area intersection is projected to operate with residual capacity, with acceptable levels of service, with manageable delays and queue lengths during weekday AM and PM peak hours.
- Based on the trip generation calculations, the proposed development is projected to generate a total of 71 new two-way trips (21 inbound and 50 outbound) and 80 new two-way trips (47 inbound and 33 outbound) during the weekday AM peak hour and PM peak hour, respectively.
- Based on the results of the capacity analysis of future total traffic volumes, the study area intersection and proposed site access are projected to operate with residual capacity, with excellent levels of service and with acceptable delay and queue lengths.
- Based on the rates prescribed in the Town’s Zoning By-law, a total of 229 vehicle parking spaces are required (197 resident spaces and 32 visitor spaces). In comparing the technical parking requirement with the proposed parking supply of 172 spaces, there is an overall shortfall of 57 spaces (25% reduction), composed of a shortfall of 51 resident spaces and a shortfall of six (6) visitor spaces.
- According to the accessible parking requirements outlined in Zoning By-law 2015-058, the total number of accessible spaces required for an overall parking requirement of 229 standard vehicle parking spaces, is 2 accessible spaces + 2% of the overall parking supply. On this basis, the minimum requirement for the proposed development is seven (7) accessible parking spaces, composed of three (3) Type A spaces and four (4) Type B spaces. The site plan used to prepare this report provides a supply of two (2) accessible parking spaces, resulting in a technical shortfall of five (5) accessible parking spaces.
- Notwithstanding the technical shortfall in accessible parking spaces, it is Nextrans’ opinion that the rates used to calculate these requirements are overly conservative since its based on the total number of standard vehicle spaces required on-site. In the case of the proposed development, the overall parking

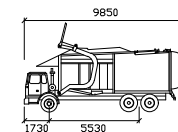
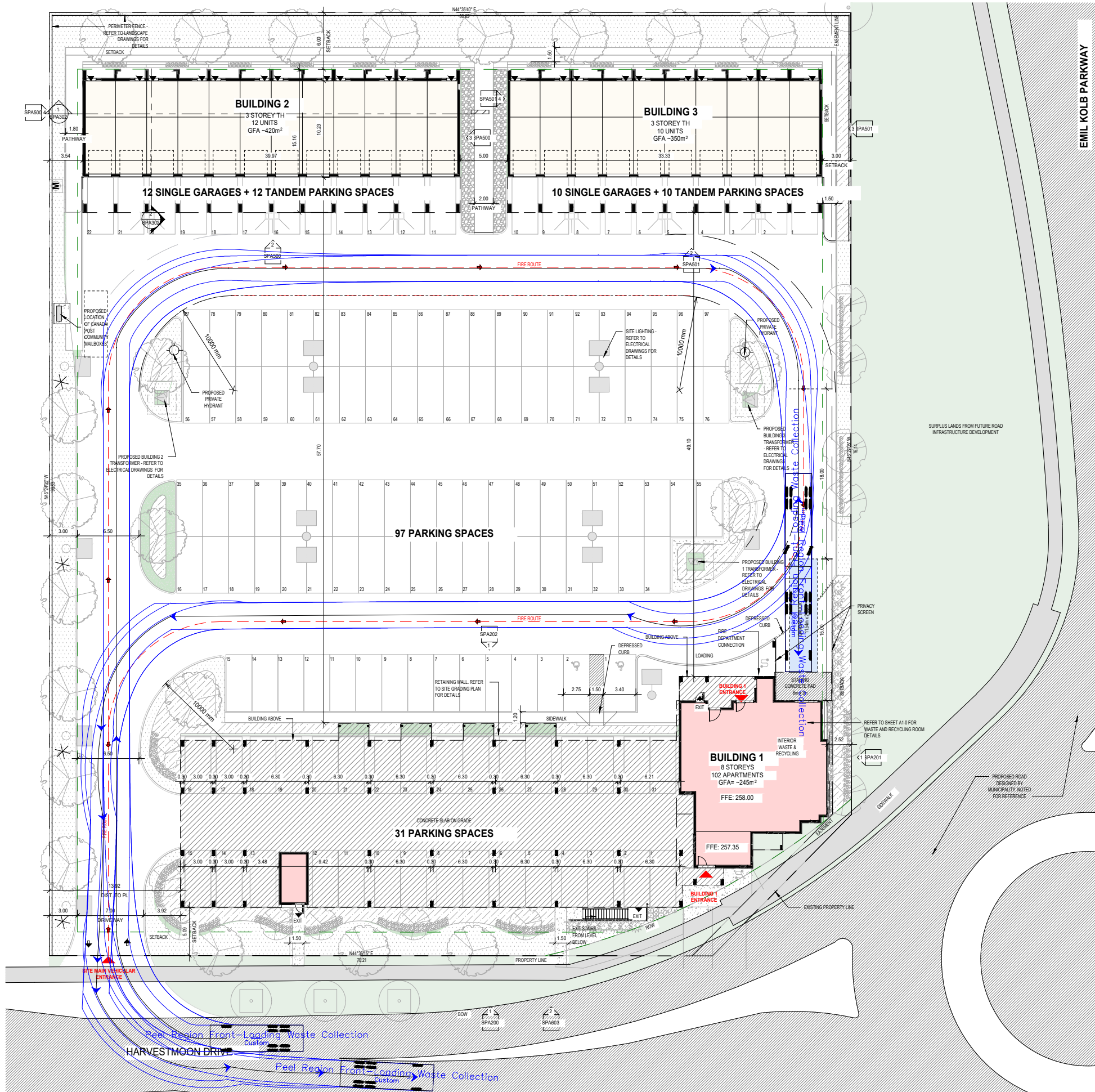
requirement is also inclusive of the proposed townhouse dwelling units, whereas it is not typical for accessible parking to be required for this type of built form as each unit is provided with a single garage and tandem outdoor parking space.

- As illustrated on the site plan, there are two (2) accessible parking spaces located nearest to the principal entrance of Building 1. Additionally, there is a pick-up/drop-off (PUDO) area at the principal entrance of Building 1 and the pedestrian walkways accommodate accessible travel and also provide connection to the existing sidewalk network. As such, it is Nextrans' opinion that the proposed accessible vehicle parking supply of two (2) spaces is adequate.
- Based on our review of previously collected parking survey data at used to justify the reduced parking rate of the proposed development, the peak observed proxy resident rate was 0.90 spaces/unit whereas the peak observed proxy visitor rate was 0.10 spaces/unit.
- Based on our review of the policies outlined in Bill 185, it is the Province's goal to eliminate minimum parking rates within MTSA designated lands. While not located within the future MTSA designated lands, the subject site is located within a 1km radius of the future Bolton GO Station.
- Our review of the Town of Caledon's Official Plan Transportation Objectives indicates that there is a need to reduce single-occupant-vehicle trips and to support other modes of transportation such as public transit and active transportation.
- AutoTURN analysis demonstrates that a Peel Region waste collection vehicle will be able to access the site.

9.2. Study Conclusions

Based on the study assessment, our report concludes that:

- The proposed development will have negligible impact to the future operations of the adjacent road network, and;
- The proposed vehicle parking supply is appropriate for the proposed development.



Peel Region Front-Loading Waste Collection

KEY PLAN

BENCHMARK

REVISIONS

NO	REVISION	DATE	BY

STAMP



PROJECT NAME:

Residential Development
Harvest Moon & Emil Kolb Parkway
Town of Caledon

DRAWING TITLE:

AutoTURN Analysis
Peel Region Front
Loading Waste Collection

DESIGN BY: K.A.	DATE: February 28, 2025
CHECKED BY: R.P.	PROJECT NO. NT-20-113
DRAWN BY: K.A.	DRAWING NO.
SCALE: NTS	Figure 7-1

Appendix A – Site Plan

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PROJECT INFORMATION

PROJECT NAME

BOLTON VILLAGE - ARPEGGIO

LEGAL DESCRIPTION

PART OF LOT 9, CONCESSION 5
TOWN OF CALEDON
REGIONAL MUNICIPALITY OF PEE
PIN# 14326-1856 (LT)

MUNICIPAL ADDRESS

13656 EMIL KOLB PARKWAY, BOLTON, ON

SITE

SITE AREA

8,363.7m² / 0.83ha / 90,026.1SqFt

TOTAL LANDSCAPE AREA

1,730.6m²

SOFT LANDSCAPE AREA

1,267.1m²

HARD LANDSCAPE AREA

463.5m²

OUTDOOR PARKING AREA

4,387.4m²

SITE COVERAGE

23.3%

BUILDING AREAS

TOTAL BUILDING AREA

1,951m²

BLDG 1 AREA - HIGH BLDG

1,181m² (INCL. 936m² OF OPEN PARKING AREA
& 245m² FIRST FLOOR AMENITIES)

BLDG 2 AREA - 12 UNITS

~420m²

BLDG 3 AREA - 10 UNITS

~350m²

UNIT BREAKDOWN

GFA

BLDG 1 - HIGH BLDG

8

BLDG 1 - HIGH BLDG

7,996m²

No OF STOREYS

102

BLDG 2 - TOWNHOUSES

18,220m²

ACCESSIBLE UNITS

15

BLDG 3 - TOWNHOUSES

15,130m²

BLDG 2 - TOWNHOUSES

3

FSI = 4.95

No OF STOREYS

12

BLDG 3 - TOWNHOUSES

3

No OF STOREYS

10

TOTAL # OF RESIDENTIAL UNITS

124

PARKING

PROVIDED

TOTAL # OF PARKING SPACES

172

AT GRADE PARKING

HIGH-RISE (RESIDENTS - Ratio 1:1)

102

HIGH-RISE (VISITORS - Ratio 1:0.2)

21

STACKS (RESIDENTS - Ration 1:2)

44 (22 + 22 Tandem Spaces)

STACKS (VISITOR - Ration 1:0.2)

5

BARRIER-FREE PARKING (4%)

2 (Incl.)

INFORMATION TAKEN FROM

PLAN OF SURVEY AND TOPOGRAPHY
PART OF LOT 9,
CONCESSION 5
(GEOGRAPHIC TOWNSHIP OF ALBION)
TOWN OF CALEDON
REGIONAL MUNICIPALITY OF PEE

SCALE: 1:500

R-PIPE SURVEYING LTD., O.L.S.

METRIC DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METERS AND CAN BE
CONVERTED TO FEET BY DIVIDING BY 3.048

INTEGRATION NOTE

BEARING AND UTM ZONE 18N COORDINATES DERIVED FROM OBSERVED REFERENCE POINTS
(1) AND (2) USING GNSS REAL TIME NETWORK (RTN) OBSERVATIONS.
THE UTM 18N HAZAR COORDINATE SYSTEM
COORDINATES ARE UTM ZONE 18N, HAZAR COORDINATE SYSTEM, TO
UTM ACCURACY FOR THE 1:500 SCALE. COORDINATES AND ANGLES
IN THIS PLAN ARE BASED ON THE CANADIAN DATUM OF 1984 (NAD83).
DISTANCES ARE GIVEN AND CAN BE CONVERTED TO FEET BY
MULTIPLYING BY THE CONVERSION FACTOR OF 3.048.

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Appendix B – Terms of Reference

520 Industrial Parkway South, Suite 201
Aurora, Ontario L4G 6W8

Phone: 905-503-2563
www.nextrans.ca

nextrans
CONSULTING ENGINEERS

NextEng Consulting Group Inc.

To: Arash Olia, Town of Caledon
Catherine Barnes, Region of Peel

From: Kristian Aviles, Nextrans Consulting Engineers

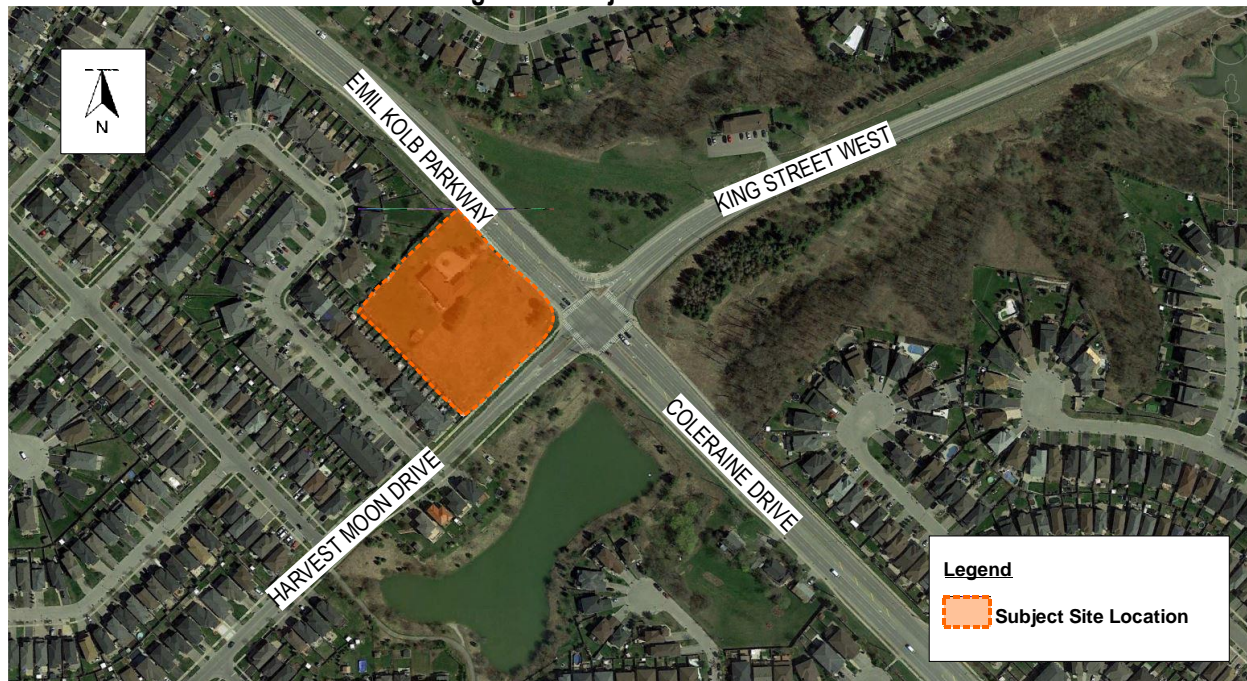
Date: June 13, 2024

**Re: Terms of Reference – Transportation Impact and Parking Justification Study
Proposed Residential Development
13656 Emil Kolb Parkway (Bolton Village)
Our Project No. NT-20-113**

INTRODUCTION

We wish to confirm the following work plan for a Transportation Impact Study for a proposed residential development located at the northwest corner of the Coleraine Drive and Harvest Moon Drive intersection, (herein referred to as the “subject site”), in the Town of Caledon. The subject lands are currently vacant. **Figure 1** illustrates the location of the subject site.

Figure 1: Subject Site Location



Based on the site plan provided, the development proposal includes three (3) townhouse blocks with a total of 62 dwelling units. A total of 103 vehicle parking spaces are provided on-site and vehicular access is envisioned via a full movement driveway onto Harvest Moon Drive. As part of our Transportation Impact Study, we will comment on the appropriateness of the site access location.

It is to be noted that Nextrans had previously prepared a Transportation Impact Study in support of the previous development proposal on these lands and thus this Transportation Impact Study will update our previous work. The following outlines the proposed Terms of Reference for our study.

STUDY AREA

Nextrans proposes to collect new turning movement count (TMC) data at the following study area intersection during AM (7:00 AM – 10:00 AM) and PM (4:00 PM – 7:00 PM) peak periods:

1. Harvest Moon Drive and Emil Kolb Parkway (signalized);

The study will also include the analysis of the proposed driveway onto Harvest Moon Drive.

BACKGROUND TRAFFIC

General Corridor Growth Rate – Historical intersection TMC data will be reviewed to establish corridor growth rates.

Road Network Improvements – Nextrans will note any road network improvements identified within the study area and account for any traffic diversions associated with these improvements within in our analysis.

Background Development Traffic – Nextrans will consult with the Town of Caledon for any relevant background developments to be considered within the study. Nextrans requests that all relevant background traffic documents be made available.

TRIP GENERATION, DISTRIBUTION, & ASSIGNMENT

Nextrans proposes to use the Institute of Transportation Engineers (ITE) Trip Generation Manual 11th Edition to determine the site traffic and newly added trips of the proposed development on the surrounding road network. The general trip distribution will be based on a review of 2016 Transportation Tomorrow Survey (TTS) data. Trip assignment will be completed accordingly to reflect the configuration of the proposed site accesses, turning restrictions, and logical routings.

FUTURE TRAFFIC SCENARIOS

Future background and future total analyses for the study area intersections will be conducted over a five (5)-year horizon from the assumed full build-out year of 2026, for a future analysis year of 2031.

REMEDIAL MEASURES

Under future total conditions, any through or shared through/turning movements at the studied intersections that exceed a V/C ratio of 0.90 or exclusive movements that exceed a V/C ratio of 1.00 will be identified. If remedial actions such as signal optimization are unsuccessful this will also be identified. If remedial measures are to be employed, a scenario will be provided demonstrating the change in intersection operations.

PARKING & LOADING

It is to be noted that the rates prescribed in the Town of Caledon's Comprehensive Zoning By-law 2006-50 do not stipulate rates for stacked townhouse units. By using the rates stipulated for other types of townhouse units (i.e., back-to-back or standard townhouse), the proposed parking supply is not compliant with the governing zoning by-law. However, it is to be noted that the proposed parking supply provides over 50% of the proposed units with 2 spaces/unit and the balance of units are provided 1 space/unit. On this basis, it is Nextrans' opinion that a practical number of parking spaces are provided on-site, which will adequately service the proposed development.

TRANSPORTATION DEMAND MANAGEMENT

A review of existing nearby transportation facilities and possible initiatives and policies to promote and encourage modes of transportation in lieu of single occupant vehicle (SOV) trips will be made to influence the travel behaviour of residents and visitors to reduce travel demand and create a more efficient transportation network.

We trust the enclosed sufficiently addresses your needs. Should you have any questions, please do not hesitate to contact the undersigned.

Yours truly,

NEXTRANS CONSULTING ENGINEERS

A handwritten signature in black ink, reading "Kristian Aviles". The signature is written in a cursive, flowing style.

Kristian Aviles, B.Eng
Transportation Analyst

Appendix C – Traffic Data



Turning Movement Count (1 . HARVEST MOON DR / KING ST W & EMIL KOLB PARKWAY / COLERAINE DR) CustID: 00903381

Start Time	Southbound EMIL KOLB PKWY						Westbound KING ST						Northbound COLERAINE DR						Eastbound HARVEST MOON DR						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total			
07:00:00	1	87	30	0	1	118	35	6	17	0	0	58	12	32	7	0	0	51	37	23	1	0	0	61	288		
07:15:00	4	101	19	0	0	124	37	8	37	0	0	82	8	32	9	0	0	49	34	21	4	0	0	59	314		
07:30:00	4	106	41	0	0	151	36	11	25	0	0	72	5	27	10	0	0	42	58	18	0	0	0	76	341		
07:45:00	1	133	50	0	0	184	32	5	41	1	1	79	18	31	5	0	0	54	57	35	1	0	0	93	410	1353	
08:00:00	2	125	33	0	0	160	29	8	33	0	1	70	23	33	6	0	0	62	63	25	3	0	0	91	383	1448	
08:15:00	4	118	44	0	1	166	31	11	22	0	1	64	12	30	12	0	0	54	46	20	1	0	0	67	351	1485	
08:30:00	1	100	41	0	2	142	38	14	31	0	0	83	20	26	17	0	0	63	46	16	2	0	0	64	352	1496	
08:45:00	0	93	46	0	3	139	44	24	17	0	3	85	12	39	32	0	0	83	49	12	1	0	0	62	369	1455	
09:00:00	2	73	42	0	0	117	31	16	13	0	0	60	9	26	27	0	1	62	62	20	3	0	0	85	324	1396	
09:15:00	0	75	48	0	0	123	25	9	23	0	0	57	13	41	20	0	0	74	56	19	0	0	0	75	329	1374	
09:30:00	1	75	43	0	3	119	31	5	14	0	0	50	10	49	24	0	1	83	36	8	1	0	0	45	297	1319	
09:45:00	1	72	34	0	0	107	21	11	9	0	0	41	15	39	23	0	0	77	38	15	2	0	0	55	280	1230	
BREAK																											
16:00:00	4	54	44	0	0	102	57	19	9	0	1	85	38	144	63	0	0	245	37	11	2	0	0	50	482		
16:15:00	1	54	40	0	0	95	68	22	6	0	0	96	37	125	59	1	0	222	18	15	1	0	0	34	447		
16:30:00	2	60	41	0	0	103	69	19	9	0	2	97	45	158	62	0	0	265	29	9	3	0	0	41	506		
16:45:00	0	64	46	0	0	110	56	17	5	0	1	78	28	133	62	0	0	223	42	19	1	0	1	62	473	1908	
17:00:00	6	39	23	0	5	68	59	22	12	0	0	93	21	91	49	0	2	161	49	21	1	0	1	71	393	1819	
17:15:00	4	62	73	0	0	139	63	16	8	0	0	87	34	175	80	0	0	289	46	17	1	0	0	64	579	1951	
17:30:00	3	50	48	0	0	101	53	33	10	0	1	96	18	78	46	0	0	142	49	18	4	0	0	71	410	1855	
17:45:00	3	42	52	0	1	97	47	19	2	0	0	68	37	138	92	0	0	267	42	13	4	0	0	59	491	1873	
18:00:00	2	45	54	0	0	101	74	23	12	0	0	109	27	91	52	0	0	170	35	17	1	0	0	53	433	1913	
18:15:00	0	46	64	0	4	110	58	19	9	0	1	86	25	95	51	0	0	171	39	17	2	0	0	58	425	1759	
18:30:00	2	55	42	0	0	99	52	25	17	0	1	94	16	84	44	0	0	144	29	9	1	0	0	39	376	1725	
18:45:00	2	47	39	0	1	88	39	28	6	0	1	73	12	56	52	0	1	120	34	14	3	0	0	51	332	1566	
Grand Total	50	1776	1037	0	21	2863	1085	390	387	1	14	1863	495	1773	904	1	5	3173	1031	412	43	0	2	1486	9385	-	
Approach%	1.7%	62%	36.2%	0%	-	-	58.2%	20.9%	20.8%	0.1%	-	-	15.6%	55.9%	28.5%	0%	-	-	69.4%	27.7%	2.9%	0%	-	-	-	-	
Totals %	0.5%	18.9%	11%	0%	-	30.5%	11.6%	4.2%	4.1%	0%	-	19.9%	5.3%	18.9%	9.6%	0%	-	33.8%	11%	4.4%	0.5%	0%	-	15.8%	-	-	
Heavy	4	274	40	0	-	-	39	7	16	0	-	-	7	234	6	0	-	-	21	13	5	0	-	-	-	-	
Heavy %	8%	15.4%	3.9%	0%	-	-	3.6%	1.8%	4.1%	0%	-	-	1.4%	13.2%	0.7%	0%	-	-	2%	3.2%	11.6%	0%	-	-	-	-	
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Peak Hour: 07:45 AM - 08:45 AM Weather: Overcast Clouds (20.94 °C)

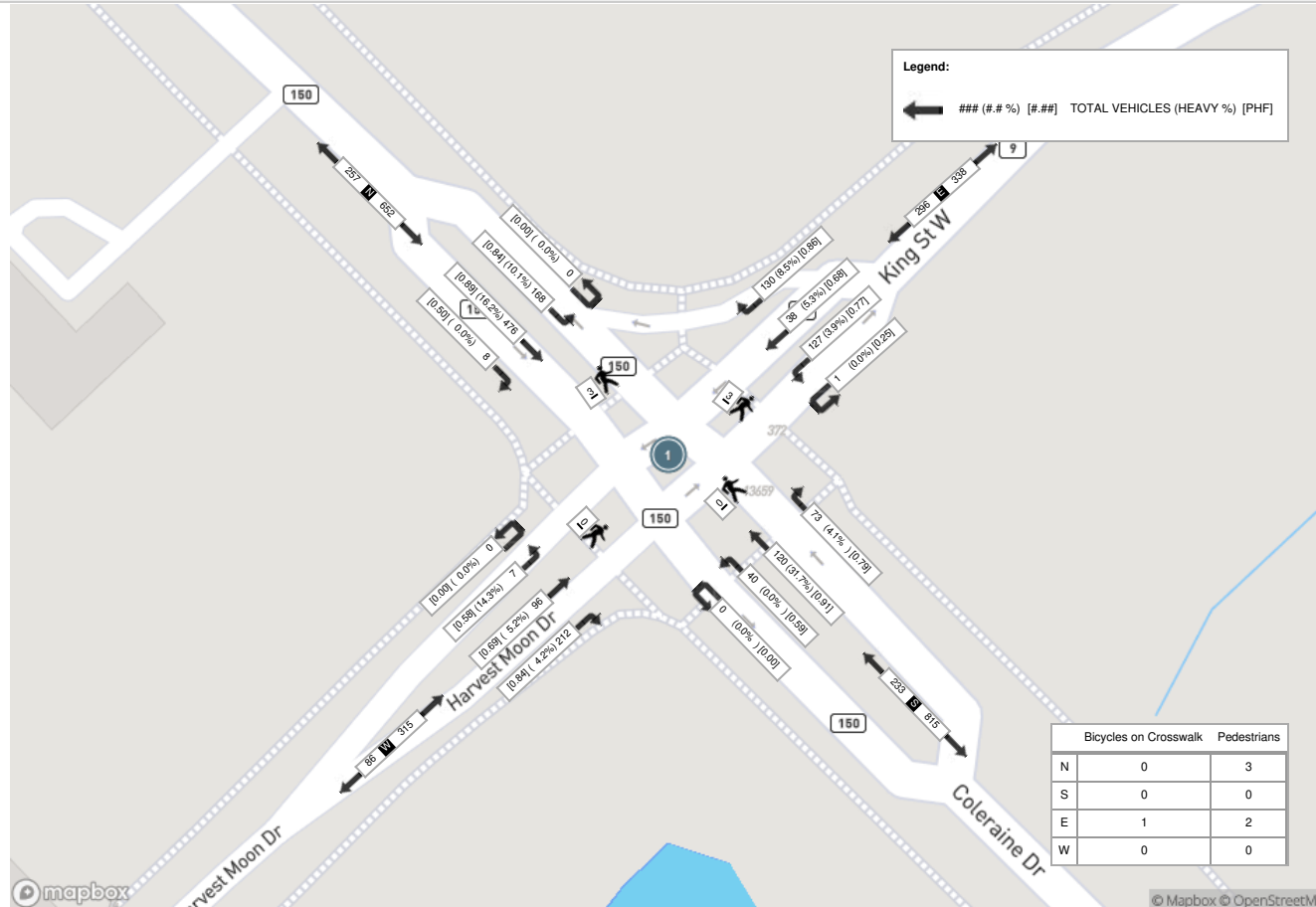
Start Time	Southbound EMIL KOLB PKWY						Westbound KING ST						Northbound COLERAINE DR						Eastbound HARVEST MOON DR						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
07:45:00	1	133	50	0	0	184	32	5	41	1	1	79	18	31	5	0	0	54	57	35	1	0	0	93	410
08:00:00	2	125	33	0	0	160	29	8	33	0	1	70	23	33	6	0	0	62	63	25	3	0	0	91	383
08:15:00	4	118	44	0	1	166	31	11	22	0	1	64	12	30	12	0	0	54	46	20	1	0	0	67	351
08:30:00	1	100	41	0	2	142	38	14	31	0	0	83	20	26	17	0	0	63	46	16	2	0	0	64	352
Grand Total	8	476	168	0	3	652	130	38	127	1	3	296	73	120	40	0	0	233	212	96	7	0	0	315	1496
Approach%	1.2%	73%	25.8%	0%		-	43.9%	12.8%	42.9%	0.3%		-	31.3%	51.5%	17.2%	0%		-	67.3%	30.5%	2.2%	0%		-	-
Totals %	0.5%	31.8%	11.2%	0%		43.6%	8.7%	2.5%	8.5%	0.1%		19.8%	4.9%	8%	2.7%	0%		15.6%	14.2%	6.4%	0.5%	0%		21.1%	-
PHF	0.5	0.89	0.84	0		0.89	0.86	0.68	0.77	0.25		0.89	0.79	0.91	0.59	0		0.92	0.84	0.69	0.58	0		0.85	-
Heavy	0	77	17	0		94	11	2	5	0		18	3	38	0	0		41	9	5	1	0		15	-
Heavy %	0%	16.2%	10.1%	0%		14.4%	8.5%	5.3%	3.9%	0%		6.1%	4.1%	31.7%	0%	0%		17.6%	4.2%	5.2%	14.3%	0%		4.8%	-
Lights	8	399	151	0		558	119	36	122	1		278	70	80	40	0		190	203	91	6	0		300	-
Lights %	100%	83.8%	89.9%	0%		85.6%	91.5%	94.7%	96.1%	100%		93.9%	95.9%	66.7%	100%	0%		81.5%	95.8%	94.8%	85.7%	0%		95.2%	-
Single-Unit Trucks	0	43	8	0		51	4	0	1	0		5	0	19	0	0		19	7	1	0	0		8	-
Single-Unit Trucks %	0%	9%	4.8%	0%		7.8%	3.1%	0%	0.8%	0%		1.7%	0%	15.8%	0%	0%		8.2%	3.3%	1%	0%	0%		2.5%	-
Buses	0	2	9	0		11	6	2	4	0		12	3	3	0	0		6	2	4	1	0		7	-
Buses %	0%	0.4%	5.4%	0%		1.7%	4.6%	5.3%	3.1%	0%		4.1%	4.1%	2.5%	0%	0%		2.6%	0.9%	4.2%	14.3%	0%		2.2%	-
Articulated Trucks	0	32	0	0		32	1	0	0	0		1	0	16	0	0		16	0	0	0	0		0	-
Articulated Trucks %	0%	6.7%	0%	0%		4.9%	0.8%	0%	0%	0%		0.3%	0%	13.3%	0%	0%		6.9%	0%	0%	0%	0%		0%	-
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	-
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	1.7%	0%	0%		0.9%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	50%	-	-	-	-	-	33.3%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	16.7%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-



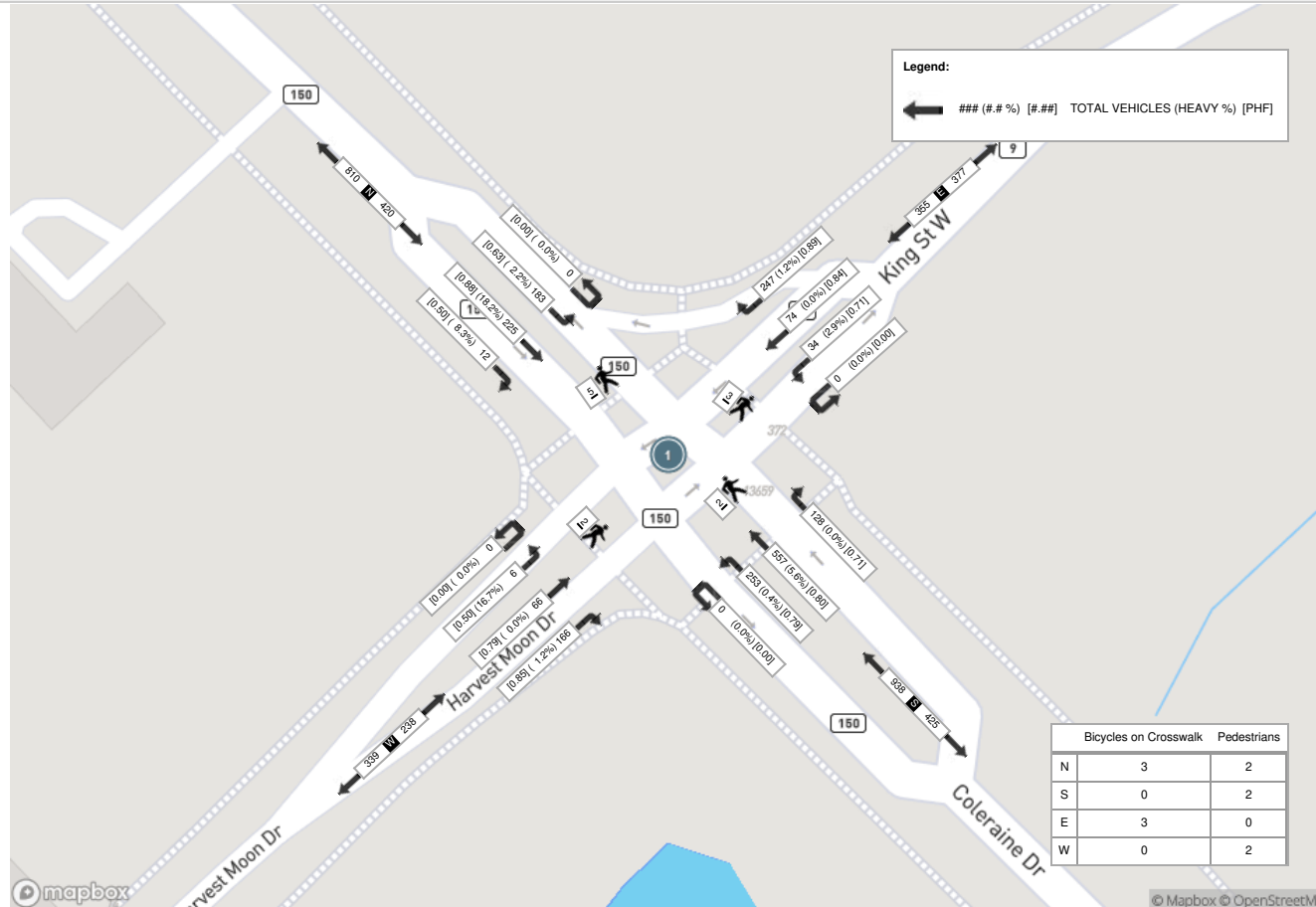
Peak Hour: 04:30 PM - 05:30 PM Weather: Broken Clouds (28.83 °C)

Start Time	Southbound EMIL KOLB PKWY						Westbound KING ST						Northbound COLERAINE DR						Eastbound HARVEST MOON DR						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:30:00	2	60	41	0	0	103	69	19	9	0	2	97	45	158	62	0	0	265	29	9	3	0	0	41	506
16:45:00	0	64	46	0	0	110	56	17	5	0	1	78	28	133	62	0	0	223	42	19	1	0	1	62	473
17:00:00	6	39	23	0	5	68	59	22	12	0	0	93	21	91	49	0	2	161	49	21	1	0	1	71	393
17:15:00	4	62	73	0	0	139	63	16	8	0	0	87	34	175	80	0	0	289	46	17	1	0	0	64	579
Grand Total	12	225	183	0	5	420	247	74	34	0	3	355	128	557	253	0	2	938	166	66	6	0	2	238	1951
Approach%	2.9%	53.6%	43.6%	0%		-	69.6%	20.8%	9.6%	0%		-	13.6%	59.4%	27%	0%		-	69.7%	27.7%	2.5%	0%		-	-
Totals %	0.6%	11.5%	9.4%	0%		21.5%	12.7%	3.8%	1.7%	0%		18.2%	6.6%	28.5%	13%	0%		48.1%	8.5%	3.4%	0.3%	0%		12.2%	-
PHF	0.5	0.88	0.63	0		0.76	0.89	0.84	0.71	0		0.91	0.71	0.8	0.79	0		0.81	0.85	0.79	0.5	0		0.84	-
Heavy	1	41	4	0		46	3	0	1	0		4	0	31	1	0		32	2	0	1	0		3	-
Heavy %	8.3%	18.2%	2.2%	0%		11%	1.2%	0%	2.9%	0%		1.1%	0%	5.6%	0.4%	0%		3.4%	1.2%	0%	16.7%	0%		1.3%	-
Lights	11	181	178	0		370	244	74	33	0		351	127	525	252	0		904	154	64	5	0		223	-
Lights %	91.7%	80.4%	97.3%	0%		88.1%	98.8%	100%	97.1%	0%		98.9%	99.2%	94.3%	99.6%	0%		96.4%	92.8%	97%	83.3%	0%		93.7%	-
Single-Unit Trucks	1	14	1	0		16	3	0	0	0		3	0	17	1	0		18	0	0	1	0		1	-
Single-Unit Trucks %	8.3%	6.2%	0.5%	0%		3.8%	1.2%	0%	0%	0%		0.8%	0%	3.1%	0.4%	0%		1.9%	0%	0%	16.7%	0%		0.4%	-
Buses	0	1	1	0		2	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Buses %	0%	0.4%	0.5%	0%		0.5%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Articulated Trucks	0	26	2	0		28	0	0	1	0		1	0	14	0	0		14	2	0	0	0		2	-
Articulated Trucks %	0%	11.6%	1.1%	0%		6.7%	0%	0%	2.9%	0%		0.3%	0%	2.5%	0%	0%		1.5%	1.2%	0%	0%	0%		0.8%	-
Bicycles on Road	0	3	1	0		4	0	0	0	0		0	1	1	0	0		2	10	2	0	0		12	-
Bicycles on Road %	0%	1.3%	0.5%	0%		1%	0%	0%	0%	0%		0%	0.8%	0.2%	0%	0%		0.2%	6%	3%	0%	0%		5%	-
Pedestrians	-	-	-	-	2	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	2	-	-	-
Pedestrians%	-	-	-	-	16.7%	-	-	-	-	0%	-	-	-	-	-	16.7%	-	-	-	-	-	16.7%	-	-	-
Bicycles on Crosswalk	-	-	-	-	3	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-
Bicycles on Crosswalk%	-	-	-	-	25%	-	-	-	-	25%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-

Peak Hour: 07:45 AM - 08:45 AM Weather: Overcast Clouds (20.94 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Broken Clouds (28.83 °C)



REGIONAL MUNICIPALITY OF PEEL

Traffic Signal Timing Parameters

Database Date	June 28, 2024		Prepared Date	July 10, 2024
Database Rev	iNET		Completed By	N.T
Timing Card / Field rev	-		Checked By	N.R.L

Location	Coleraine Drive / Emil Kolb Parkway and King Street / Harvest Moon Drive								
----------	--	--	--	--	--	--	--	--	--

Phase #	Street Name - Direction	Vehicle Minimum (s)	Pedestrian Minimum (s)		Amber (s)	All Red (s)	TIME PERIOD (s) (Green+Amber+All Red)		
			WALK	FDWALK			AM SPLITS	OFF SPLITS	PM SPLITS
1	Coleraine Drive - NBLT Prot. Perm.	7	0	0	3	0	11	10	22
2	Emil Kolb Parkway - Southbound	10	10	23	4	2.7	40	45	38
3	Not in Use	-	-	-	-	-	-	-	-
4	King Street - Westbound	10	10	27	4	4	59	55	60
5	Emil Kolb Parkway - SBLT Prot. Perm.	7	0	0	3	0	11	10	12
6	Coleraine Drive - Northbound	10	10	23	4	2.7	40	45	48
7	King Street - WBLT Prot. Perm.	7	0	0	3	0	10	10	10
8	Harvest Moon Drive - Eastbound	10	10	27	4	4	49	45	50

System Control Yes Semi-Actuated Mode Yes	TIME (M-F)		PEAK	CYCLE LENGTH (s)	OFFSET (s)
	6:00 - 9:00		AM	110	0
	9:00 - 15:00		OFF	110	0
	15:00 - 19:00		PM	120	0






















Appendix D – Existing Traffic Analysis

Queues

Existing AM Traffic Conditions

1: Coleraine Drive/Emil Kolb Parkway & Harvest Moon Drive/King Street West

02/06/2025

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	7	96	212	127	38	130	40	120	73	168	476
Future Volume (vph)	7	96	212	127	38	130	40	120	73	168	476
Lane Group Flow (vph)	0	113	233	140	42	143	44	132	80	166	551
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA
Protected Phases		8		7	4		1	6		5	2
Permitted Phases	8		8	4		4	6		6	2	
Detector Phase	8	8	8	7	4	4	1	6	6	5	2
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0	10.0	7.0	10.0	10.0	7.0	10.0
Minimum Split (s)	45.0	45.0	45.0	10.0	45.0	45.0	10.0	39.7	39.7	10.0	39.7
Total Split (s)	49.0	49.0	49.0	10.0	59.0	59.0	11.0	40.0	40.0	11.0	40.0
Total Split (%)	44.5%	44.5%	44.5%	9.1%	53.6%	53.6%	10.0%	36.4%	36.4%	10.0%	36.4%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	4.0	4.0	4.0	0.0	4.0	4.0	0.0	2.7	2.7	0.0	2.7
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		8.0	8.0	3.0	8.0	8.0	3.0	6.7	6.7	3.0	6.7
Lead/Lag	Lag	Lag	Lag	Lead			Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min
v/c Ratio		0.35	0.51	0.27	0.07	0.23	0.10	0.24	0.20	0.36	0.58
Control Delay		25.1	9.3	12.1	13.7	4.3	9.7	20.6	4.1	12.4	18.2
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		25.1	9.3	12.1	13.7	4.3	9.7	20.6	4.1	12.4	18.2
Queue Length 50th (m)		10.8	1.8	8.5	2.9	0.0	2.5	6.4	0.0	11.4	23.6
Queue Length 95th (m)		26.1	19.1	21.6	9.6	10.4	7.5	13.5	6.0	25.0	39.2
Internal Link Dist (m)		72.1			392.5			232.1			193.5
Turn Bay Length (m)			45.0	115.0		100.0	60.0		70.0	150.0	
Base Capacity (vph)		1228	1156	524	1584	1295	469	1563	921	458	1749
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.09	0.20	0.27	0.03	0.11	0.09	0.08	0.09	0.36	0.32

Intersection Summary







Cycle Length: 110

Actuated Cycle Length: 58.6

Natural Cycle: 105

Control Type: Semi Act-Uncoord

Splits and Phases: 1: Coleraine Drive/Emil Kolb Parkway & Harvest Moon Drive/King Street West
























 Ø1	 Ø2	 Ø4
11 s	40 s	59 s
 Ø5	 Ø6	 Ø7
11 s	40 s	10 s
		49 s

HCM Signalized Intersection Capacity Analysis

Existing AM Traffic Conditions

1: Coleraine Drive/Emil Kolb Parkway & Harvest Moon Drive/King Street West

02/06/2025






















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	96	212	127	38	130	40	120	73	168	476	8
Future Volume (vph)	7	96	212	127	38	130	40	120	73	168	476	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		8.0	8.0	3.0	8.0	8.0	3.0	6.7	6.7	3.0	6.7	
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.91	0.91	
Frbp, ped/bikes		1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1792	1553	1736	1810	1462	1805	2735	1532	1492	2981	
Flt Permitted		0.97	1.00	0.54	1.00	1.00	0.44	1.00	1.00	0.54	0.95	
Satd. Flow (perm)		1747	1553	980	1810	1462	828	2735	1532	855	2829	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	8	105	233	140	42	143	44	132	80	185	523	9
RTOR Reduction (vph)	0	0	174	0	0	93	0	0	62	0	1	0
Lane Group Flow (vph)	0	113	59	140	42	50	44	132	18	166	550	0
Confl. Peds. (#/hr)	3					3			3	3		
Heavy Vehicles (%)	14%	5%	4%	4%	5%	9%	0%	32%	4%	10%	16%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		8		7	4		1	6		5	2	
Permitted Phases	8		8	4		4	6		6	2		
Actuated Green, G (s)		10.9	10.9	20.9	20.9	20.9	17.3	13.2	13.2	24.1	24.1	
Effective Green, g (s)		10.9	10.9	20.9	20.9	20.9	17.3	13.2	13.2	24.1	24.1	
Actuated g/C Ratio		0.18	0.18	0.35	0.35	0.35	0.29	0.22	0.22	0.40	0.40	
Clearance Time (s)		8.0	8.0	3.0	8.0	8.0	3.0	6.7	6.7	3.0	6.7	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		318	283	431	633	511	307	604	338	429	1162	
v/s Ratio Prot				c0.04	0.02		0.01	0.05		0.05	c0.06	
v/s Ratio Perm		0.06	0.04	c0.08		0.03	0.03		0.01	0.10	c0.13	
v/c Ratio		0.36	0.21	0.32	0.07	0.10	0.14	0.22	0.05	0.39	0.47	
Uniform Delay, d1		21.3	20.7	13.8	12.9	13.1	15.4	19.0	18.3	12.0	13.1	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.7	0.4	0.4	0.0	0.1	0.2	0.2	0.1	0.6	0.3	
Delay (s)		22.0	21.1	14.2	13.0	13.1	15.6	19.2	18.4	12.6	13.4	
Level of Service		C	C	B	B	B	B	B	B	B	B	
Approach Delay (s)		21.4			13.6			18.3			13.2	
Approach LOS		C			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			15.8									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.46									
Actuated Cycle Length (s)			59.7									Sum of lost time (s) 20.7
Intersection Capacity Utilization			56.5%									ICU Level of Service B
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Existing PM Traffic Conditions

1: Coleraine Drive/Emil Kolb Parkway & Harvest Moon Drive/King Street West

02/06/2025

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	6	66	166	34	74	247	253	557	128	183	225
Future Volume (vph)	6	66	166	34	74	247	253	557	128	183	225
Lane Group Flow (vph)	0	86	198	40	88	294	301	663	152	129	371
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA
Protected Phases		8		7	4		1	6		5	2
Permitted Phases	8		8	4		4	6		6	2	
Detector Phase	8	8	8	7	4	4	1	6	6	5	2
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0	10.0	7.0	10.0	10.0	7.0	10.0
Minimum Split (s)	45.0	45.0	45.0	10.0	45.0	45.0	10.0	39.7	39.7	10.0	39.7
Total Split (s)	50.0	50.0	50.0	10.0	60.0	60.0	22.0	48.0	48.0	12.0	38.0
Total Split (%)	41.7%	41.7%	41.7%	8.3%	50.0%	50.0%	18.3%	40.0%	40.0%	10.0%	31.7%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	4.0	4.0	4.0	0.0	4.0	4.0	0.0	2.7	2.7	0.0	2.7
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		8.0	8.0	3.0	8.0	8.0	3.0	6.7	6.7	3.0	6.7
Lead/Lag	Lag	Lag	Lag	Lead			Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min
v/c Ratio		0.27	0.45	0.09	0.18	0.48	0.43	0.58	0.24	0.30	0.53
Control Delay		27.7	8.5	14.6	18.9	6.5	10.3	20.7	4.7	10.2	15.6
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		27.7	8.5	14.6	18.9	6.5	10.3	20.7	4.7	10.2	15.6
Queue Length 50th (m)		9.8	0.0	3.1	8.0	1.8	20.1	39.2	0.0	8.5	14.7
Queue Length 95th (m)		21.8	13.7	9.0	18.1	15.3	33.2	53.0	9.7	16.7	22.4
Internal Link Dist (m)		72.1			392.5			232.1			193.5
Turn Bay Length (m)			45.0	115.0		100.0	60.0		70.0	150.0	
Base Capacity (vph)		1285	1182	440	1624	1383	807	2389	1161	453	1301
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.07	0.17	0.09	0.05	0.21	0.37	0.28	0.13	0.28	0.29

Intersection Summary

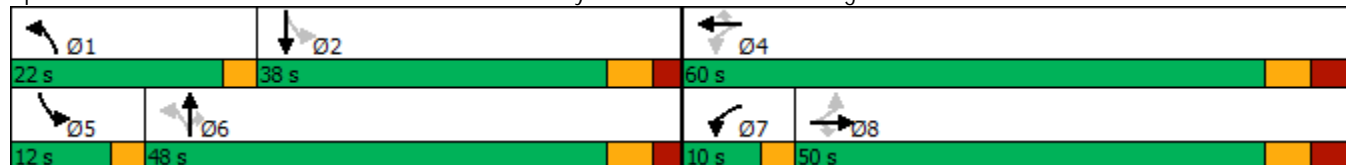
Cycle Length: 120

Actuated Cycle Length: 60.7

Natural Cycle: 105

Control Type: Semi Act-Uncoord

Splits and Phases: 1: Coleraine Drive/Emil Kolb Parkway & Harvest Moon Drive/King Street West




HCM Signalized Intersection Capacity Analysis

Existing PM Traffic Conditions

1: Coleraine Drive/Emil Kolb Parkway & Harvest Moon Drive/King Street West

02/06/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱	↰	↱	↱	↰	↱	↱	↰	↱	↱
Traffic Volume (vph)	6	66	166	34	74	247	253	557	128	183	225	12
Future Volume (vph)	6	66	166	34	74	247	253	557	128	183	225	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		8.0	8.0	3.0	8.0	8.0	3.0	6.7	6.7	3.0	6.7	
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.91	0.91	
Frpb, ped/bikes		1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	
Satd. Flow (prot)		1866	1578	1752	1900	1576	1804	3406	1593	1610	2983	
Flt Permitted		0.96	1.00	0.55	1.00	1.00	0.52	1.00	1.00	0.40	0.69	
Satd. Flow (perm)		1803	1578	1010	1900	1576	993	3406	1593	677	2089	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	7	79	198	40	88	294	301	663	152	218	268	14
RTOR Reduction (vph)	0	0	164	0	0	197	0	0	102	0	2	0
Lane Group Flow (vph)	0	86	34	40	88	97	301	663	50	129	369	0
Confl. Peds. (#/hr)	5		2	2		5	2		3	3		2
Heavy Vehicles (%)	17%	0%	1%	3%	0%	1%	0%	6%	0%	2%	18%	8%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		8		7	4		1	6		5	2	
Permitted Phases	8		8	4		4	6		6	2		
Actuated Green, G (s)		10.7	10.7	17.4	17.4	17.4	30.2	20.5	20.5	22.2	22.2	
Effective Green, g (s)		10.7	10.7	17.4	17.4	17.4	30.2	20.5	20.5	22.2	22.2	
Actuated g/C Ratio		0.17	0.17	0.28	0.28	0.28	0.48	0.33	0.33	0.36	0.36	
Clearance Time (s)		8.0	8.0	3.0	8.0	8.0	3.0	6.7	6.7	3.0	6.7	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		309	271	326	530	440	633	1120	524	341	840	
v/s Ratio Prot				0.01	0.05		c0.09	c0.19		0.04	0.05	
v/s Ratio Perm		c0.05	0.02	0.03		c0.06	0.14		0.03	0.09	0.11	
v/c Ratio		0.28	0.13	0.12	0.17	0.22	0.48	0.59	0.10	0.38	0.44	
Uniform Delay, d1		22.4	21.8	16.6	17.0	17.2	9.9	17.4	14.5	14.0	15.3	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.5	0.2	0.2	0.1	0.3	0.6	0.8	0.1	0.7	0.4	
Delay (s)		22.9	22.0	16.8	17.1	17.5	10.5	18.3	14.6	14.7	15.7	
Level of Service		C	C	B	B	B	B	B	B	B	B	
Approach Delay (s)		22.3			17.3			15.7			15.4	
Approach LOS		C			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			16.7									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			62.3									Sum of lost time (s) 20.7
Intersection Capacity Utilization			63.4%									ICU Level of Service B
Analysis Period (min)			15									

c Critical Lane Group

Appendix E – Background Development Excerpts



Traffic Impact Study

Chickadee Grove Community

Town of Caledon

GHD | 6705 Millcreek Drive Mississauga Ontario L5N 5M4 Canada

800 | Report No 3 | May 2, 2022



Executive Summary

GHD is please to provide this updated Traffic Impact Study for the proposed residential development located on the east and west side of Chickadee Lane in the community of Bolton, in the Town of Caledon. This update is in response to comments received from the Town on the first submission, a copy of these comments is included in Appendix A. Consistent with the original report, this update determines the site related traffic and the subsequent traffic-related impacts on the adjacent road network during the weekday a.m. and p.m. peak hours from the proposed development. These impacts are based on projected future background traffic and road network conditions derived for a 2031 planning horizon.

Proposed Site Characteristics

The proposed site plan prepared by Humphries Planning Group Inc., dated August 20, 2021 consists of 151 residential townhouse units and 1 single family detached residential unit.

New Site Traffic

The total subject development is estimated to generate a total of 77 two-way trips during the a.m. peak hour consisting of 17 inbound and 60 outbound trips and a total of 86 two-way trips during the p.m. peak hour consisting of 55 inbound and 31 outbound trips.

Future Intersection Operating Characteristics

Based on the results of the capacity analysis, the subject development is expected to have a negligible impact on intersection operations at Chickadee Lane and De Rose Avenue. Emil Kolb Parkway and De Rose Avenue will experience some issues with the westbound left-turn lane which can be mitigated with the signalization of the intersection.

A signal warrant was completed for the intersection of Emil Kolb Parkway and De Rose Avenue which determined that traffic signals are not warranted under the 2031 total traffic scenario. It is recommended that the Region continue to monitor this intersection and that traffic signals be installed by the Region when the warrants are satisfied.

We trust that this satisfies your requirements, but do not hesitate to contact the undersigned if you have any questions.

Sincerely,

GHD

William Maria, P.Eng.
Transportation Planning Lead





Table 2 Site Trip Distribution

Trip Orientation	A.M. Peak		P.M. Peak	
	In	Out	In	Out
North on Emil Kolb Parkway	50%	30%	30%	60%
South on Emil Kolb Parkway	50%	70%	70%	40%
Total	100%	100%	100%	100%

The estimated site trips generated by the proposed development, as assigned to the nearby road network for the weekday a.m. and p.m. peak hours, is shown in **Figure 5**.



Figure 5 Site Generated Trips

6. Future Total Traffic

Appendix F – Future Background Traffic Analysis

Intersection								
Intersection Delay, s/veh	17.9							
Intersection LOS	C							
Approach	EB		WB		NB		SB	
Entry Lanes	1		1		2		2	
Conflicting Circle Lanes	2		2		1		1	
Adj Approach Flow, veh/h	295		435		1261		553	
Demand Flow Rate, veh/h	298		439		1309		616	
Vehicles Circulating, veh/h	642		1165		320		443	
Vehicles Exiting, veh/h	417		464		420		864	
Follow-Up Headway, s	3.186		3.186		3.186		3.186	
Ped Vol Crossing Leg, #/h	2		3		2		5	
Ped Cap Adj	1.000		1.000		0.998		0.996	
Approach Delay, s/veh	6.7		13.0		24.8		11.8	
Approach LOS	A		B		C		B	
Lane	Left	Bypass	Left	Bypass	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized	Yield		Yield					
Lane Util	1.000		1.000		0.470	0.530	0.471	0.529
Critical Headway, s	4.113		4.113		5.193	5.193	5.193	5.193
Entry Flow, veh/h	98	200	142	297	615	694	290	326
Cap Entry Lane, veh/h	721	842	500	617	821	821	726	726
Entry HV Adj Factor	0.990	0.990	0.993	0.990	0.963	0.963	0.897	0.899
Flow Entry, veh/h	97	198	141	294	592	668	260	293
Cap Entry, veh/h	713	834	496	611	789	789	648	650
V/C Ratio	0.136	0.238	0.284	0.481	0.751	0.847	0.401	0.451
Control Delay, s/veh	6.5	6.8	11.5	13.6	20.7	28.5	11.2	12.3
LOS	A	A	B	B	C	D	B	B
95th %tile Queue, veh	0	1	1	3	7	10	2	2

Intersection								
Intersection Delay, s/veh	17.9							
Intersection LOS	C							
Approach	EB		WB		NB		SB	
Entry Lanes	1		1		2		2	
Conflicting Circle Lanes	2		2		1		1	
Adj Approach Flow, veh/h	295		435		1261		553	
Demand Flow Rate, veh/h	298		439		1309		616	
Vehicles Circulating, veh/h	642		1165		320		443	
Vehicles Exiting, veh/h	417		464		420		864	
Follow-Up Headway, s	3.186		3.186		3.186		3.186	
Ped Vol Crossing Leg, #/h	2		3		2		5	
Ped Cap Adj	1.000		1.000		0.998		0.996	
Approach Delay, s/veh	6.7		13.0		24.8		11.8	
Approach LOS	A		B		C		B	
Lane	Left	Bypass	Left	Bypass	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized	Yield		Yield					
Lane Util	1.000		1.000		0.470	0.530	0.471	0.529
Critical Headway, s	4.113		4.113		5.193	5.193	5.193	5.193
Entry Flow, veh/h	98	200	142	297	615	694	290	326
Cap Entry Lane, veh/h	721	842	500	617	821	821	726	726
Entry HV Adj Factor	0.990	0.990	0.993	0.990	0.963	0.963	0.897	0.899
Flow Entry, veh/h	97	198	141	294	592	668	260	293
Cap Entry, veh/h	713	834	496	611	789	789	648	650
V/C Ratio	0.136	0.238	0.284	0.481	0.751	0.847	0.401	0.451
Control Delay, s/veh	6.5	6.8	11.5	13.6	20.7	28.5	11.2	12.3
LOS	A	A	B	B	C	D	B	B
95th %tile Queue, veh	0	1	1	3	7	10	2	2

Appendix G – TTS Data Extraction

Wed Feb 05 2020 22:04:18 GMT-0500 (Eastern Standard Time) - Run Time: 100Time

Cross Tabulation Query Form - Trip - 2022	
Row: Planning district of origin - pd_int	
Columns: 2008 GTA zone of destination - gdm0_dest	
and	
RowG:	
ColG (1513):	
TMS:	
Filter:	
Start time of trip - start_time to 600-600	
and	
Planning district of:	
and	
2008 GTA zone of destination - gdm0_dest to 3153	
Trip 2022	
Table:	
PD 6 of Toronto	
Brimley/Hwy	
Markham	
Vaughan	
Brampton	
Mississauga	
Oshawa	
Grand Valley	
1	
9	
17	
22	
30	
32	
33	
34	
122	
4	

Row Labels	Sum of Distribution
COLLEAGUE_HB	80%
COLLEAGUE_HB	16%
PNP_HB	16%
Grand Total	100%

Wed Feb 05 2020 22:06:47 GMT-0500 (Eastern Standard Time) - Run Time: 296Time

Cross Tabulation Query Form - Trip - 2022	
Row: 2008 GTA zone of origin - gdm0_int	
Columns: 2008 GTA zone of destination - gdm0_dest	
and	
RowG:	
ColG (1513):	
TMS:	
Filter:	
Start time of trip - start_time to 600-600	
and	
Planning district of:	
and	
2008 GTA zone of destination - gdm0_dest to 3153	
Trip 2022	
Table:	
3002	
3100	
3153	
3164	
112	

Wed Feb 05 2020 22:05:49 GMT-0500 (Eastern Standard Time) - Run Time: 343Time

Cross Tabulation Query Form - Trip - 2022	
Row: Planning district of origin - pd_int	
Columns: 2008 GTA zone of destination - gdm0_dest	
and	
RowG:	
ColG (1513):	
TMS:	
Filter:	
Start time of trip - start_time to 1000-1000	
and	
Planning district of origin:	
and	
2008 GTA zone of destination - gdm0_dest to 3153	
Trip 2022	
Table:	
PD 1 of Toronto	
PD 2 of Toronto	
PD 3 of Toronto	
PD 4 of Toronto	
Vaughan	
Brampton	
Mississauga	
Oshawa	
Grand Valley	
1	
16	
12	
20	
23	
30	
31	
32	
33	
34	
122	
4	

Row Labels	Sum of Distribution
COLLEAGUE_HB	37%
COLLEAGUE_HB	26%
PNP_HB	17%
Grand Total	100%

Wed Feb 05 2020 22:07:38 GMT-0500 (Eastern Standard Time) - Run Time: 302Time

Cross Tabulation Query Form - Trip - 2022	
Row: 2008 GTA zone of origin - gdm0_int	
Columns: 2008 GTA zone of destination - gdm0_dest	
and	
RowG:	
ColG (1513):	
TMS:	
Filter:	
Start time of trip - start_time to 1000-1000	
and	
Planning district of origin:	
and	
2008 GTA zone of destination - gdm0_dest to 3153	
Trip 2022	
Table:	
3013	
3103	
3153	
3164	
122	
1	
7	
10	
16	
17	
23	
30	
31	
32	
33	
34	
122	
4	

Wed Feb 05 2020 22:11:58 GMT-0500 (Eastern Standard Time) - Run Time: 21Time

Cross Tabulation Query Form - Trip - 2022	
Row: Planning district of destination - pd_dest	
Columns: 2008 GTA zone of origin - gdm0_int	
and	
RowG:	
ColG (1513):	
TMS:	
Filter:	
Start time of trip - start_time to 600-600	
and	
Planning district of:	
and	
2008 GTA zone of origin - gdm0_int to 3153	
Trip 2022	
Table:	
PD 1 of Toronto	
PD 2 of Toronto	
PD 3 of Toronto	
PD 4 of Toronto	
Vaughan	
Brampton	
Mississauga	
Oshawa	
Grand Valley	
1	
16	
12	
20	
23	
30	
31	
32	
33	
34	
122	
4	

Row Labels	Sum of Distribution
COLLEAGUE_HB	80%
COLLEAGUE_HB	23%
PNP_HB	23%
Grand Total	100%

Wed Feb 05 2020 22:14:26 GMT-0500 (Eastern Standard Time) - Run Time: 300Time

Cross Tabulation Query Form - Trip - 2022	
Row: 2008 GTA zone of destination - gdm0_dest	
Columns: 2008 GTA zone of origin - gdm0_int	
and	
RowG:	
ColG (1513):	
TMS:	
Filter:	
Start time of trip - start_time to 600-600	
and	
Planning district of:	
and	
2008 GTA zone of origin - gdm0_int to 3153	
Trip 2022	
Table:	
3002	
3102	
3152	
3162	
122	
1	
7	
10	
16	
17	
23	
30	
31	
32	
33	
34	
122	
4	

Wed Feb 05 2020 22:12:27 GMT-0500 (Eastern Standard Time) - Run Time: 287Time

Cross Tabulation Query Form - Trip - 2022	
Row: Planning district of destination - pd_dest	
Columns: 2008 GTA zone of origin - gdm0_int	
and	
RowG:	
ColG (1513):	
TMS:	
Filter:	
Start time of trip - start_time to 1000-1000	
and	
Planning district of:	
and	
2008 GTA zone of origin - gdm0_int to 3153	
Trip 2022	
Table:	
PD 6 of Toronto	
Brimley/Hwy	
Markham	
Vaughan	
Brampton	
Mississauga	
Oshawa	
Grand Valley	
1	
9	
17	
22	
30	
32	
33	
34	
122	
4	

Row Labels	Sum of Distribution
COLLEAGUE_HB	44%
COLLEAGUE_HB	44%
PNP_HB	44%
Grand Total	100%

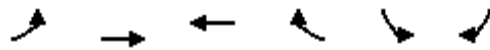
Appendix H – Future Total Traffic Analysis




Intersection								
Intersection Delay, s/veh	10.6							
Intersection LOS	B							
Approach	EB		WB		NB		SB	
Entry Lanes	1		1		2		2	
Conflicting Circle Lanes	2		2		1		1	
Adj Approach Flow, veh/h	362		331		286		841	
Demand Flow Rate, veh/h	378		352		341		964	
Vehicles Circulating, veh/h	1100		267		339		240	
Vehicles Exiting, veh/h	103		413		897		223	
Follow-Up Headway, s	3.186		3.186		3.186		3.186	
Ped Vol Crossing Leg, #/h	0		3		0		3	
Ped Cap Adj	1.000		1.000		1.000		0.997	
Approach Delay, s/veh	11.9		5.9		7.8		12.9	
Approach LOS	B		A		A		B	
Lane	Left	Bypass	Left	Bypass	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized	Yield		Yield					
Lane Util	1.000		1.000		0.469	0.531	0.470	0.530
Critical Headway, s	4.113		4.113		5.193	5.193	5.193	5.193
Entry Flow, veh/h	136	242	196	156	160	181	453	511
Cap Entry Lane, veh/h	523	603	937	967	805	805	889	889
Entry HV Adj Factor	0.948	0.962	0.957	0.917	0.840	0.838	0.873	0.873
Flow Entry, veh/h	129	233	188	143	134	152	395	446
Cap Entry, veh/h	496	580	897	886	677	674	774	774
V/C Ratio	0.260	0.402	0.209	0.161	0.199	0.225	0.511	0.577
Control Delay, s/veh	11.1	12.3	6.1	5.6	7.6	8.0	12.0	13.7
LOS	B	B	A	A	A	A	B	B
95th %tile Queue, veh	1	2	1	1	1	1	3	4

HCM Unsignalized Intersection Capacity Analysis 2: Harvest Moon Drive

Future Total AM Traffic Conditions

02/07/2025



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	362	99	0	0	0
Future Volume (Veh/h)	0	362	99	0	0	0
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	393	108	0	0	0
Pedestrians		2	5		4	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	112				510	114
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	112				510	114
tC, single (s)	4.2				6.4	6.3
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.4
p0 queue free %	100				100	100
cM capacity (veh/h)	1448				523	913
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	393	108	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1448	1700	1700			
Volume to Capacity	0.00	0.06	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			29.7%	ICU Level of Service		A
Analysis Period (min)			15			

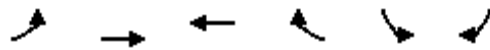
Intersection								
Intersection Delay, s/veh	20.2							
Intersection LOS	C							
Approach	EB		WB		NB		SB	
Entry Lanes	1		1		2		2	
Conflicting Circle Lanes	2		2		1		1	
Adj Approach Flow, veh/h	335		442		1293		570	
Demand Flow Rate, veh/h	341		446		1341		634	
Vehicles Circulating, veh/h	642		1217		344		482	
Vehicles Exiting, veh/h	474		468		420		884	
Follow-Up Headway, s	3.186		3.186		3.186		3.186	
Ped Vol Crossing Leg, #/h	2		3		2		5	
Ped Cap Adj	1.000		1.000		0.998		0.997	
Approach Delay, s/veh	7.1		13.4		29.1		12.8	
Approach LOS	A		B		D		B	
Lane	Left	Bypass	Left	Bypass	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized	Yield		Yield					
Lane Util	1.000		1.000		0.470	0.530	0.470	0.530
Critical Headway, s	4.113		4.113		5.193	5.193	5.193	5.193
Entry Flow, veh/h	122	219	149	297	630	711	298	336
Cap Entry Lane, veh/h	721	842	482	609	801	801	698	698
Entry HV Adj Factor	0.967	0.990	0.993	0.990	0.964	0.964	0.899	0.899
Flow Entry, veh/h	118	217	148	294	607	685	268	302
Cap Entry, veh/h	697	834	479	603	771	771	625	626
V/C Ratio	0.169	0.260	0.309	0.488	0.788	0.889	0.428	0.483
Control Delay, s/veh	7.1	7.1	12.4	14.0	23.6	34.1	12.1	13.4
LOS	A	A	B	B	C	D	B	B
95th %tile Queue, veh	1	1	1	3	8	12	2	3




HCM Unsignalized Intersection Capacity Analysis

2: Harvest Moon Drive

Future Total PM Traffic Conditions

02/07/2025



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	273	389	47	33	0
Future Volume (Veh/h)	0	273	389	47	33	0
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	297	423	51	36	0
Pedestrians			19		7	
Lane Width (m)			3.6		3.6	
Walking Speed (m/s)			1.2		1.2	
Percent Blockage			2		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	481				772	456
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	481				772	456
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				90	100
cM capacity (veh/h)	1086				363	605
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	297	474	36			
Volume Left	0	0	36			
Volume Right	0	51	0			
cSH	1086	1700	363			
Volume to Capacity	0.00	0.28	0.10			
Queue Length 95th (m)	0.0	0.0	2.6			
Control Delay (s)	0.0	0.0	16.0			
Lane LOS			C			
Approach Delay (s)	0.0	0.0	16.0			
Approach LOS			C			
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			33.4%	ICU Level of Service	A	
Analysis Period (min)			15			