

nextrans.ca



Transportation Impact & Parking Justification Study

PROPOSED RESIDENTIAL DEVELOPMENT

Harvest Moon Drive and Emil Kolb Parkway Town of Caledon

August 18, 2021 Project No: NT-20-113



A Division of NextEng Consulting Group Inc.

August 18, 2021

Humphries Planning Group Inc. 190 Pippin Road, Suite A Vaughan, On, L4K 4X9

Attention: Rosemarie L. Humphries

Re: Transportation Impact and Parking Justification Study Proposed Residential Development Harvest Moon Drive and 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 and Parking Justification Study in support of a Zoning By-Law Amendment application for a proposed residential development at the above noted property.

The subject property is currently vacant and has a total site area of 4,537.89 m² (48,845.39 ft²). Based on the preliminary concept plan prepared by Humphries Planning Group Inc., the development proposal is to construct 45 condominium stacked townhouse units. The total building GFA is 1,901.41 m² (20,466.59 ft²). The proposed development will provide a total of 54 parking spaces, 45 spaces will be provided for residents and nine (9) spaces will be provided for visitors. Vehicular access to the subject site is proposed via a full movement entrance onto Harvest Moon Drive.

The study concludes that the development proposal can adequately be accommodated by the existing transportation network with negligible traffic impact to the adjacent public roadways. 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:

Listian Aniles

Kristian Aviles, B.Eng. Transportation Analyst

Approved by:

Richard Pernicky, MITE Principal

EXECUTIVE SUMMARY

NexTrans Consulting Engineers (A Division of NextEng Consulting Group Ltd.) was retained by Humphries Planning Group Ltd. (the 'Client') to undertake a Transportation Impact and Parking Justification Study in support of a Zoning By-law Amendment application for a proposed residential development. The subject property is located on the western quadrant of the Harvest Moon Drive / King Street West and Emil Kolb Parkway / Coleraine Drive intersection, municipally known as 13656 Emil Kolb Parkway, in the Town of Caledon (the 'Town').

Development Proposal

The subject property is currently vacant with a total site area of 4,537.89 m² (48,845.39 ft²). Based on the preliminary concept plan prepared by Humphries Planning Group Inc., the development proposal is to construct 45 condominium stacked townhouse units. The total building GFA is 1,901.41 m² (20,466.59 ft²). The proposed development will provide a total of 54 parking spaces, 45 spaces will be provided for residents and nine (9) spaces will be provided for visitors. Vehicular access to the subject site is proposed via a full movement entrance onto Harvest Moon Drive.

Capacity Analysis

Based on the trip generation calculations, the proposed development is expected to generate 19 new two-way trips (4 inbound and 15 outbound) and 26 new two-way trips (16 inbound and 10 outbound) during the AM peak hour and PM peak hour, respectively.

Parking Review

In accordance with the Town's parking provisions outlined in the Zoning By-law, the site requires 102 vehicular parking spaces for the intended uses. In comparing the parking requirement with the proposed provision of 54 spaces, there will be a technical deficit of 48 parking spaces. A parking utilization survey was previously undertaken by NexTrans at a proxy site in the Town of Ajax with similar land use characteristics to the proposed development. Based on the rates obtained from the parking requirement to the parking provision of 54 spaces, there will be a surplus of one (1) space. In comparing the parking requirement to the parking Generation Manual 5th Edition to justify the parking deficit in accordance with the Town's By-law provisions. In accordance with the ITE Parking Generation Manual, the subject site requires a total of 52 vehicular parking spaces for the 45 dwelling units. In comparing the parking requirement with the proposed parking supply of 54 spaces, there will be a surplus of two (2) parking spaces. To further justify the parking deficiency in accordance with the Town's parking provisions outlined in the Zoning By-law, the Town of Caledon's Official Plan was reviewed. 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.

Loading Area Review

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 side-loading waste collection vehicle and a fire / emergency truck (HSU TAC-2017) can effectively maneuver through the study area. Additionally, AutoTURN analysis demonstrates that a passenger vehicle (P TAC-2017) can maneuver into all of the parking spaces.

TABLE OF CONTENTS

1.0	INTRODUCTION
2.0	EXISTING TRAFFIC CONDITIONS2
2.1.	Existing Road Network2
2.2.	Existing Transit Network2
2.3.	Existing Active Transportation Network3
2.4.	Existing Traffic Volumes4
2.5.	Existing Traffic Assessment
3.0	FUTURE BACKGROUND CONDITIONS
3.1.	Future Background Traffic Assessment5
4.0.	SITE TRAFFIC
4.1.	TTS Data for Ward 4 in the Town of Caledon6
4.2.	Site Trip Distribution and Assignment7
5.0	FUTURE TOTAL TRAFFIC CONDITIONS
5.0 6.0	FUTURE TOTAL TRAFFIC CONDITIONS
5.0 6.0 6.1.	FUTURE TOTAL TRAFFIC CONDITIONS .7 PARKING ASSESSMENT. .9 Town of Caledon`s Zoning By-law 84-63. .9
5.0 6.0 6.1. 6.2.	FUTURE TOTAL TRAFFIC CONDITIONS 7 PARKING ASSESSMENT. 9 Town of Caledon`s Zoning By-law 84-63. 9 ITE Parking Generation Manual 9
5.0 6.0 6.1. 6.2. 6.3.	FUTURE TOTAL TRAFFIC CONDITIONS7PARKING ASSESSMENT.9Town of Caledon's Zoning By-law 84-63.9ITE Parking Generation Manual9Town of Caledon Official Plan (2018).11
5.0 6.0 6.1. 6.2. 6.3. 6.4.	FUTURE TOTAL TRAFFIC CONDITIONS7PARKING ASSESSMENT.9Town of Caledon's Zoning By-law 84-63.9ITE Parking Generation Manual9Town of Caledon Official Plan (2018).11Transportation Demand Management11
5.0 6.0 6.1. 6.2. 6.3. 6.4. 7.0	FUTURE TOTAL TRAFFIC CONDITIONS7PARKING ASSESSMENT.9Town of Caledon's Zoning By-law 84-63.9ITE Parking Generation Manual9Town of Caledon Official Plan (2018)11Transportation Demand Management11SITE PLAN REVIEW12
5.0 6.0 6.1. 6.2. 6.3. 6.4. 7.0 7.1.	FUTURE TOTAL TRAFFIC CONDITIONS7PARKING ASSESSMENT.9Town of Caledon's Zoning By-law 84-63.9ITE Parking Generation Manual9Town of Caledon Official Plan (2018).11Transportation Demand Management11SITE PLAN REVIEW12Vehicle Maneuverability Assessment12
5.0 6.0 6.1. 6.2. 6.3. 6.4. 7.0 7.1. 8.0	FUTURE TOTAL TRAFFIC CONDITIONS7PARKING ASSESSMENT.9Town of Caledon's Zoning By-law 84-63.9ITE Parking Generation Manual9Town of Caledon Official Plan (2018).11Transportation Demand Management11SITE PLAN REVIEW12Vehicle Maneuverability Assessment12TRANSPORTATION DEMAND MANAGEMENT12
5.0 6.0 6.1. 6.2. 6.3. 6.4. 7.0 7.1. 8.0 9.0	FUTURE TOTAL TRAFFIC CONDITIONS7PARKING ASSESSMENT.9Town of Caledon's Zoning By-law 84-63.9ITE Parking Generation Manual9Town of Caledon Official Plan (2018).11Transportation Demand Management11SITE PLAN REVIEW12Vehicle Maneuverability Assessment12TRANSPORTATION DEMAND MANAGEMENT.12CONCLUSION / FINDINGS12
5.0 6.0 6.1. 6.2. 6.3. 6.4. 7.0 7.1. 8.0 9.0 9.1.	FUTURE TOTAL TRAFFIC CONDITIONS7PARKING ASSESSMENT9Town of Caledon's Zoning By-law 84-639ITE Parking Generation Manual9Town of Caledon Official Plan (2018)11Transportation Demand Management11SITE PLAN REVIEW12Vehicle Maneuverability Assessment12TRANSPORTATION DEMAND MANAGEMENT12CONCLUSION / FINDINGS12Study Findings12

LIST OF FIGURES

- Figure 1-1 Site Location
- Figure 1-2 Proposed Site Plan
- Figure 2-1 Transit Network
- Figure 2-2 Cycling Network
- Figure 2-3 Existing Traffic Volumes
- Figure 3-1 Future (2023) Background Traffic Volumes
- Figure 3-2 Future (2028) Background Traffic Volumes
- Figure 4-1 Site Traffic (2024)
- Figure 5-1 Future (2023) Total Traffic Volumes
- Figure 5-2 Future (2028) Total Traffic Volumes
- Figure 7-1 AutoTURN Maneuverability Demonstration (Peel Region Side-Loading Waste Collection)
- Figure 7-2 AutoTURN Maneuverability Demonstration (HSU TAC-2017)
- Figure 7-3 AutoTURN Maneuverability Demonstration (P TAC-2017)

LIST OF TABLES

- Table 1.1 Site Statistics
- Table 2.1 Level of Service Existing Traffic Assessments
- Table 3.1 Level of Service Future Background (2023) Traffic Assessments
- Table 3.2 Level of Service Future Background (2028) Traffic Assessments
- Table 4.1 2016 TTS Data for Ward 2 (Municipality of Clarington)
- Table 4.2 Site Traffic Trip Generation
- Table 4.3 Site Traffic Trip Distribution
- Table 5.1 Future (2023) Total Traffic Assessments
- Table 5.2 Future (2028) Total Traffic Assessments
- Table 6.1 Vehicle Parking Requirements (Zoning By-law 84-63)
- Table 6.2 Vehicle Parking Requirements (ITE Parking Generation Manual 5th Edition)

APPENDICES

- Appendix A Proposed Concept Plan
- Appendix B Existing Transit Information
- Appendix C Detailed Traffic Data
- Appendix D Existing Traffic Assessment
- Appendix E Terms of Reference
- Appendix F Future Background Traffic Assessment (2023)
- Appendix G Future Background Traffic Assessment (2028)
- Appendix H 2016 TTS Data for Ward 4 (Town of Caledon)
- Appendix I Future Total Traffic Assessment (2023)
- Appendix J Future Total Traffic Assessment (2028)

1.0 INTRODUCTION

NexTrans Consulting Engineers (A Division of NextEng Consulting Group Ltd.) was retained by Humphries Planning Group Ltd. (the 'Client') to undertake a Transportation Impact and Parking Justification Study in support of a Zoning By-law Amendment application for a proposed residential development. The subject property is located on the western quadrant of the Harvest Moon Drive / King Street West and Emil Kolb Parkway / Coleraine Drive intersection, municipally known as 13656 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 – Site Location

The subject property is currently vacant with a total site area of 4,537.89 m² (48,845.39 ft²). Based on the preliminary concept plan prepared by Humphries Planning Group Inc., the development proposal is to construct 45 condominium stacked townhouse units. The total building GFA is 1,901.41 m² (20,466.59 ft²). The proposed development will provide a total of 54 parking spaces, 45 spaces will be provided for residents and nine (9) spaces will be provided for visitors. Vehicular access to the subject site is proposed via a full movement entrance onto Harvest Moon Drive.

Vehicular access to the subject site is proposed via a full movement onto Harvest Moon. The development site statistics are detailed in **Table 1.1**.

Site Area	Total Building Area	Total Residential Units	Total Parking Supply						
4,537.89 m ² (48,845.39 ft ²)	1,901.41 m ² (20,466.59 ft ²)	45 units	54 spaces						

Table 1.1 – Site Statistics

The proposed concept plan is provided in **Figure 1-2**, while **Appendix A** also provides a larger scale version of the proposed concept plan.



Figure 1-2 – Proposed Site Plan

2.0 EXISTING TRAFFIC CONDITIONS

2.1. Existing Road Network

The existing subject lands are located on the southwestern 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 eastwest 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.

2.2. Existing Transit Network

The subject site is situated in a transit supportive neighbourhood, with two (2) bus stop located approximately a six (6) minute walk from the subject site, which is within comfortable walking distance. The route service in the immediate area is described below and illustrated in **Figure 2-1**, and provided in full detail in **Appendix B**.

• Bolton Line: The Bolton Line bus route travels typically in the north-south directions from King Street at Ann Street to Highway 50 @ Willow Street. The Bolton Line bus operates during AM (6:00 AM to 9:30 AM) and PM (3:00 PM to 6:30 PM) peak hours from Monday to Friday.





2.3. Existing Active Transportation Network

<u>Sidewalks</u>

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

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.





2.4. Existing Traffic Volumes

Historic traffic volumes at the Harvest Moon / King Street West and Coleraine Drive / Emil Kolb Parkway intersection were obtained from Spectrum Traffic on Thursday, September 24, 2019 during the morning (7:00 AM to 9:00 AM) and afternoon (3:00 PM to 6:00 PM) peak periods. Detailed traffic data sheets are provided in **Appendix C**.

2.5. Existing Traffic Assessment

The existing traffic volumes are illustrated in **Figure 2-3** and were analyzed using Synchro 10 software. The methodology of the software follows the procedures described and outlined in the highway capacity manual, HCM 2000, published by the Transportation Research Board. Heavy Vehicles (%) and Peak Hour Factor have been obtained from the information contained in the turning movement counts for the Green Road and Highway 2 intersection. The detailed results are provided in **Appendix D** and summarized in **Table 2.1**.

Intercaction	Movement	Weel	kday AM Peak	Hour	Weekday PM Peak Hour		
Intersection	wovement	LOS (v/c)	Delay (s)	Queue (m)	LOS (v/c)	Delay (s)	Queue (m)
	Overall	B (0.50)	15.7	-	B (0.50)	16.1	-
Hanvaat Maan	EBLT	C (0.33)	21.7	25.0	C (0.34)	23.6	24.9
Drive / King	EBR	C (0.45)	22.7	33.6	C (0.10)	22.2	15.0
Drive / King	WBL	B (0.34)	14.2	25.0	B (0.16)	17.2	10.9
	WBT	B (0.05)	12.8	7.5	B (0.18)	17.5	20.63
α Coloraina Driva	WBR	B (0.14)	13.3	12.7	B (0.15)	17.3	14.8
	NBL	B (0.17)	16.3	7.9	A (0.52)	9.9	44.6
	NBT	B (0.26)	18.9	17.1	B (0.56)	16.3	58.3
(aignalized)	NBR	B (0.03)	17.7	1.9	B (0.13)	13.3	13.0
(Signalized)	SBL	B (0.48)	12.6	34.1	B (0.42)	16.6	17.9
	SBTR	B (0.50)	13.1	49.1	B (0.48)	17.4	22.4

Table 2.1 – Level of Service – Existing Traffic Assessments

Based on **Table 2.1**, the existing major signalized intersection is currently operating at excellent levels of service during both AM and PM peak hours, with no critical movements identified.

3.0 FUTURE BACKGROUND CONDITIONS

The assumed build out year for the proposed development is the year 2023. A five-year horizon from full build-out (2028) was also analyzed for future background traffic volumes. A Terms of Reference was submitted to Peel Region for review (see **Appendix E**) but since the Region has not provided comments on the Terms of Reference in a timely manner, a 2% growth rate was applied to all of the existing through at the major signalized intersection of Harvest Moon Drive / King Street West and Coleraine Drive / Emil Kolb Parkway.

3.1. Future Background Traffic Assessment

The estimated 2023 future background traffic volumes are illustrated in **Figure 3-1**. The detailed calculations are provided in **Appendix F** and **Table 3.1** summarizes the level of service at the study area intersection under future background traffic conditions.

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour			
Intersection	WOVEINEIN	LOS (v/c)	Delay (s)	Queue (m)	LOS (v/c)	Delay (s)	Queue (m)	
	Overall	B (0.52)	16.0	-	B (0.51)	16.3	-	
Hanvaat Maan	EBLT	C (0.34)	22.1	26.6	C (0.35)	24.3	26.4	
	EBR	C (0.48)	23.3	36.1	C (0.10)	22.7	15.3	
Drive / King	WBL	B (0.34)	14.5	25.9	B (0.16)	17.8	11.3	
	WBT	B (0.05)	13.0	8.1	B (0.20)	18.1	22.2	
α Coloraina Driva	WBR	B (0.14)	13.5	13.0	B (0.15)	17.8	15.2	
Coleraine Drive	NBL	B (0.15)	15.3	8.0	A (0.52)	9.8	45.1	
	NBT	B (0.26)	19.0	18.2	B (0.58)	16.5	62.7	
Parkway	NBR	B (0.03)	17.8	1.8	B (0.13)	13.2	12.9	
(signalized)	SBL	B (0.48)	12.7	34.9	B (0.42)	16.4	18.0	
	SBTR	B (0.53)	13.5	53.5	B (0.49)	17.5	23.4	

Table 3.1 – Level of Service – Future Background (2023) Traffic Assessments

Based on **Table 3.1**, the existing major signalized intersection is expected to operate at excellent levels of service during both AM and PM peak hours under future background conditions in the year 2023, with no critical movements identified.

The estimated 2028 future background traffic volumes are illustrated in **Figure 3-2**. The detailed calculations are provided in **Appendix G** and **Table 3.2** summarizes the level of service at the study area intersection under future background traffic conditions.

Interception	Movement	Wee	Weekday AM Peak Hour			Weekday PM Peak Hour		
Intersection	wovement	LOS (v/c)	Delay (s)	Queue (m)	LOS (v/c)	Delay (s)	Queue (m)	
	Overall	B (0.56)	16.5	-	B (0.53)	16.7	-	
Hanvast Moon	EBLT	C (0.36)	22.9	30.2	C (0.38)	35.4	29.3	
Drivo / King	EBR	C (0.51)	24.4	41.2	C (0.10)	23.6	15.5	
Street West	WBL	B (0.34)	15.1	17.7	B (0.16)	18.6	11.8	
	WBT	B (0.06)	13.6	9.1	B (0.22)	19.1	24.1	
a Coloraina Driva	WBR	B (0.14)	14.1	13.5	B (0.15)	18.7	15.5	
	NBL	B (0.15)	15.3	8.2	A (0.52)	9.7	46.0	
/ Emil Kub	NBT	B (0.27)	19.0	20.3	B (0.61)	16.9	71.5	
(cignalized)	NBR	B (0.03)	17.7	1.6	B (0.13)	13.0	12.7	
(Signalized)	SBL	B (0.47)	12.8	35.7	B (0.44)	16.4	18.7	
	SBTR	B (0.57)	14.2	61.4	B (0.50)	17.6	25.3	

Table 3.2 – Level of Service – Future Background (2028) Traffic Assessments

Based on **Table 3.2**, the existing major signalized intersection is expected to operate at excellent levels of service during both AM and PM peak hours under future background conditions in the 2028 horizon year, with no critical movements identified.

4.0. SITE TRAFFIC

4.1. TTS Data for Ward 4 in the Town of Caledon

According to 2016 TTS data, approximately 12% of people in the vicinity of the subject site utilize alternative modes of transportation, such as transit, walking and cycling as summarized in **Table 4.1**. TTS data is provided in **Appendix H**.

Time Deried	Auto Mod	e of Travel	Non-Auto Mode of Travel							
Time Period	Driver	Passenger	Transit	GO Train	Walking & Cycling	Other				
6-9 AM	72%	11%	0%	0%	1%	14%				
24 Hours	79%	12%	1%	0%	1%	7%				
Average	76%	12%	1%	0%	1%	10%				
Total	Total 88%		12%							

As previously identified, the development proposal is to construct 45 condominium stacked townhouse units with a total building GFA of 1,901.41 m² (20,466.59 ft²). Trip rates and site generated trips were derived from the information contained in the *Trip Generation Manual*, *10th Edition* published by the Institute of Transportation (ITE) for "Multi Family Housing (Mid-Rise)" (LUC 221) and for "Shopping Centre" (LUC 820). Average rates were used for "Shopping Centre" as the commercial space is ground floor ancillary use which is expected to attract the tenants in the building as foot traffic. The trip generation summary for phase 1 is shown in **Table 4.2**.

Land Use (LUC	Paramotor	Weekday AM Peak Hour			Weekday PM Peak Hour		
160)	Farameter	In	Out	Total	In	Out	Total
Multi Family	Gross Trips	5	17	22	18	11	29
Housing (Mid Biac)	Gross Rate	0.11	0.39	0.50	0.40	0.24	0.64
(IVIII-RISE) (LUC 221)	Non-Auto (11%)	1	2	3	2	1	3
(A)	New Trip	4	15	19	16	10	26

Table 4.2 – Site Traffic Trip Generation

Based on the trip generation calculations, the proposed development is expected to generate 19 new two-way trips (4 inbound and 15 outbound) and 26 new two-way trips (16 inbound and 10 outbound) during the AM peak hour and PM peak hour, respectively.

Site Trip Distribution and Assignment 4.2.

The 2016 Transportation Tomorrow Survey (TTS) data was reviewed for traffic zone 3153 to estimate the general trip distributions for the proposed development. As a result, the site traffic distribution is summarized in Table 4.3 and the site traffic for the assumed 2023 build-out year is illustrated in Figure 4-1.

Direction	Via	AM Pea	k Hour	PM Peak Hour						
Direction	Vid	Inbound	Outbound	Inbound	Outbound					
	Proposed Site Access and Harvest Moon Drive Intersection									
East	Harvest Moon Drive	68%	68%	74%	74%					
West	Harvest Moon Drive	33%	33%	26%	26%					
	Total	100%	100%	100%	100%					
D . (1	\/¦ia	AM Peak Hour		PM Peak Hour						
Direction	Via	7 111 1 00	R HOUI	1 11 1 66						
Direction	Via	Inbound	Outbound	Inbound	Outbound					
Direction	Via Harvest Moon Drive / Ki	Inbound ng Street West & Col	Outbound eraine Drive / Emil K	Inbound	Outbound ection					
Direction North	Via Harvest Moon Drive / Ki Emil Kolb Parkway	Inbound ng Street West & Col 23%	Outbound eraine Drive / Emil k 23%	Inbound Colb Parkway Interse 23%	Outbound ection 23%					
Direction North East	Via Harvest Moon Drive / Ki Emil Kolb Parkway King Street West	Inbound ng Street West & Col 23% 41%	Outbound eraine Drive / Emil M 23% 41%	Inbound Kolb Parkway Interso 23% 41%	Outbound ection 23% 41%					
Direction North East South	Via Harvest Moon Drive / Kin Emil Kolb Parkway King Street West Coleraine Drive	Inbound ng Street West & Col 23% 41% 36%	Outbound eraine Drive / Emil M 23% 41% 36%	Inbound Colb Parkway Interso 23% 41% 36%	Outbound ection 23% 41% 36%					

5.0 FUTURE TOTAL TRAFFIC CONDITIONS

The forecasted future (2023) total traffic volumes (future background traffic volumes plus site generated traffic volumes) are illustrated in Figure 5-1, for AM and PM peak hour, respectively, and were analyzed using Synchro 10 software. The detailed calculations are provided in Appendix I and are summarized in Table 5.1.

Interception	Movement	Weel	kday AM Peak	Hour	Weekday PM Peak Hour			
Intersection	wovement	LOS (v/c)	Delay (s)	Queue (m)	LOS (v/c)	Delay (s)	Queue (m)	
	Overall	B (0.53)	16.6	-	B (0.52)	16.4	-	
Hanvaat Maan	EBLT	C (0.36)	22.2	28.1	C (0.37)	24.4	28.0	
	EBR	C (0.49)	23.3	37.4	C (0.10)	22.7	15.3	
Drive / King	WBL	B (0.34)	14.5	26.0	B (0.16)	17.8	11.3	
	WBT	B (0.05)	13.0	8.5	B (0.20)	18.1	22.7	
α Coloraina Driva	WBR	B (0.14)	13.5	13.0	B (0.15)	17.8	15.1	
/ Emil Kalh	NBL	B (0.15)	15.4	8.2	A (0.53)	10.0	46.6	
	NBT	B (0.26)	19.0	18.3	B (0.58)	16.6	63.5	
Parkway	NBR	B (0.03)	17.8	1.8	B (0.13)	13.3	13.0	
(signalized)	SBL	B (0.48)	12.8	35.2	B (0.42)	16.6	18.3	
	SBTR	B (0.53)	13.6	54.2	B (0.50)	17.7	24.1	
Harvest Moon	EBTL	A (0.00)	0.0	0.0	A (0.00)	0.2	0.1	
& Site Access	SBLR	B (0.03)	10.5	0.7	B (0.03)	13.4	0.8	

Table 5.1 – Future (2023) Total Traffic Assessments

Based on **Table 5.1**, the site access, as well as the Harvest Moon Drive / King Street West and Coleraine Drive / Emil Kolb Parkway intersection is expected to operate at excellent levels of service during both AM and PM peak hours, with no critical movements identified under future total traffic conditions for the year 2023. <u>Based on above, it is our opinion that the proposed residential development will have negligible impact to the future operations of the adjacent road network in the expected build-out year of 2023.</u>

The forecasted future (2028) total traffic volumes (future background traffic volumes plus site generated traffic volumes) are illustrated in **Figure 5-2**, for AM and PM peak hours, respectively, and were analyzed using Synchro 10 software. The detailed calculations are provided in **Appendix J** and are summarized in **Table 5.2**.

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
Intersection	wovement	LOS (v/c)	Delay (s)	Queue (m)	LOS (v/c)	Delay (s)	Queue (m)
	Overall	B (0.56)	16.6	-	B (0.54)	16.8	-
Harvest Moon	EBLT	C (0.38)	23.0	31.5	C (0.40)	25.6	30.7
Drivo / King	EBR	C (0.52)	24.6	14.3	C (0.10)	23.6	15.6
Drive / King	WBL	B (0.34)	15.1	11.1	B (0.16)	18.7	11.9
	WBT	B (0.06)	13.7	2.6	B (0.23)	19.2	25.5
a Coloraina Driva	WBR	B (0.14)	14.1	0.0	B (0.15)	18.7	15.6
	NBL	B (0.16)	15.4	2.5	A (0.52)	9.9	47.5
	NBT	B (0.27)	19.1	10.0	B (0.61)	16.9	72.2
(aignalized)	NBR	B (0.03)	17.8	0.0	B (0.13)	13.1	12.8
(signalized)	SBL	B (0.47)	12.8	15.4	B (0.44)	16.6	19.0
	SBTR	B (0.57)	14.2	34.8	B (0.51)	17.9	26.0
Harvest Moon Drive & Site Access	EBTL SBLR	A (0.00) B (0.03)	0.0 10.5	0.0 0.7	A (0.01) B (0.03)	0.5 13.6	0.1 0.8

Table 5.2 – Future (2028) Total Traffic Assessments

Based on **Table 5.2**, the site access, as well as the Harvest Moon Drive / King Street West and Coleraine Drive / Emil Kolb Parkway intersection is expected to operate at excellent levels of service during both AM and PM peak hours, with no critical movements identified under future total traffic conditions for the 2028 horizon year. <u>Based on above, it is our opinion that the proposed residential development will have negligible impact to the future operations of the adjacent road network in the 2028 horizon year</u>.

6.0 PARKING ASSESSMENT

6.1. Town of Caledon's Zoning By-law 84-63

The proposed development is zoned A1 and is subject to the Town of Caledon's Zoning By-law 84-63, which stipulates different parking rates based on the land use. the development proposal is to construct 45 condominium stacked townhouse units with a total building GFA of 1,901.41 m² (20,466.59 ft²).

Based on communications with the Town, the Town has accepted an "all-in" parking rate instead of separating parking requirement for residents and visitors. As such, the detailed parking calculation is calculated in **Table 6.1**.

	· ····· · · · · · · · · · · · · · · ·										
Туре	No. of Units / GFA m ²	Parking Rate	Parking Requirement	Parking Provided	(+) Surplus / (-) Deficit						
Townhouse	45 units	2.25 spaces / unit	102 spaces	54 spaces	-48 spaces						

Table 6.1 – Vehicle Parking Requirements

In accordance with the Town's parking provisions outlined in the Zoning By-law, the site requires 102 vehicular parking spaces for the intended uses. In comparing the parking requirement with the proposed provision of 54 spaces, there will be a technical deficit of 48 parking spaces.

The following justifications are provided to support the reduction in parking provision for the proposed development:

- 1. Proxy Site Parking Utilization Surveys;
- 2. ITE Parking Generation;
- 3. Town of Caledon's Official Plan; and,
- 4. Transportation Demand Management.

6.2. Proxy Site Parking Utilization Surveys

To justify the reduced parking provision, NexTrans has undertaken a parking survey for an existing site with similar land use characteristics located at the northeast corner of Kingston Road West and Chapman Drive, in the Town of Ajax. The details of the proxy survey are broken down as follows:

- The proxy site is an existing stacked townhouse complex with 51 residential units;
- The development includes 15 individual parking garages, which were assumed as occupied;
- The existing 15 individual garages are assumed to be occupied; and,
- The survey was undertaken on Tuesday, May 16, 2017 from 5:00 PM to 11:30 PM at 30-minute intervals.

The proxy site location is illustrated in **Figure 6-1** and the parking utilization survey results are summarized in **Table 6.2**.



Table 6.2 – Parking Utilization Survey (Tuesday May 16, 2017)

		Resi	dent			Visitor
Time	Pa	arking Demand	-	Parking Rate	Parking	Parking Pate (spaces
(Starting)	Surface	Garage	Total	(spaces per unit)	Demand	per unit)
5:00 pm	18	15	33	0.35	5	0.10
5:30 pm	20	15	35	0.39	5	0.10
6:00 pm	21	15	36	0.41	5	0.10
6:30 pm	26	15	41	0.51	3	0.06
7:00 pm	25	15	40	0.49	4	0.08
7:30 pm	23	15	38	0.45	5	0.10
8:00 pm	25	15	40	0.49	7	0.14
8:30 pm	28	15	43	0.55	6	0.12
9:00 pm	29	15	44	0.57	4	0.08
9:30 pm	31	15	46	0.61	5	0.10
10:00 pm	35	15	50	0.69	4	0.08
10:30 pm	38	15	53	0.75	3	0.06
11:00 pm	38	15	53	0.75	3	0.06
11:30 pm	38	15	53	0.75	3	0.06
Max	38	15	53	1.04	7	0.14

Based on the results of the parking utilization survey at the proxy site, it was observed that the maximum residential parking utilization was 1.04 spaces per unit, whereas the maximum visitor parking utilization was 0.14 spaces per unit. Using these observed parking utilization rates, the parking requirement for both tenants and visitors can be calculated for the proposed development.

The parking requirement for tenants and visitors is summarized in **Table 6.3**.

Use	Number of Units	Rate	Parking Requirement	Parking Provided	Difference
Townhouse	45	1.04 space per unit	47	51 anagag	. 1
Residential Visitor	40	0.14 spaces per unit	6	54 spaces	+1
	Total		53	54 spaces	+1

Table 6.3 – Adjusted Parking

As summarized in **Table 6.3**, based on the rates obtained from the parking utilization survey, the proposed development will require a total of 53 vehicular parking spaces. In comparing the parking requirement to the parking provision of 54 spaces, there will be a surplus of one (1) space. <u>On this basis, it is NexTrans' opinion that the parking provision of 54 spaces is adequate</u> to meet the expected demand on-site.

6.3. ITE Parking Generation Manual

Parking rates and site generated parking demand was derived from the information contained in the *Parking Generation Manual*, 5th Edition, published by the Institute of Transportation (ITE) for "Multi Family Housing (Mid-Rise)" (LUC 221) and for "Shopping Centre" (LUC 820). The parking generation summary for the proposed development is shown in **Table 6.4**.

Table 6.4 – Vehicle Parking	Requirements	(ITE Parking Generatio	n Manual 5th Edition)
Table 0.7 - Vehicle Talking	Incquiremento	(IIL I arking Ocheratio	

Туре	No. of Units / GFA	Parking Rate	Parking Requirement	Parking Provided	(+) Surplus / (-) Deficit
Townhouse	45 units	P=1.34(X)-8.73	52 spaces	54 spaces	+2 spaces

In accordance with the *Parking Generation Manual, 5th Edition*, published by the Institute of Transportation (ITE), the subject site requires a total of 52 vehicular parking spaces for the 45 dwelling units. In comparing the parking requirement with the proposed parking supply of 54 spaces, there is a surplus of two (2) parking spaces. <u>As a result, it is our opinion that the proposed parking supply of 54 spaces can sufficiently meet the parking requirement based on the ITE Parking Generation Manual 5th Edition.</u>

6.4. 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."*

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

6.5. 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 side-loading waste collection vehicle and a fire / emergency truck (HSU TAC-2017) can effectively maneuver through the study area. Additionally, AutoTURN analysis demonstrates that a passenger vehicle (P TAC-2017) can maneuver into all of the parking spaces. Vehicular maneuverability is illustrated in **Figure 7-1**, **Figure 7-2** and **Figure 7-3**.

8.0 TRANSPORTATION DEMAND MANAGEMENT

Based on our experience, excessive parking supply imposes environmental costs, contradicts community development objectives for more liveable and walkable communities and tends to increase driving and discourage the use of alternative modes of travel. It is anticipated that the combination of reduced parking supply and an efficient public transit system will encourage the use of alternative modes of travel.

Based on the review of the context of the proposed development in relation to the TDM requirements in the Town's Official Plan (2018), the following TDM measures and incentives are recommended for the proposed development:

- Provide information packages for new residents. The information package includes transit schedules and community cycling maps, where appropriate. The information can be distributed at the sales office; and
- Provide a one-time pre-loaded PRESTO card with the starting value of \$50. This will help future residents to consider taking transit as an alternative mode of transportation. The PRESTO cards can be distributed in conjunction with the information package at the time of purchase or at occupancy.
- Provide short term bicycle parking on-site to encourage future residents to consider cycling as an alternative mode of transportation to and from the subject site.

9.0 CONCLUSION / FINDINGS

9.1. Study Findings

The findings and conclusions of our analysis are as follows:

- The development proposal is to construct 45 condominium stacked townhouse units. The total building GFA is 1,901.41 m² (20,466.59 ft²). The proposed development will provide a total of 54 parking spaces, 45 spaces will be provided for residents and nine (9) spaces will be provided for visitors. Vehicular access to the subject site is proposed via a full movement entrance onto Harvest Moon Drive.
- Based on the trip generation calculations, the proposed development is expected to generate 19 new two-way trips (4 inbound and 15 outbound) and 26 new two-way trips (16 inbound and 10 outbound) during the AM peak hour and PM peak hour, respectively.

- The intersection capacity analysis results (based on the methodology and procedures outlined in the Highway Capacity Manual, HCM 2000, published by the Transportation Research Board) indicate that under future total traffic conditions for the 2023 expected build out year and the 2028 horizon year, the site access as well as the intersection of Harvest Moon Drive / King Street West and Coleraine Drive / Emil Kolb Parkway are expected to operate at acceptable levels of service during both AM and PM peak hours, with no critical movements identified.
- In accordance with the Town's parking provisions outlined in the Zoning By-law, the site requires 102 vehicular parking spaces for the intended uses. In comparing the parking requirement with the proposed provision of 54 spaces, there will be a technical deficit of 48 parking spaces.
- Based on the rates obtained from the parking utilization survey, the proposed development will require a total of 53 vehicular parking spaces. In comparing the parking requirement to the parking provision of 54 spaces, there will be a surplus of one (1) space.
- The parking requirement was calculated based on the ITE Parking Generation Manual 5th Edition to justify the parking deficit in accordance with the Town's By-law provisions. In accordance with the ITE Parking Generation Manual, the subject site requires a total of 52 vehicular parking spaces for the 45 dwelling units. In comparing the parking requirement with the proposed parking supply of 54 spaces, there will be a surplus of two (2) parking spaces.
- To further justify the parking deficiency in accordance with the Town's parking provisions outlined in the Zoning Bylaw, the Town of Caledon's Official Plan was reviewed. 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 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 fire / emergency truck (HSU TAC-2017) can effectively maneuver through the study area. Additionally, AutoTURN analysis demonstrates that a passenger vehicle (P TAC-2017) can maneuver into the surface level parking spaces.
- Based on the review of the context of the proposed development in relation to the TDM requirements in the Town's Official Plan (2018), the following TDM measures and incentives are recommended for the proposed development:
 - Provide information packages for new residents. The information package includes GO Transit schedules and community cycling maps, where appropriate. The information can be distributed at the sales office; and
 - Provide a one-time pre-loaded PRESTO card with the starting value of \$50 (the approximate cost of an adult monthly pass for each residential unit on demand basis). This will help future residents to consider taking GO transit as an alternative mode of transportation. The PRESTO cards can be distributed in conjunction with the information package at the time of purchase or at occupancy.
 - Provide short term bicycle parking on-site to encourage future residents to consider cycling as an alternative mode of transportation.

9.2. Study Conclusions

Based on the study assessment, our report concludes that:

- the proposed residential development will have negligible impact to the future operations of the adjacent road network, and;
- the supply of 54 vehicular parking spaces is sufficient to accommodate the expected demand of the proposed development.







Figure 2-3 - Existing Traffic Volumes





Figure 3-1 - Future Background (2023) Traffic Volumes

King Street West







Figure 3-2 - Future Background (2028) Traffic Volumes

King Street West







Figure 4-1 - Site Traffic Volumes





Figure 5-1 - Future Total (2023) Traffic Volumes





Figure 5-2 - Future Total (2028) Traffic Volumes





ļ

	KET FLAN
	BENCHMARK
>	
Ŕ	
	REVISONS
Z	
\triangleleft	
۲.	
	STANIP
0	
\bigcirc	
	nex rans
	CONSULTING ENGINEERS
	Suite 201, 520 Industrial Parkway South Aurora ON L4G 6W8
	18: 905-003-2003 Web: www.nextrans.ca
	PROJECT NAME:
	RESIDENTIAL DEVELOPMENT
	Harvest Moon and Emil Kolb Parkway
	(Town of Caledon)
	DRAWING TITLE:
	AutoTURN Analysis
	(HSU TAC-2017)
	DESIGN BY: K.A. DATE: August 17, 2021
	CHECKED BY: R.P. PROJECT NO. NT-20-113
	SCALE: NTS DRAWING NO.
	人 Figure 7-2 】



KEY F	PLAN
	4
	'
BENCHMARK	
	J
REVISONS	
+	
)
nov	Kape
nex	I di i S
CONSULTING Suite 201 520 Indust	ENGINEERS
Aurora ON L4	4G 6W8
Web: www.nex	ktrans.ca
PROJECT NAME:	
RESIDENTIAL	DEVELOPMENT
Harvest Moon Drive a	and Emil Kolb Pkwy
	· · · · · · · · · · · · · · · · · · ·
FOWN OF	CALEDON
·)
DRAWING TITLE:	
AutoTURN	Analysis
(P TAC	-2017)
(1 100	
	$ \longrightarrow$
HECKED BY: R.P.	DATE: January 14, 2020 PROJECT NO.
RAWN BY: K.A.	NT-20-113
CALE: NTS	DRAWING NO.
	⊢igure 7-3

Appendix A - Proposed Concept Plan



Appendix B – Existing Transit Information

MORNING ROUTE - 6 A.M. - 9:30 A.M.

1W	2W	35	4 E	55	6 S	75	8E	95	10	9N	8N	11N	12N	13N	
King Street @ Ann Street (Westbound)	King Street @ Deer Valley Drive (Westbound)	Coleraine Drive @ Old Elwood Drive (Southbound)	Holland Drive @ Coleraine Drive (Eastbound)	Holland Drive @ Browning Court (Southbound)	Coleraine Drive @ Healy Road (Southbound)	12724 Coleraine Dr. (Southbound)	George Bolton Parkway@ Hwy 50 (Eastbound)	Hwy 50 @ Mayfield Road GO Parking Lot (Southbound)	Hwy 50 @ Hwy7 / Queen Street Brampton Transit (Zum Bus Stop)	Hwy 50 @ Mayfield Road GO Parking Lot (Northbound)	Hwy 50 @ George Bolton Parkway (Northbound)	Hwy 50 @ McEwan Drive (Northbound)	Hwy 50 @ Queensgate Boulevard (Northbound)	Hwy 50 @ Allan Drive (Northbound)	
6:00 AM	6:02 AM	6:03 AM	6:05 AM	6:06 AM	6:07 AM	6:09 AM	6:14 AM	6:17 AM	6:35 AM	6:50 AM	6:52 AM	6:53 AM	6:54 AM	6:55 AM	
6:30 AM	6:32 AM	6:33 AM	6:35 AM	6:36 AM	6:37 AM	6:39 AM	6:44 AM	6:47 AM	7:05 AM	7:20 AM	7:22 AM	7:23 AM	7:24 AM	7:25 AM	
7:00 AM	7:02 AM	7:03 AM	7:05 AM	7:06 AM	7:07 AM	7:09 AM	7:14 AM	7:17 AM	7:35 AM	7:50 AM	7:52 AM	7:53 AM	7:54 AM	7:55 AM	
7:30 AM	7:32 AM	7:33 AM	7:35 AM	7:36 AM	7:37 AM	7:39 AM	7:44 AM	7:47 AM	8:05 AM	8:20 AM	8:22 AM	8:23 AM	8:24 AM	8:25 AM	
8:00 AM	8:02 AM	8:03 AM	8:05 AM	8:06 AM	8:07 AM	8:09 AM	8:14 AM	8:17 AM	8:35 AM	8:50 AM	8:52 AM	8:53 AM	8:54 AM	8:55 AM	
8:30 AM	8:32 AM	8:33 AM	8:35 AM	8:36 AM	8:37 AM	8:39 AM	8:44 AM	8:47 AM	9:05 AM	9:20 AM	9:22 AM	9:23 AM	9:24 AM	9:25 AM	

AFTERNOON ROUTE - 3 P.M. - 6:30 P.M.

1E	13S	125	115	85	95	10	9N	8W	7N	6N	5N	4W	ЗN	
King Street @ Hwy 50 (Eastbound)	Hwy 50 @ Wilton Drive (Southbound)	Hwy 50 @ Queensgate Boulevard (Southbound)	Hwy 50 @ McEwan Drive (Southbound)	Hwy 50 @ George Bolton Parkway (Southbound)	Hwy 50 @ Mayfield Road GO Parking Lot (Southbound)	Hwy 50 @ Hwy7 / Queen Street Brampton Transit (Zum Bus Stop)	Hwy 50 @ Mayfield Road GO Parking Lot (Northbound)	George Bolton Parkway @ Hwy 50 (Westbound)	12724 Coleraine Dr. (Northbound)	Coleraine Drive @ Healey Road Northbound)	Holland Drive @ Browning Court (Northbound)	Holland Drive @ Coleraine Drive (Westbound)	Coleraine Drive @ Old Elwood Drive (Northbound)	
3:00 PM	3:03 PM	3:04 PM	3:06 PM	3:07 PM	3:10 PM	3:26 PM	3:41 PM	3:44 PM	3:48 PM	3:49 PM	3:51 PM	3:53 PM	3:54 PM	
3:30 PM	3:33 PM	3:34 PM	3:36 PM	3:37 PM	3:40 PM	3:56 PM	4:11 PM	4:14 PM	4:18 PM	4:19 PM	4:21 PM	4:23 PM	4:24 PM	
4:00 PM	4:03 PM	4:04 PM	4:06 PM	4:07 PM	4:10 PM	4:26 PM	4:41 PM	4:44 PM	4:48 PM	4:49 PM	4:51 PM	4:53 PM	4:54 PM	
4:30 PM	4:33 PM	4:34 PM	4:36 PM	4:37 PM	4:40 PM	4:56 PM	5:11 PM	5:14 PM	5:18 PM	5:19 PM	5:21 PM	5:23 PM	5:24 PM	
5:00 PM	5:03 PM	5:04 PM	5:06 PM	5:07 PM	5:10 PM	5:26 PM	5:41 PM	5:44 PM	5:48 PM	5:49 PM	5:51 PM	5:53 PM	5:54 PM	
5:30 PM	5:33 PM	5:34 PM	5:36 PM	5:37 PM	5:40 PM	5:56 PM	6:11 PM	6:14 PM	6:18 PM	6:19 PM	6:21 PM	6:23 PM	6:24 PM	

Ge züm Ge



Note: bus arrival times may vary due to traffic conditions. Use the realtime bus location tracker at **caledon.ca/transit** for accurate arrival times.



Appendix C – Detailed Traffic Data



Left

Start Time

Turning Movement Count Location Name: COLERAINE DR & KING ST Date: Tue, Sep 24, 2019 Deployment Lead: David Chu

Turning Movement Count (2. COLERAINE DR & KING ST) CustID: 00903381 MioID:

, ,

Int. Total

(15 min)

Approach Total

	S	outhbou	nd				v	/estboun	d				N	orthbour	nd				F	Eastboun	d
Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds
125	0	0	0	174	34	7	50	0	0	91	7	44	11	0	0	62	3	33	67	0	0
131	2	0	0	188	36	6	47	0	0	89	9	38	9	0	0	56	0	18	41	0	0
135	0	0	0	183	31	5	53	0	0	89	17	38	14	0	0	69	3	14	68	0	0

07:00:00	49	125	0	0	0	174	34	7	50	0	0	91	7	44	11	0	0	62	3	33	67	0	0	103	430
07:15:00	55	131	2	0	0	188	36	6	47	0	0	89	9	38	9	0	0	56	0	18	41	0	0	59	392
07:30:00	48	135	0	0	0	183	31	5	53	0	0	89	17	38	14	0	0	69	3	14	68	0	0	85	426
07:45:00	66	173	0	0	0	239	40	8	51	0	0	99	6	35	12	0	0	53	0	24	74	0	1	98	489
Hourly	218	564	2	0	0	784	141	26	201	0	0	368	39	155	46	0	0	240	6	89	250	0	1	345	1737
08:00:00	51	161	0	0	1	212	48	7	58	0	0	113	15	22	6	0	0	43	2	22	52	0	0	76	444
08:15:00	51	138	1	0	3	190	33	9	40	0	0	82	17	29	8	0	0	54	1	21	55	0	0	77	403
08:30:00	50	105	1	0	1	156	42	16	44	0	0	102	18	24	5	0	0	47	2	16	43	0	0	61	366
08:45:00	36	105	1	0	0	142	31	12	25	0	0	68	28	24	10	0	0	62	2	14	51	0	0	67	339
Hourly	188	509	3	0	5	700	154	44	167	0	0	365	78	99	29	0	0	206	7	73	201	0	0	281	1552
***BREAK	***	·····																							
11:00:00	27	60	3	0	1	90	18	5	26	0	0	49	18	40	8	0	0	66	1	3	41	0	0	45	250
11:15:00	35	66	0	0	0	101	9	8	18	0	0	35	22	44	12	0	0	78	0	10	19	0	0	29	243
11:30:00	21	43	3	0	2	67	9	12	31	0	0	52	28	33	13	0	0	74	0	8	23	0	0	31	224
11:45:00	24	54	5	0	1	83	13	7	24	0	0	44	27	48	14	0	0	89	0	10	20	0	1	30	246
Hourly	107	223	11	0	4	341	49	32	99	0	0	180	95	165	47	0	0	307	1	31	103	0	1	135	963
12:00:00	23	66	0	0	1	89	11	9	28	0	0	48	23	43	15	0	0	81	0	10	33	0	0	43	261
12:15:00	36	56	2	0	0	94	16	22	21	0	0	59	23	60	19	0	0	102	2	13	23	0	0	38	293
12:30:00	32	46	3	0	0	81	17	8	35	0	0	60	24	42	15	0	0	81	0	9	35	0	2	44	266
12:45:00	21	51	1	0	0	73	7	9	30	0	0	46	31	40	17	0	0	88	1	8	28	0	1	37	244
Hourly	112	219	6	0	1	337	51	48	114	0	0	213	101	185	66	0	0	352	3	40	119	0	3	162	1064
13:00:00	25	51	3	0	0	79	17	9	31	0	0	57	34	46	18	0	0	98	1	10	34	0	0	45	279
13:15:00	26	58	2	0	1	86	12	6	28	0	0	46	32	50	11	0	0	93	2	5	22	0	0	29	254
13:30:00	34	58	0	0	0	92	12	23	27	0	0	62	33	56	16	0	0	105	0	10	21	0	1	31	290
13:45:00	24	39	1	0	0	64	11	7	29	0	0	47	29	66	15	0	0	110	1	5	23	0	0	29	250
Hourly	109	206	6	0	1	321	52	45	115	0	0	212	128	218	60	0	0	406	4	30	100	0	1	134	1073
***BREAK	***	,																							
15:00:00	38	56	2	0	0	96	13	16	43	0	0	72	34	95	25	0	0	154	1	2	27	0	0	30	352
15:15:00	47	53	3	0	0	103	19	21	58	0	0	98	73	98	20	0	0	191	3	12	22	0	0	37	429
15:30:00	51	69	4	0	3	124	10	21	37	0	0	68	62	105	25	0	0	192	2	9	31	0	0	42	426
15:45:00	48	70	1	0	3	119	11	11	54	0	0	76	53	103	35	0	0	191	2	20	59	0	0	81	467
Hourly	184	248	10	0	6	442	53	69	192	0	0	314	222	401	105	0	0	728	8	43	139	0	0	190	1674
	1										1														



Turning Movement Count Location Name: COLERAINE DR & KING ST Date: Tue, Sep 24, 2019 Deployment Lead: David Chu

16:00:00	58	72	5	0	0	135	9	17	61	0	0	87	73	173	49	0	0	295	2	10	32	0	0	44	561
16:15:00	48	60	0	0	0	108	9	19	50	0	0	78	46	129	41	0	0	216	0	20	35	0	0	55	457
16:30:00	43	57	4	0	0	104	18	19	62	0	0	99	86	180	36	0	0	302	4	8	36	0	0	48	553
16:45:00	64	64	2	0	1	130	12	29	50	0	0	91	64	151	26	0	0	241	4	9	40	0	0	53	515
Hourly	213	253	11	0	1	477	48	84	223	0	0	355	269	633	152	0	0	1054	10	47	143	0	0	200	2086
17:00:00	59	41	2	0	0	102	8	23	54	0	0	85	89	199	59	0	0	347	0	13	34	0	0	47	581
17:15:00	41	44	5	0	1	90	14	22	50	0	0	86	76	132	49	0	0	257	7	22	40	0	0	69	502
17:30:00	73	63	0	0	1	136	8	20	70	0	0	98	101	156	46	0	0	303	6	19	34	0	1	59	596
17:45:00	56	52	2	0	2	110	12	21	43	0	0	76	72	131	32	0	0	235	3	15	36	0	0	54	475
Hourly	229	200	9	0	4	438	42	86	217	0	0	345	338	618	186	0	0	1142	16	69	144	0	1	229	2154
Grand Total	1360	2422	58	0	22	3840	590	434	1328	0	0	2352	1270	2474	691	0	0	4435	55	422	1199	0	7	1676	12303
Approach%	35.4%	63.1%	1.5%	0%		-	25.1%	18.5%	56.5%	0%		-	28.6%	55.8%	15.6%	0%		-	3.3%	25.2%	71.5%	0%		-	-
Totals %	11.1%	19.7%	0.5%	0%		31.2%	4.8%	3.5%	10.8%	0%		19.1%	10.3%	20.1%	5.6%	0%		36%	0.4%	3.4%	9.7%	0%		13.6%	-
Heavy	51	369	5	0		-	29	14	54	0		-	22	357	23	0		-	2	13	16	0		-	-
Heavy %	3.8%	15.2%	8.6%	0%		-	4.9%	3.2%	4.1%	0%		-	1.7%	14.4%	3.3%	0%			3.6%	3.1%	1.3%	0%		-	-
Bicycles	0	1	0	0		-	0	0	0	0		-	0	1	0	0		-	0	1	0	0		-	-

,,



Turning Movement Count Location Name: COLERAINE DR & KING ST Date: Tue, Sep 24, 2019 Deployment Lead: David Chu

Peel Region

, ,

	Peak Hour: 07:00 AM - 08:00 AM W														w Clo	ouds	(13.1	3 °C)							
Chart Time			Sc	uthbou	nd				w	estbour	nd				N	orthbour	nd				I	Eastbour	d		Int. Total
Start Time	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	(15 min)
07:00:00	49	125	0	0	0	174	34	7	50	0	0	91	7	44	11	0	0	62	3	33	67	0	0	103	430
07:15:00	55	131	2	0	0	188	36	6	47	0	0	89	9	38	9	0	0	56	0	18	41	0	0	59	392
07:30:00	48	135	0	0	0	183	31	5	53	0	0	89	17	38	14	0	0	69	3	14	68	0	0	85	426
07:45:00	66	173	0	0	0	239	40	8	51	0	0	99	6	35	12	0	0	53	0	24	74	0	1	98	489
Grand Total	218	564	2	0	0	784	141	26	201	0	0	368	39	155	46	0	0	240	6	89	250	0	1	345	1737
Approach%	27.8%	71.9%	0.3%	0%			38.3%	7.1%	54.6%	0%			16.3%	64.6%	19.2%	0%			1.7%	25.8%	72.5%	0%			-
Totals %	12.6%	32.5%	0.1%	0%		45.1%	8.1%	1.5%	11.6%	0%		21.2%	2.2%	8.9%	2.6%	0%		13.8%	0.3%	5.1%	14.4%	0%		19.9%	-
PHF	0.83	0.82	0.25	0		0.82	0.88	0.81	0.95	0		0.93	0.57	0.88	0.82	0		0.87	0.5	0.67	0.84	0		0.84	-
Heavy	17	57	0	0		74	2	3	4	0		9	2	44	4	0		50	1	5	2	0		8	-
Heavy %	7.8%	10.1%	0%	0%		9.4%	1.4%	11.5%	2%	0%		2.4%	5.1%	28.4%	8.7%	0%		20.8%	16.7%	5.6%	0.8%	0%		2.3%	
Lights	201	507	2	0		710	139	23	197	0		359	37	111	42	0		190	5	84	248	0		337	-
Lights %	92.2%	89.9%	100%	0%		90.6%	98.6%	88.5%	98%	0%		97.6%	94.9%	71.6%	91.3%	0%		79.2%	83.3%	94.4%	99.2%	0%		97.7%	-
Single-Unit Trucks	3	32	0	0		35	1	0	0	0		1	1	26	3	0		30	0	0	0	0		0	-
Single-Unit Trucks %	1.4%	5.7%	0%	0%		4.5%	0.7%	0%	0%	0%		0.3%	2.6%	16.8%	6.5%	0%		12.5%	0%	0%	0%	0%		0%	-
Buses	14	5	0	0		19	1	3	4	0		8	1	1	1	0		3	1	5	2	0		8	-
Buses %	6.4%	0.9%	0%	0%		2.4%	0.7%	11.5%	2%	0%		2.2%	2.6%	0.6%	2.2%	0%		1.3%	16.7%	5.6%	0.8%	0%		2.3%	-
Articulated Trucks	0	20	0	0		20	0	0	0	0		0	0	17	0	0		17	0	0	0	0		0	-
Articulated Trucks %	0%	3.5%	0%	0%		2.6%	0%	0%	0%	0%		0%	0%	11%	0%	0%		7.1%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
Pedestrians%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	100%		-
Bicycles on Road	0	1	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	-
Bicycles on Road%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-


Peel Region

Start Time Southbound Northbound Left Thru Right UTurn Peds Approach Total Left Left Thru Right UTurn Peds Approach Total Left							
Start Time Left Thru Right UTurn Peds Approach Total Left Thru Right UTurn Peds Approach Total Left Thru Right UTurn Peds Approach Total Left					Eastbound	d	Int. Total
	Thru	Left	Left Th	hru Right	UTurn	Peds Approach Total	(15 min)
13:00:00 25 51 3 0 0 79 17 9 31 0 0 57 34 46 18 0 0 98 1	10	1	1 10	0 34	0	0 45	279
13:15:00 26 58 2 0 1 86 12 6 28 0 0 46 32 50 11 0 0 93 2	5	2	2 5	5 22	0	0 29	254
13:30:00 34 58 0 0 92 12 23 27 0 0 62 33 56 16 0 0 105 0	10	0	0 10	0 21	0	1 31	290
13:45:00 24 39 1 0 0 64 11 7 29 0 0 47 29 66 15 0 0 110 1	5	1	1 5	5 23	0	0 29	250
Grand Total 109 206 6 0 1 321 52 45 115 0 0 212 128 218 60 0 0 406 4	30	4	4 30	30 100	0	1 134	1073
Approach% 34% 64.2% 1.9% 0% - 24.5% 21.2% 54.2% 0% - 31.5% 53.7% 14.8% 0% - 3%	22.4%	3%	3% 22.4	.4% 74.6%	6 0%	-	-
Totals % 10.2% 19.2% 0.6% 0% 29.9% 4.8% 4.2% 10.7% 0% 19.8% 11.9% 20.3% 5.6% 0% 37.8% 0.4%	2.8%	0.4%	0.4% 2.8	8% 9.3%	0%	12.5%	-
PHF 0.8 0.89 0.5 0 0.87 0.76 0.49 0.93 0 0.85 0.94 0.83 0.83 0 0.92 0.5	0.75	0.5	0.5 0.7	.75 0.74	0	0.74	-
Heavy 5 50 0 0 55 3 0 4 0 7 2 48 3 0 53 0	0	0	0 0	0 0	0	0	
Heavy % 4.6% 24.3% 0% 0% 17.1% 5.8% 0% 3.5% 0% 3.3% 1.6% 22% 5% 0% 13.1% 0%	0%	0%	0% 0%	% 0%	0%	0%	
Lights 104 156 6 0 266 49 45 111 0 205 126 170 57 0 353 4	30	4	4 30	30 100	0	134	-
Lights % 95.4% 75.7% 100% 0% 82.9% 94.2% 100% 96.5% 0% 96.7% 98.4% 78% 95% 0% 86.9% 100%	100%	100%	100% 100	0% 100%	0%	100%	-
Single-Unit Trucks 3 34 0 37 3 0 1 0 4 1 27 3 0 31 0	0	0	0 0	0 0	0	0	-
Single-Unit Trucks % 2.8% 16.5% 0% 11.5% 5.8% 0% 0.9% 0% 1.9% 0.8% 12.4% 5% 0% 7.6% 0%	0%	0%	0% 0%	% 0%	0%	0%	-
Buses 2 1 0 0 3 0 0 3 0 3 1 2 0 0 3 0	0	0	0 0	0 0	0	0	-
Buses % 1.8% 0.5% 0% 0% 0.9% 0% 0% 0% 2.6% 0% 1.4% 0.8% 0.9% 0% 0% 0.7% 0%	0%	0%	0% 0%	% 0%	0%	0%	-
Articulated Trucks 0 15 0 0 0 0 19 0	0	0	0 0	0 0	0	0	-
Articulated Trucks % 0% 7.3% 0% 0% 4.7% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0%	0%	0%	0% 0%	% 0%	0%	. 0%	-
	-	-			-	1 -	-
Pedesinans%	-	-			-	0	-
Bicycles on Road%	-	-			-	0%	



Peel Region

	Peak Hour: 05:00 PM - 06:00 PM Weather: Broken Clouds (20.19 °C)																								
01			So	uthbou	nd				w	/estbour	nd				No	orthboui	nd				I	Eastbour	nd		Int. Total
Start Time	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	Left	Thru	Right	UTurn	Peds	Approach Total	(15 min)
17:00:00	59	41	2	0	0	102	8	23	54	0	0	85	89	199	59	0	0	347	0	13	34	0	0	47	581
17:15:00	41	44	5	0	1	90	14	22	50	0	0	86	76	132	49	0	0	257	7	22	40	0	0	69	502
17:30:00	73	63	0	0	1	136	8	20	70	0	0	98	101	156	46	0	0	303	6	19	34	0	1	59	596
17:45:00	56	52	2	0	2	110	12	21	43	0	0	76	72	131	32	0	0	235	3	15	36	0	0	54	475
Grand Total	229	200	9	0	4	438	42	86	217	0	0	345	338	618	186	0	0	1142	16	69	144	0	1	229	2154
Approach%	52.3%	45.7%	2.1%	0%		-	12.2%	24.9%	62.9%	0%		-	29.6%	54.1%	16.3%	0%		-	7%	30.1%	62.9%	0%		-	-
Totals %	10.6%	9.3%	0.4%	0%		20.3%	1.9%	4%	10.1%	0%		16%	15.7%	28.7%	8.6%	0%		53%	0.7%	3.2%	6.7%	0%		10.6%	-
PHF	0.78	0.79	0.45	0		0.81	0.75	0.93	0.78	0		0.88	0.84	0.78	0.79	0		0.82	0.57	0.78	0.9	0		0.83	-
Heavy	4	40	1	0		45	3	0	2	0		5	2	42	0	0		44	0	0	1	0		1	
Heavy %	1.7%	20%	11.1%	0%		10.3%	7.1%	0%	0.9%	0%		1.4%	0.6%	6.8%	0%	0%		3.9%	0%	0%	0.7%	0%		0.4%	-
Lights	225	160	8	0		393	39	86	215	0		340	336	576	186	0		1098	16	69	143	0		228	-
Lights %	98.3%	80%	88.9%	0%		89.7%	92.9%	100%	99.1%	0%		98.6%	99.4%	93.2%	100%	0%		96.1%	100%	100%	99.3%	0%		99.6%	-
Single-Unit Trucks	3	15	1	0		19	3	0	2	0		5	1	31	0	0		32	0	0	0	0		0	-
Single-Unit Trucks %	1.3%	7.5%	11.1%	0%		4.3%	7.1%	0%	0.9%	0%		1.4%	0.3%	5%	0%	0%		2.8%	0%	0%	0%	0%		0%	-
Buses	1	1	0	0		2	0	0	0	0		0	1	0	0	0		1	0	0	1	0		1	-
Buses %	0.4%	0.5%	0%	0%		0.5%	0%	0%	0%	0%		0%	0.3%	0%	0%	0%		0.1%	0%	0%	0.7%	0%		0.4%	-
Articulated Trucks	0	24	0	0		24	0	0	0	0		0	0	11	0	0		11	0	0	0	0		0	-
Articulated Trucks %	0%	12%	0%	0%		5.5%	0%	0%	0%	0%		0%	0%	1.8%	0%	0%		1%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
Pedestrians%	-	-	-	-	80%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	20%		-
Bicycles on Hoad	U	U	U	U	09/	-	U	U	U	U	0	-	U	U	U	U	U OV	-	U	1	U	U	08/	-	-
bicycles off hoad %	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-













		REGIONAL MUN	IICIPAL	ITY OF F	PEEL							
		Traffic Signal	Timing Pa	rameters								
Database	Date	December 8, 2020			Pre	pared Date	Γ	December 9, 2	020			
Database	Rev	iNET			Cor	npleted By		JP				
Timing Ca	rd / Field rev	-			C	hecked By		MA				
Location	King Sti	eet West/Harvest M	oon at Co	oon at Coleraine Drive/Emil Kolb Parkway								
Phase	Street Name - Direction	Vehicle	Pede Minim	estrian um (s)	Amber	All Red	T (Gre	IME PERIOD en+Amber+A	(s) II Red)			
#	Offeet Name - Direction	Minimum (s)		iuiii (0)	(s)	(s)	AM	OFF	PM			
			WALK	FDWALK			SPLITS	SPLITS	SPLITS			
1	Emil Kolb Parkway- NB PP LT	5	0	0	3	0	11	10	22			
2	Coleraine Drive - SB	8	8	23	4	2.6	40	45	38			
3	Not in use	-	-	-	-	-	-	-	-			
4	Harvest Moon Road - WB	8	8	27	4	3.1	59	55	60			
5	Coleraine Drive - SB PP LT	5	0	0	3	0	11	10	12			
6	Emil Kolb Parkway- NB	8	8	23	4	2.6	40	45	48			
7	Harvest Moon Road - WB PP LT	5	0	0	3	0	10	10	10			
8	King Street West - EB	8	8 8 27 4 3.1					45	50			
	System Control		TIME	(M-F)	PEAK	CYCLE LI	ENGTH (s)	OFFSET (s)				
	Yes		06:00 ·	- 09:00	AM	1	10	0				
	Semi-Actuated Mode			09:00 -	- 15:00	OFF	1	10	0			
Yes					- 19:00	PM	1:	20	0			

Appendix D – Existing Traffic Assessment

	-	\mathbf{i}	•	-	•	•	t	1	×	Ļ	
Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
Lane Group Flow (vph)	104	272	153	28	218	42	168	50	213	639	
v/c Ratio	0.32	0.62	0.29	0.05	0.31	0.11	0.29	0.13	0.45	0.59	
Control Delay	24.3	16.0	12.8	13.7	3.9	10.0	21.0	1.7	14.0	17.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	24.3	16.0	12.8	13.7	3.9	10.0	21.0	1.7	14.0	17.9	
Queue Length 50th (m)	9.1	8.8	8.6	1.7	0.0	2.3	8.0	0.0	14.2	26.6	
Queue Length 95th (m)	25.0	33.6	25.0	7.5	12.7	7.9	17.1	1.9	34.1	49.1	
Internal Link Dist (m)	244.3			279.6			122.1			104.4	
Turn Bay Length (m)		45.0	115.0		100.0	60.0		70.0	150.0		
Base Capacity (vph)	1288	1228	537	1532	1451	435	1664	915	471	1845	
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	0.08	0.22	0.28	0.02	0.15	0.10	0.10	0.05	0.45	0.35	
Intersection Summary											

-		-	
		0	
3° L'OIEraine L'Irive/P	-mil koin Parkwav	& Harvest Woon Lirive/Ki	na Street West
			0

	≯	-	\mathbf{r}	1	-	*	1	1	1	1	Ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		र्स	1	5	•	1	5	^	1	5	± the second s	
Traffic Volume (vph)	6	89	250	141	26	201	39	155	46	218	564	2
Future Volume (vph)	6	89	250	141	26	201	39	155	46	218	564	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.1	7.1	3.0	7.1	7.1	3.0	6.6	6.6	3.0	6.6	
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.91	0.91	
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)		1774	1599	1787	1696	1583	1719	2820	1482	1521	3139	
Flt Permitted		0.98	1.00	0.54	1.00	1.00	0.40	1.00	1.00	0.53	0.94	
Satd. Flow (perm)		1739	1599	1018	1696	1583	720	2820	1482	849	2971	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	97	272	153	28	218	42	168	50	237	613	2
RTOR Reduction (vph)	0	0	140	0	0	141	0	0	38	0	0	0
Lane Group Flow (vph)	0	104	132	153	28	77	42	168	12	213	639	0
Heavy Vehicles (%)	17%	6%	1%	1%	12%	2%	5%	28%	9%	8%	10%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)		10.9	10.9	20.9	20.9	20.9	16.4	13.8	13.8	24.9	24.9	
Effective Green, g (s)		10.9	10.9	20.9	20.9	20.9	16.4	13.8	13.8	24.9	24.9	
Actuated g/C Ratio		0.18	0.18	0.35	0.35	0.35	0.28	0.23	0.23	0.42	0.42	
Clearance Time (s)		7.1	7.1	3.0	7.1	7.1	3.0	6.6	6.6	3.0	6.6	
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	292	448	595	556	242	654	343	446	1266	
v/s Ratio Prot				c0.04	0.02		0.01	0.06		0.06	c0.07	
v/s Ratio Perm		0.06	c0.08	0.08		0.05	0.04		0.01	0.13	c0.14	
v/c Ratio		0.33	0.45	0.34	0.05	0.14	0.17	0.26	0.03	0.48	0.50	
Uniform Delay, d1		21.1	21.6	13.8	12.7	13.2	16.0	18.7	17.7	11.8	12.8	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.6	1.1	0.5	0.0	0.1	0.3	0.2	0.0	0.8	0.3	
Delay (s)		21.7	22.7	14.2	12.8	13.3	16.3	18.9	17.7	12.6	13.1	
Level of Service		С	С	В	В	В	В	В	В	В	В	
Approach Delay (s)		22.5			13.6			18.2			13.0	
Approach LOS		С			В			В			В	
Intersection Summary												
HCM 2000 Control Delay			15.7	Н	CM 2000	Level of	Service		В			
HCM 2000 Volume to Capacity	y ratio		0.50									
Actuated Cycle Length (s)			59.5	S	um of los	t time (s)			19.7			
Intersection Capacity Utilizatio	n		56.2%	IC	CU Level	of Service	9		В			
Analysis Period (min)			15									
c Critical Lane Group												

	-	\mathbf{r}	1	-	•	1	1	1	1	Ŧ	
Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
Lane Group Flow (vph)	92	157	46	93	236	367	672	202	129	347	
v/c Ratio	0.33	0.40	0.12	0.20	0.41	0.47	0.54	0.28	0.33	0.60	
Control Delay	28.5	8.8	15.3	18.8	5.4	10.1	19.1	4.2	11.0	17.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	28.5	8.8	15.3	18.8	5.4	10.1	19.1	4.2	11.0	17.4	
Queue Length 50th (m)	10.1	0.0	3.5	8.1	0.0	23.1	36.4	0.0	7.6	12.4	
Queue Length 95th (m)	24.9	15.0	10.9	20.3	14.8	44.6	58.3	13.0	17.9	22.4	
Internal Link Dist (m)	244.3			279.6			122.1			104.4	
Turn Bay Length (m)		45.0	115.0		100.0	60.0		70.0	150.0		
Base Capacity (vph)	1294	1232	392	1659	1426	836	2428	1218	430	1258	
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	0.13	0.12	0.06	0.17	0.44	0.28	0.17	0.30	0.28	
Intersection Summary											

	· • • • • • •	
3: Coleraine Drive/Emil Kolb Park	wav & Harvest M	loon Drive/King Street West
		<u> </u>

	≯	-	\mathbf{r}	•	-	•	1	1	1	1	Ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		र्स	1	ሻ	•	1	5	^	1	7		
Traffic Volume (vph)	16	69	144	42	86	217	338	618	186	229	200	9
Future Volume (vph)	16	69	144	42	86	217	338	618	186	229	200	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.1	7.1	3.0	7.1	7.1	3.0	6.6	6.6	3.0	6.6	
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.91	0.91	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	
Satd. Flow (prot)		1883	1599	1687	1900	1599	1787	3374	1615	1610	2982	
Flt Permitted		0.91	1.00	0.53	1.00	1.00	0.54	1.00	1.00	0.40	0.65	
Satd. Flow (perm)		1734	1599	943	1900	1599	1008	3374	1615	672	1976	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	75	157	46	93	236	367	672	202	249	217	10
RTOR Reduction (vph)	0	0	132	0	0	173	0	0	130	0	1	0
Lane Group Flow (vph)	0	92	25	46	93	63	367	672	72	129	346	0
Heavy Vehicles (%)	0%	0%	1%	7%	0%	1%	1%	7%	0%	2%	20%	11%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)		9.6	9.6	16.2	16.2	16.2	31.1	21.8	21.8	19.1	19.1	
Effective Green, g (s)		9.6	9.6	16.2	16.2	16.2	31.1	21.8	21.8	19.1	19.1	
Actuated g/C Ratio		0.16	0.16	0.27	0.27	0.27	0.51	0.36	0.36	0.31	0.31	
Clearance Time (s)		7.1	7.1	3.0	7.1	7.1	3.0	6.6	6.6	3.0	6.6	
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)		272	251	294	504	424	709	1205	577	307	722	
v/s Ratio Prot				0.01	c0.05		c0.13	c0.20		0.04	0.05	
v/s Ratio Perm		c0.05	0.02	0.03		0.04	0.13		0.04	0.09	0.10	
v/c Ratio		0.34	0.10	0.16	0.18	0.15	0.52	0.56	0.13	0.42	0.48	
Uniform Delay, d1		22.9	22.0	17.0	17.3	17.1	9.2	15.7	13.2	15.6	16.9	
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	0.2	0.2	0.2	0.2	0.6	0.6	0.1	0.9	0.5	
Delay (s)		23.6	22.2	17.2	17.5	17.3	9.9	16.3	13.3	16.6	17.4	
Level of Service		С	С	В	В	В	А	В	В	В	В	
Approach Delay (s)		22.7			17.3			13.9			17.2	
Approach LOS		С			В			В			В	
Intersection Summary												
HCM 2000 Control Delay			16.1	Н	CM 2000	Level of	Service		В			
HCM 2000 Volume to Capacity	ratio		0.50									
Actuated Cycle Length (s)			61.0	S	um of los	t time (s)			19.7			
Intersection Capacity Utilization	า		56.2%	IC	CU Level	of Service)		В			
Analysis Period (min)			15									
c Critical Lane Group												

Appendix E – Terms of Reference

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

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



NextEng Consulting Group Inc.

Terms of Reference

То:	Shan Rosalie, Region of Peel
From:	Kristian Aviles, Transportation Analyst, NexTrans Consulting Engineers
Date:	December 2, 2020
Re:	Harvest Moon Drive and Emil Kolb Parkway, Proposed Mixed Use / Residential Development – TOR for Transportation Impact and Parking Justification Study

These terms of reference have been prepared to outline (for the Region's review and approval) the intended scope of work for a transportation impact and parking justification study for a proposed mixed use / residential development with 97.15 m² GFA for retail uses and 40 dwelling units. The subject site is located on the western quadrant of the Harvest Moon Drive / King Street West and Emil Kolb Parkway / Coleraine Drive intersection, in the Town of Caledon, Ontario.

Introduction

The report introduction will include:

- 1. Description of site location
- 2. Description of nature of application
- 3. Description of proposed development and land use
- 4. Proposed study area

Access to the site is envisioned through one (1) full movement entrance, which is provided onto Harvest Moon Drive to the south.

Existing Traffic Assessment

The existing conditions within the study area will be summarized and documented. This will include, but not limited to:

- A description of key roads and intersections (lanes, speed limits)
- Identifying forms of traffic control, lane configurations, turning restrictions
- Identifying pedestrian and cycling facilities
- Noting the location of adjacent driveways and access points
- Identifying other traffic generators in the vicinity of the site

Turning movement counts will be requested from the Town / Region during the weekday AM (7 AM - 10 AM) and weekday PM (4 PM - 7 PM) peak periods at the following study area intersection:

• Harvest Moon Drive / King Street West and Emil Kolb Parkway / Coleraine Drive

Once traffic volumes have been collected, we will prepare a baseline model of existing traffic operations at the study area intersections using Synchro v.10 analysis for the identified critical time periods (weekday AM and PM peak hours). The existing analysis will include levels of service, volume to capacity ratios, and queuing at the key study intersections.

Future Background Traffic Assessment

Future Background consists of background growth and other background development traffic. We will apply a 2% growth rate to existing traffic data for the assumed full build-out year for the proposed development along with a 5-year time horizon period thereafter.

We do understand that there is and may be further redevelopment applications, as such traffic generation associated with those developments will be included in our analysis to reflect our horizon year assessment.

Operational deficiencies as a result of future forecasted traffic volumes will be identified and mitigative measures will be proposed and documented in the final report.

Site Traffic Assessment

The weekday AM and PM peak hour traffic to be generated by the proposed development will be estimated based on information published in the *Trip Generation*, 10th Edition, by the Institute of Transportation Engineers (ITE).

The directional trip distribution and assignment for traffic approaching and departing the site will be determined based upon existing traffic patterns and Transportation Tomorrow Survey (TTS) 2016 data.

Future Total Traffic Assessment

Future total traffic consists of future background plus site traffic. Operational deficiencies as a result of site traffic will be identified and mitigative measures will be proposed and documented in the final report. We will develop and recommend appropriate intersection controls and geometric improvements for all key intersections as well as determine the appropriateness of the proposed site access location(s) and the lane requirements at these new locations.

Parking Justification / On Site Circulation and Site Access Review

- Review the available parking to determine whether the proposed parking supply is sufficient to accommodate the parking demand of the proposed site and meets current by-law requirements.
- We will review and provide comment on the most recent site plan with respect to the functionality of the internal vehicular circulation to facilitate vehicle maneuvering, loading, servicing, parking and pick-up / drop-off activities.
- Using Auto TURN, we will confirm the turning radius requirements and site circulation for passenger and heavy vehicles.
- Determine the appropriateness of access location and ensure adequate connections to main corridors are provided.
- Assign appropriate internal signage to site plan.
- Sight distances in accordance with the TAC Manual to be prepared.

Transit and Transportation Demand Management Plan

A review of the existing and future transit availability in the area and recommendations shall be made to ensure acceptable walking distances are proposed to the subject lands. Transit routes, service frequencies, and stations will be identified in the study area.

Appendix F – Future Background Traffic Assessment (2023)

	-	\mathbf{i}	•	-	•	•	t	1	×	Ļ	
Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
Lane Group Flow (vph)	109	272	153	30	218	42	178	50	213	677	
v/c Ratio	0.33	0.63	0.29	0.05	0.31	0.11	0.29	0.12	0.45	0.64	
Control Delay	25.1	17.5	13.4	14.4	3.9	10.0	20.7	1.5	14.1	19.3	
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	17.5	13.4	14.4	3.9	10.0	20.7	1.5	14.1	19.3	
Queue Length 50th (m)	10.5	10.9	9.9	2.1	0.0	2.3	8.6	0.0	14.6	29.2	
Queue Length 95th (m)	26.6	36.1	25.9	8.1	13.0	8.0	18.2	1.8	34.9	53.5	
Internal Link Dist (m)	244.3			279.6			122.1			104.4	
Turn Bay Length (m)		45.0	115.0		100.0	60.0		70.0	150.0		
Base Capacity (vph)	1254	1197	530	1491	1418	430	1620	893	471	1841	
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	0.23	0.29	0.02	0.15	0.10	0.11	0.06	0.45	0.37	
Intersection Summary											

-		•	•	
3: Coleraine Driv	ve/Emil Kolb Pa	rkway	& Harvest Mod	on Drive/King Street West

	≯	-	\mathbf{r}	1	-	•	1	1	1	1	Ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		ર્સ	1	ሻ	•	1	ሻ	44	1	5	± ↑	
Traffic Volume (vph)	6	94	250	141	28	201	39	164	46	218	599	2
Future Volume (vph)	6	94	250	141	28	201	39	164	46	218	599	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.1	7.1	3.0	7.1	7.1	3.0	6.6	6.6	3.0	6.6	
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.91	0.91	
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)		1775	1599	1787	1696	1583	1719	2820	1482	1521	3140	
Flt Permitted		0.98	1.00	0.54	1.00	1.00	0.38	1.00	1.00	0.53	0.94	
Satd. Flow (perm)		1742	1599	1021	1696	1583	693	2820	1482	848	2972	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	102	272	153	30	218	42	178	50	237	651	2
RTOR Reduction (vph)	0	0	130	0	0	141	0	0	38	0	0	0
Lane Group Flow (vph)	0	109	142	153	30	77	42	178	12	213	677	0
Heavy Vehicles (%)	17%	6%	1%	1%	12%	2%	5%	28%	9%	8%	10%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)		11.3	11.3	21.4	21.4	21.4	18.5	14.5	14.5	25.6	25.6	
Effective Green, g (s)		11.3	11.3	21.4	21.4	21.4	18.5	14.5	14.5	25.6	25.6	
Actuated g/C Ratio		0.19	0.19	0.35	0.35	0.35	0.30	0.24	0.24	0.42	0.42	
Clearance Time (s)		7.1	7.1	3.0	7.1	7.1	3.0	6.6	6.6	3.0	6.6	
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)		324	297	449	597	558	278	673	354	447	1275	
v/s Ratio Prot				c0.04	0.02		0.01	0.06		0.06	c0.07	
v/s Ratio Perm		0.06	c0.09	0.08		0.05	0.04		0.01	0.14	c0.15	
v/c Ratio		0.34	0.48	0.34	0.05	0.14	0.15	0.26	0.03	0.48	0.53	
Uniform Delay, d1		21.4	22.1	14.0	13.0	13.4	15.0	18.8	17.7	11.9	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		0.6	1.2	0.5	0.0	0.1	0.3	0.2	0.0	0.8	0.4	
Delay (s)		22.1	23.3	14.5	13.0	13.5	15.3	19.0	17.8	12.7	13.5	
Level of Service		С	С	В	В	В	В	В	В	В	В	
Approach Delay (s)		22.9			13.8			18.2			13.3	
Approach LOS		С			В			В			В	
Intersection Summary												
HCM 2000 Control Delay			16.0	Н	CM 2000	Level of	Service		В			
HCM 2000 Volume to Capacity	y ratio		0.52									
Actuated Cycle Length (s)			60.7	S	um of los	t time (s)			19.7			
Intersection Capacity Utilizatio	n		57.2%	IC	CU Level	of Service	9		В			
Analysis Period (min)			15									
c Critical Lane Group												

	-	\mathbf{r}	1	+	•	1	1	1	1	Ļ	
Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
Lane Group Flow (vph)	96	157	46	99	236	367	713	202	129	360	
v/c Ratio	0.34	0.40	0.12	0.21	0.41	0.47	0.56	0.28	0.33	0.61	
Control Delay	29.4	8.9	15.9	19.6	5.5	10.1	19.2	4.1	11.1	17.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	29.4	8.9	15.9	19.6	5.5	10.1	19.2	4.1	11.1	17.6	
Queue Length 50th (m)	10.8	0.0	3.6	8.9	0.0	23.5	39.6	0.0	7.9	13.1	
Queue Length 95th (m)	26.4	15.3	11.3	22.2	15.2	45.1	62.7	12.9	18.0	23.4	
Internal Link Dist (m)	244.3			279.6			122.1			104.4	
Turn Bay Length (m)		45.0	115.0		100.0	60.0		70.0	150.0		
Base Capacity (vph)	1268	1210	388	1635	1409	834	2378	1198	424	1218	
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	0.08	0.13	0.12	0.06	0.17	0.44	0.30	0.17	0.30	0.30	
Intersection Summary											

Frt

3: Coleraine Drive/Emil Kolb Parkwa	ay & Harvest Moon Drive/King Street West

٩ t ٭ \$ ٩ ۶ Ť ✓ € ┢ Movement EBL EBT EBR WBL NBT SBL WBT WBR NBL NBR SBT SBR Lane Configurations đ 7 ኘ ٦ ŧ۴ ۴ ٦ 4ħ Ŧ 1 Traffic Volume (vph) 16 73 144 42 91 217 338 656 186 229 212 9 Future Volume (vph) 16 73 144 42 91 338 186 229 212 9 217 656 Ideal Flow (vphpl) 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 Total Lost time (s) 7.1 7.1 3.0 7.1 7.1 3.0 6.6 6.6 3.0 6.6 Lane Util. Factor 1.00 1.00 1.00 1.00 1.00 1.00 0.95 1.00 0.91 0.91 1.00 0.85 1.00 1.00 0.85 1.00 1.00 0.85 1.00 1.00 0.99 0.98 Flt Protected 1.00 0.95 1.00 1.00 0.95 1.00 0.95 1.00 Satd. Flow (prot) 1883 1599 1687 1900 1599 1787 3374 1615 1610 2978 Flt Permitted 0.91 1.00 0.53 1.00 1.00 0.53 1.00 1.00 0.38 0.64 Satd. Flow (perm) 1737 1599 945 1900 1599 994 3374 1615 645 1950 Peak-hour factor, PHF 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 Adj. Flow (vph) 17 79 157 46 99 236 367 713 202 249 230 10 RTOR Reduction (vph) 0 0 132 0 0 174 0 0 128 0 1 0 Lane Group Flow (vph) 0 96 25 46 99 62 367 713 74 129 359 0 Heavy Vehicles (%) 0% 0% 1% 7% 0% 1% 1% 0% 2% 20% 11% 7% Perm Perm Turn Type NA NA NA NA pm+pt Perm pm+pt Perm pm+pt Protected Phases 4 3 8 2 6 5 1 8 Permitted Phases 4 4 8 2 2 6 Actuated Green, G (s) 9.8 9.8 16.4 32.3 22.9 22.9 20.2 20.2 16.4 16.4 Effective Green, q (s) 9.8 9.8 22.9 20.2 16.4 16.4 16.4 32.3 22.9 20.2 0.32 Actuated g/C Ratio 0.16 0.16 0.26 0.26 0.26 0.52 0.37 0.37 0.32 Clearance Time (s) 7.1 7.1 3.0 7.1 7.1 3.0 6.6 6.6 3.0 6.6 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) 499 272 251 291 420 711 1238 592 307 736 v/s Ratio Prot 0.01 c0.05 c0.13 c0.21 0.04 0.05 v/s Ratio Perm c0.06 0.02 0.03 0.04 0.05 0.09 0.11 0.14 v/c Ratio 0.35 0.10 0.16 0.20 0.15 0.52 0.58 0.13 0.42 0.49 Uniform Delay, d1 23.5 22.5 17.5 17.9 16.9 17.6 9.1 15.9 13.1 15.5 1.00 Progression Factor 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 Incremental Delay, d2 0.8 0.2 0.3 0.2 0.2 0.6 0.7 0.1 0.9 0.5 Delay (s) 24.3 22.7 17.8 9.8 13.2 16.4 17.5 17.8 18.1 16.5 Level of Service В С С В В А В В В В 17.9 17.2 Approach Delay (s) 23.3 14.1 Approach LOS В С В В

Intersection Summary				
HCM 2000 Control Delay	16.3	HCM 2000 Level of Service	В	
HCM 2000 Volume to Capacity ratio	0.51			
Actuated Cycle Length (s)	62.4	Sum of lost time (s)	19.7	
Intersection Capacity Utilization	56.2%	ICU Level of Service	В	
Analysis Period (min)	15			
c Critical Lane Group				

Appendix G – Future Background Traffic Assessment (2028)

	-	\mathbf{r}	1	+	•	1	Ť	1	1	Ļ	
Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
Lane Group Flow (vph)	120	272	153	33	218	42	198	50	213	744	
v/c Ratio	0.36	0.64	0.29	0.05	0.31	0.11	0.30	0.12	0.45	0.68	
Control Delay	26.5	19.8	14.4	15.4	4.1	10.2	20.7	1.3	14.1	20.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	26.5	19.8	14.4	15.4	4.1	10.2	20.7	1.3	14.1	20.3	
Queue Length 50th (m)	12.6	13.8	11.0	2.5	0.0	2.4	10.0	0.0	15.3	34.5	
Queue Length 95th (m)	30.2	41.2	27.7	9.1	13.5	8.2	20.3	1.6	35.7	61.4	
Internal Link Dist (m)	244.3			279.6			122.1			104.4	
Turn Bay Length (m)		45.0	115.0		100.0	60.0		70.0	150.0		
Base Capacity (vph)	1213	1154	524	1440	1377	418	1561	864	475	1770	
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	0.10	0.24	0.29	0.02	0.16	0.10	0.13	0.06	0.45	0.42	
Intersection Summary											

-		•	•	
3: Coleraine Driv	ve/Emil Kolb Pa	rkway	& Harvest Mod	on Drive/King Street West

	≯	-	\rightarrow	4	-	•	1	†	1	1	Ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		र्भ	1	ሻ	•	1	5	^	1	5	± the second s	
Traffic Volume (vph)	6	104	250	141	30	201	39	182	46	218	661	2
Future Volume (vph)	6	104	250	141	30	201	39	182	46	218	661	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.1	7.1	3.0	7.1	7.1	3.0	6.6	6.6	3.0	6.6	
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.91	0.91	
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)		1776	1599	1787	1696	1583	1719	2820	1482	1521	3140	
Flt Permitted		0.98	1.00	0.55	1.00	1.00	0.36	1.00	1.00	0.53	0.95	
Satd. Flow (perm)		1748	1599	1027	1696	1583	647	2820	1482	848	2972	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	113	272	153	33	218	42	198	50	237	718	2
RTOR Reduction (vph)	0	0	115	0	0	141	0	0	37	0	0	0
Lane Group Flow (vph)	0	120	157	153	33	77	42	198	13	213	744	0
Heavy Vehicles (%)	17%	6%	1%	1%	12%	2%	5%	28%	9%	8%	10%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)		12.2	12.2	22.3	22.3	22.3	20.3	16.3	16.3	27.4	27.4	
Effective Green, g (s)		12.2	12.2	22.3	22.3	22.3	20.3	16.3	16.3	27.4	27.4	
Actuated g/C Ratio		0.19	0.19	0.35	0.35	0.35	0.32	0.26	0.26	0.43	0.43	
Clearance Time (s)		7.1	7.1	3.0	7.1	7.1	3.0	6.6	6.6	3.0	6.6	
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)		336	307	446	596	556	274	725	381	452	1305	
v/s Ratio Prot				c0.04	0.02		0.01	0.07		0.06	c0.07	
v/s Ratio Perm		0.07	c0.10	0.08		0.05	0.04		0.01	0.14	c0.17	
v/c Ratio		0.36	0.51	0.34	0.06	0.14	0.15	0.27	0.03	0.47	0.57	
Uniform Delay, d1		22.2	22.9	14.6	13.6	14.0	15.0	18.8	17.6	12.0	13.6	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.7	1.4	0.5	0.0	0.1	0.3	0.2	0.0	0.8	0.6	
Delay (s)		22.9	24.4	15.1	13.6	14.1	15.3	19.0	17.7	12.8	14.2	
Level of Service		С	С	В	В	В	В	В	В	В	В	
Approach Delay (s)		23.9			14.5			18.2			13.9	
Approach LOS		С			В			В			В	
Intersection Summary												
HCM 2000 Control Delay			16.5	H	CM 2000	Level of	Service		В			
HCM 2000 Volume to Capacity	ratio		0.56									
Actuated Cycle Length (s)			63.4	S	um of los	t time (s)			19.7			
Intersection Capacity Utilization	n		58. 9 %	IC	CU Level	of Service	Э		В			
Analysis Period (min)			15									
c Critical Lane Group												

	-	\mathbf{r}	1	-	•	1	Ť	1	×	Ŧ	
Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
Lane Group Flow (vph)	105	157	46	110	236	367	787	202	132	381	
v/c Ratio	0.37	0.40	0.12	0.24	0.42	0.47	0.59	0.27	0.35	0.62	
Control Delay	30.9	9.0	16.9	21.0	5.7	10.1	19.6	3.9	11.3	18.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	30.9	9.0	16.9	21.0	5.7	10.1	19.6	3.9	11.3	18.1	
Queue Length 50th (m)	12.6	0.0	3.9	10.7	0.0	24.3	46.1	0.0	8.3	14.4	
Queue Length 95th (m)	29.3	15.5	11.8	25.1	15.5	46.0	71.5	12.7	18.7	25.3	
Internal Link Dist (m)	244.3			279.6			122.1			104.4	
Turn Bay Length (m)		45.0	115.0		100.0	60.0		70.0	150.0		
Base Capacity (vph)	1224	1168	379	1593	1379	828	2284	1158	413	1151	
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	0.13	0.12	0.07	0.17	0.44	0.34	0.17	0.32	0.33	
Intersection Summary											

2: Coloraina Driva/Emil Kalh Parkwa	8 Harvoet Moon Drive/King Street West

	≯	-	$\mathbf{\hat{z}}$	4	-	*	1	Ť	1	1	ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		र्स	1	ሻ	•	1	5	^	1	5	At≽	
Traffic Volume (vph)	16	81	144	42	101	217	338	724	186	229	234	9
Future Volume (vph)	16	81	144	42	101	217	338	724	186	229	234	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.1	7.1	3.0	7.1	7.1	3.0	6.6	6.6	3.0	6.6	
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.91	0.91	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	
Satd. Flow (prot)		1885	1599	1687	1900	1599	1787	3374	1615	1610	2970	
Flt Permitted		0.92	1.00	0.53	1.00	1.00	0.52	1.00	1.00	0.35	0.63	
Satd. Flow (perm)		1746	1599	948	1900	1599	974	3374	1615	600	1910	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	88	157	46	110	236	367	787	202	249	254	10
RTOR Reduction (vph)	0	0	132	0	0	175	0	0	124	0	1	0
Lane Group Flow (vph)	0	105	25	46	110	61	367	787	78	132	380	0
Heavy Vehicles (%)	0%	0%	1%	7%	0%	1%	1%	7%	0%	2%	20%	11%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)		10.3	10.3	16.9	16.9	16.9	34.4	25.0	25.0	22.1	22.1	
Effective Green, g (s)		10.3	10.3	16.9	16.9	16.9	34.4	25.0	25.0	22.1	22.1	
Actuated g/C Ratio		0.16	0.16	0.26	0.26	0.26	0.53	0.38	0.38	0.34	0.34	
Clearance Time (s)		7.1	7.1	3.0	7.1	7.1	3.0	6.6	6.6	3.0	6.6	
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)		276	253	287	494	415	711	1297	621	303	753	
v/s Ratio Prot				0.01	c0.06		c0.12	c0.23		0.04	0.05	
v/s Ratio Perm		c0.06	0.02	0.03		0.04	0.15		0.05	0.11	0.12	
v/c Ratio		0.38	0.10	0.16	0.22	0.15	0.52	0.61	0.13	0.44	0.50	
Uniform Delay, d1		24.5	23.4	18.4	18.9	18.5	9.1	16.1	12.9	15.4	17.1	
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		0.9	0.2	0.3	0.2	0.2	0.6	0.8	0.1	1.0	0.5	
Delay (s)		25.4	23.6	18.6	19.1	18.7	9.7	16.9	13.0	16.4	17.6	
Level of Service		С	С	В	В	В	А	В	В	В	В	
Approach Delay (s)		24.3			18.8			14.4			17.3	
Approach LOS		С			В			В			В	
Intersection Summary												
HCM 2000 Control Delay			16.7	H	CM 2000	Level of	Service		В			
HCM 2000 Volume to Capacity	ratio		0.53									
Actuated Cycle Length (s)			65.0	S	um of los	t time (s)			19.7			
Intersection Capacity Utilization	n		57.7%	IC	CU Level	of Service	9		В			
Analysis Period (min)			15									
c Critical Lane Group												

Appendix H – 2016 TTS Data for Ward 4 (Town of Caledon)

malatest



Kilometers

WARD 4

HOUSEHOLD CHARACTERISTICS																		
	Dwelling Type Household Size						Number of Available Vehicles Household Averages											
Households	House	Townhouse	Apartment	1	2	3	4	5+	0	1	2	3	4+	Persons	Workers	Drivers	Vehicles	Trips/Day
4,700	94%	5%	1%	10%	33%	17%	25%	15%	1%	16%	43%	25%	15%	3.2	2.0	2.4	2.5	6.4

						POP	ULATIC	ON CHA	ARACT	ERISTICS						
				Age					L.		Em	ployment T	уре			
Population		5	5	5	4		edian	Daily Trips per Person (age 11+)	v Work Trips pe Worker	Population	Full Time	Part Time	At Home	Student	Licensed	Transit Pass
	-10	6-25 6-27 1-11 6-45 6-45 6-45 6-64 6-64 6-64 6-64 6-64					1ed	Pe	aily	Male						
	0	1	1	2	4	9	2			7,300	49%	8%	4%	24%	78%	3%
												Fe	emale			
14,900	10%	9%	14%	23%	30%	14%	41.7	2.2	0.72	7,600	36%	9%	7%	25%	72%	4%

	TRIPS MADE BY RESIDENTS OF TOWN OF CALEDON - WARD 4															
Timo		0/		Trip I	Purpose				Mode o	of Travel			Ν	/ledian Trip	Length (km)
Period	Trips	% 24hr	HB-W	HB-S	HB-D	N-HB	Driver	Pass.	Transit	GO Train	Walk & Cycle	Other	Driver	Pass.	Transit	GO Train
6-9 AM	7,600	25.6%	53%	21%	17%	9%	72%	11%	*	0%	1%	14%	21.3	29.4	*	48.7
24 Hrs	29,900		36%	14%	35%	15%	79%	12%	1%	0%	1%	7%	16.7	15.0	19.9	48.7

	TRIPS MADE TO TOWN OF CALEDON - WARD 4 - BY RESIDENTS OF THE TTS AREA																		
Time % 24 Trip Purpose								Mode of Travel							Median Trip Length (km)				
Period	Trips	% 24 hr	Work	School	Home	Other	Driver	Pass.	Transit	GO Train	Walk & Cycle	Other	Driver	Pass.	Transit	GO Train			
6-9 AM	3,500	18.1%	45%	37%	5%	13%	60%	11%	*	*	9%	21%	18.6	9.5	*	*			
24 Hrs	19,400		14%	7%	66%	13%	75%	12%	*	0%	3%	9%	16.6	12.6	*	48.7			

Appendix I – Future Total Traffic Assessment (2023)

	-	\mathbf{i}	•	-	•	•	t	-	× -	Ļ	
Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
Lane Group Flow (vph)	116	276	153	32	218	43	178	50	213	678	
v/c Ratio	0.35	0.63	0.29	0.05	0.31	0.11	0.29	0.12	0.45	0.64	
Control Delay	25.5	17.7	13.5	14.4	3.9	10.2	20.8	1.5	14.2	19.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	25.5	17.7	13.5	14.4	3.9	10.2	20.8	1.5	14.2	19.4	
Queue Length 50th (m)	11.3	11.4	10.0	2.2	0.0	2.4	8.6	0.0	14.8	29.7	
Queue Length 95th (m)	28.1	37.4	26.0	8.5	13.0	8.2	18.3	1.8	35.2	54.2	
Internal Link Dist (m)	71.3			279.6			122.1			104.4	
Turn Bay Length (m)		45.0	115.0		100.0	60.0		70.0	150.0		
Base Capacity (vph)	1240	1191	530	1484	1412	429	1612	889	470	1829	
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	0.23	0.29	0.02	0.15	0.10	0.11	0.06	0.45	0.37	
Intersection Summary											

-		•	•		
3: Coleraine	Drive/Emil Kolb P	arkway	& Harvest	Moon Drive/King	Street West

	≯	-	\mathbf{r}	•	-	*	1	t	1	1	ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		र्स	1	ሻ	•	1	5	44	1	5	-at+	
Traffic Volume (vph)	8	98	254	141	29	201	40	164	46	218	599	3
Future Volume (vph)	8	98	254	141	29	201	40	164	46	218	599	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.1	7.1	3.0	7.1	7.1	3.0	6.6	6.6	3.0	6.6	
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.91	0.91	
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)		1771	1599	1787	1696	1583	1719	2820	1482	1521	3139	
Flt Permitted		0.97	1.00	0.54	1.00	1.00	0.38	1.00	1.00	0.53	0.94	
Satd. Flow (perm)		1730	1599	1018	1696	1583	692	2820	1482	849	2971	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	107	276	153	32	218	43	178	50	237	651	3
RTOR Reduction (vph)	0	0	130	0	0	141	0	0	38	0	0	0
Lane Group Flow (vph)	0	116	146	153	32	77	43	178	12	213	678	0
Heavy Vehicles (%)	17%	6%	1%	1%	12%	2%	5%	28%	9%	8%	10%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)		11.5	11.5	21.6	21.6	21.6	18.6	14.6	14.6	25.7	25.7	
Effective Green, g (s)		11.5	11.5	21.6	21.6	21.6	18.6	14.6	14.6	25.7	25.7	
Actuated g/C Ratio		0.19	0.19	0.35	0.35	0.35	0.30	0.24	0.24	0.42	0.42	
Clearance Time (s)		7.1	7.1	3.0	7.1	7.1	3.0	6.6	6.6	3.0	6.6	
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)		326	301	449	600	560	278	674	354	446	1274	
v/s Ratio Prot				c0.04	0.02		0.01	0.06		0.06	c0.07	
v/s Ratio Perm		0.07	c0.09	0.08		0.05	0.04		0.01	0.14	c0.15	
v/c Ratio		0.36	0.49	0.34	0.05	0.14	0.15	0.26	0.03	0.48	0.53	
Uniform Delay, d1		21.5	22.1	14.0	13.0	13.4	15.1	18.8	17.8	12.0	13.2	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.7	1.2	0.5	0.0	0.1	0.3	0.2	0.0	0.8	0.4	
Delay (s)		22.2	23.3	14.5	13.0	13.5	15.4	19.0	17.8	12.8	13.6	
Level of Service		С	С	В	В	В	В	В	В	В	В	
Approach Delay (s)		23.0			13.8			18.2			13.4	
Approach LOS		С			В			В			В	
Intersection Summary												
HCM 2000 Control Delay			16.1	H	CM 2000	Level of	Service		В			
HCM 2000 Volume to Capacity	y ratio		0.53									
Actuated Cycle Length (s)			61.0	S	um of los	t time (s)			19.7			
Intersection Capacity Utilizatio	n		57.4%	IC	U Level	of Service	9		В			
Analysis Period (min)			15									
c Critical Lane Group												

	۶	→	+	*	1	∢	
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		સ્	eî 🗧		Y		
Traffic Volume (veh/h)	1	350	69	3	10	6	
Future Volume (Veh/h)	1	350	69	3	10	6	
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)	1	380	75	3	11	7	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None	None				
Median storage veh)							
Upstream signal (m)			95				
pX, platoon unblocked							
vC, conflicting volume	78				458	76	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	78				458	76	
tC, single (s)	4.1				6.4	6.2	
tC, 2 stage (s)							
tF (s)	2.2				3.5	3.3	
p0 queue free %	100				98	99	
cM capacity (veh/h)	1533				564	990	
Direction, Lane #	EB 1	WB 1	SB 1				
Volume Total	381	78	18				
Volume Left	1	0	11				
Volume Right	0	3	7				
cSH	1533	1700	677				
Volume to Capacity	0.00	0.05	0.03				
Queue Length 95th (m)	0.0	0.0	0.7				
Control Delay (s)	0.0	0.0	10.5				
Lane LOS	А		В				
Approach Delay (s)	0.0	0.0	10.5				
Approach LOS			В				
Intersection Summary							
			0.4				
Intersection Canacity Litilization	n		20.4	IC		f Service	
Analysis Period (min)	///		15	iC			

	-	\mathbf{x}	•	-	•	•	t	-	× -	Ļ	
Lane Group	EBT	EBR	• WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
Lane Group Flow (vph)	103	159	46	102	236	372	713	202	129	365	
v/c Ratio	0.37	0.40	0.12	0.22	0.41	0.48	0.56	0.28	0.34	0.62	
Control Delay	29.8	8.8	15.9	19.6	5.5	10.3	19.4	4.1	11.3	18.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	29.8	8.8	15.9	19.6	5.5	10.3	19.4	4.1	11.3	18.1	
Queue Length 50th (m)	11.6	0.0	3.6	9.2	0.0	24.2	40.0	0.0	7.9	13.5	
Queue Length 95th (m)	28.0	15.3	11.3	22.7	15.1	46.6	63.5	13.0	18.3	24.1	
Internal Link Dist (m)	69.3			279.6			122.1			104.4	
Turn Bay Length (m)		45.0	115.0		100.0	60.0		70.0	150.0		
Base Capacity (vph)	1243	1203	389	1628	1404	829	2362	1191	421	1211	
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	0.08	0.13	0.12	0.06	0.17	0.45	0.30	0.17	0.31	0.30	
Intersection Summary											

3. Coleraine Drive/Emil Kolh Parkway	& Harvest Moon Drive/King Street West
J. COICIAINC DIVC/LINII KOID I AIKWA	

۶ ۰ t ٩ ۶ ↘ Ī € ┢ EBL EBT EBR WBL Movement WBT WBR NBL NBT NBR SBL SBT SBR Lane Configurations đ 7 ኘ ٦ 44 ۴ ٦ 4ħ Ŧ 1 Traffic Volume (vph) 19 75 146 42 94 217 14 342 656 186 229 212 Future Volume (vph) 19 75 146 42 94 342 186 229 212 14 217 656 1900 Ideal Flow (vphpl) 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 Total Lost time (s) 7.1 7.1 3.0 7.1 7.1 3.0 6.6 6.6 3.0 6.6 Lane Util. Factor 1.00 1.00 1.00 1.00 1.00 1.00 0.95 1.00 0.91 0.91 0.99 1.00 0.85 1.00 1.00 0.85 1.00 1.00 0.85 1.00 0.99 0.98 Flt Protected 1.00 0.95 1.00 1.00 0.95 1.00 0.95 1.00 Satd. Flow (prot) 1881 1599 1687 1900 1599 1787 3374 1615 1610 2973 Flt Permitted 0.90 1.00 0.53 1.00 1.00 0.53 1.00 1.00 0.38 0.65 Satd. Flow (perm) 1714 1599 945 1900 1599 989 3374 1615 645 1951 Peak-hour factor, PHF 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 Adj. Flow (vph) 21 82 159 46 102 236 372 713 202 249 230 15 RTOR Reduction (vph) 0 0 133 0 0 173 0 0 128 0 2 0 Lane Group Flow (vph) 0 103 26 46 102 63 372 713 74 129 363 0 Heavy Vehicles (%) 0% 0% 1% 7% 1% 0% 2% 20% 11% 0% 1% 7% Turn Type Perm Perm NA NA NA NA pm+pt Perm pm+pt Perm pm+pt Protected Phases 4 3 8 2 5 1 6 8 Permitted Phases 4 4 8 2 2 6 10.1 10.1 16.7 32.5 23.1 23.1 20.3 20.3 Actuated Green, G (s) 16.7 16.7 20.3 Effective Green, a (s) 10.1 10.1 16.7 16.7 16.7 32.5 23.1 23.1 20.3 0.32 Actuated g/C Ratio 0.16 0.16 0.27 0.27 0.27 0.52 0.37 0.37 0.32 Clearance Time (s) 7.1 7.1 3.0 7.1 7.1 3.0 6.6 6.6 3.0 6.6 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) 275 256 293 504 424 708 1239 593 306 733 v/s Ratio Prot 0.01 c0.05 c0.13 c0.21 0.04 0.05 v/s Ratio Perm c0.06 0.02 0.03 0.04 0.05 0.09 0.11 0.14 v/c Ratio 0.37 0.10 0.16 0.20 0.15 0.53 0.58 0.13 0.42 0.50 Uniform Delay, d1 22.5 17.5 17.9 15.7 23.6 17.7 9.3 16.0 13.2 17.2 Progression Factor 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 Incremental Delay, d2 0.9 0.2 0.3 0.2 0.2 0.7 0.7 0.1 0.9 0.5 Delay (s) 24.4 22.7 17.8 10.0 13.3 17.7 17.8 18.1 16.6 16.6 Level of Service С С В В В А В В В В 17.9 Approach Delay (s) 23.4 14.2 17.4 Approach LOS С В В В Intersection Summary HCM 2000 Control Delay 16.4 HCM 2000 Level of Service В HCM 2000 Volume to Capacity ratio 0.52 Actuated Cycle Length (s) 62.9 Sum of lost time (s) 19.7 Intersection Capacity Utilization 56.4% ICU Level of Service В Analysis Period (min) 15

c Critical Lane Group

Frt

04/20/2021

✓

	٦	-	-	•	1	∢	
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		र्स	f,		¥		
Traffic Volume (veh/h)	4	233	438	12	7	4	
Future Volume (Veh/h)	4	233	438	12	7	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)	4	253	476	13	8	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)			93				
pX, platoon unblocked	0.81				0.81	0.81	
vC, conflicting volume	489				744	482	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	254				567	246	
tC, single (s)	4.1				6.4	6.2	
tC, 2 stage (s)							
tF (s)	2.2				3.5	3.3	
p0 queue free %	100				98	99	
cM capacity (veh/h)	1073				394	647	
Direction, Lane #	EB 1	WB 1	SB 1				
Volume Total	257	489	12				
Volume Left	4	0	8				
Volume Right	0	13	4				
cSH	1073	1700	453				
Volume to Capacity	0.00	0.29	0.03				
Queue Length 95th (m)	0.1	0.0	0.7				
Control Delay (s)	0.2	0.0	13.2				
Lane LOS	А		В				
Approach Delay (s)	0.2	0.0	13.2				
Approach LOS			В				
Intersection Summary							
Average Delay			0.3				
Intersection Capacity Utiliza	ation		33.8%	IC	U Level o	of Service	
Analysis Period (min)			15				

Appendix J – Future Total Traffic Assessment (2028)

	-	\mathbf{i}	•	-	•	•	t	1	×	Ļ	
Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
Lane Group Flow (vph)	126	276	153	34	218	43	198	50	213	745	
v/c Ratio	0.37	0.65	0.29	0.06	0.31	0.11	0.30	0.12	0.45	0.68	
Control Delay	26.8	20.1	14.5	15.5	4.1	10.2	20.7	1.3	14.2	20.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	26.8	20.1	14.5	15.5	4.1	10.2	20.7	1.3	14.2	20.5	
Queue Length 50th (m)	13.3	14.3	11.1	2.6	0.0	2.5	10.0	0.0	15.4	34.8	
Queue Length 95th (m)	31.5	42.1	27.7	9.4	13.5	8.4	20.4	1.5	36.0	62.0	
Internal Link Dist (m)	71.3			279.6			122.1			104.4	
Turn Bay Length (m)		45.0	115.0		100.0	60.0		70.0	150.0		
Base Capacity (vph)	1201	1149	523	1435	1373	417	1555	862	474	1762	
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	0.10	0.24	0.29	0.02	0.16	0.10	0.13	0.06	0.45	0.42	
Intersection Summary											
HCM Signalized Intersection Capacity Analysis

-		•	•		
3: Coleraine	Drive/Emil Kolb P	arkway	& Harvest	Moon Drive/King	Street West

٩ t ٭ \$ ٩ ۴ Ť ✓ € ┢ EBL EBT EBR WBL NBT Movement WBT WBR NBL NBR SBL SBT SBR Lane Configurations đ 7 ٦ ኘ ŧ۴ 7 ٦ ₹ħ Ŧ 1 Traffic Volume (vph) 8 108 141 3 254 31 201 40 182 46 218 661 Future Volume (vph) 8 108 254 141 31 201 40 182 46 218 661 3 Ideal Flow (vphpl) 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 Total Lost time (s) 7.1 7.1 3.0 7.1 7.1 3.0 6.6 6.6 3.0 6.6 Lane Util. Factor 1.00 1.00 1.00 1.00 1.00 1.00 0.95 1.00 0.91 0.91 Frt 1.00 0.85 1.00 1.00 0.85 1.00 1.00 0.85 1.00 1.00 1.00 Flt Protected 1.00 0.95 1.00 1.00 0.95 1.00 1.00 0.95 1.00 Satd. Flow (prot) 1773 1599 1787 1696 1583 1719 2820 1482 1521 3140 Flt Permitted 0.98 1.00 0.54 1.00 1.00 0.36 1.00 1.00 0.53 0.95 Satd. Flow (perm) 1736 1599 1023 1696 1583 646 2820 1482 848 2972 Peak-hour factor, PHF 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 Adj. Flow (vph) 9 117 276 153 34 218 43 198 50 237 718 3 RTOR Reduction (vph) 0 0 115 0 0 141 0 0 37 0 0 0 Lane Group Flow (vph) 0 126 161 153 34 77 43 198 13 213 745 0 Heavy Vehicles (%) 17% 6% 1% 1% 12% 2% 5% 28% 9% 8% 10% 0% Turn Type Perm NA Perm NA NA NA pm+pt Perm pm+pt Perm pm+pt Protected Phases 4 3 8 2 5 1 6 8 Permitted Phases 4 4 8 2 2 6 12.3 12.3 22.4 22.4 22.4 20.3 27.5 Actuated Green, G (s) 16.3 16.3 27.5 12.3 27.5 Effective Green, a (s) 12.3 22.4 22.4 22.4 20.3 16.3 16.3 27.5 Actuated g/C Ratio 0.19 0.19 0.35 0.35 0.35 0.32 0.26 0.26 0.43 0.43 Clearance Time (s) 7.1 7.1 3.0 7.1 7.1 3.0 6.6 6.6 3.0 6.6 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) 379 335 309 445 597 557 273 722 453 1306 c0.04 v/s Ratio Prot 0.02 0.01 0.07 0.06 c0.07 v/s Ratio Perm 0.07 0.08 0.05 0.04 0.01 c0.10 0.14 c0.17 v/c Ratio 0.38 0.52 0.34 0.06 0.14 0.16 0.27 0.03 0.47 0.57 Uniform Delay, d1 22.3 23.0 14.7 12.0 13.6 14.0 15.1 18.9 17.7 13.6 Progression Factor 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 Incremental Delay, d2 0.7 1.6 0.5 0.0 0.1 0.3 0.2 0.0 0.8 0.6 Delay (s) 23.0 12.8 14.2 24.6 15.1 13.7 14.1 15.4 19.1 17.8 Level of Service С С В В В В В В В В Approach Delay (s) 24.1 14.5 18.3 13.9 Approach LOS С В В В Intersection Summary HCM 2000 Control Delay 16.6 HCM 2000 Level of Service В HCM 2000 Volume to Capacity ratio 0.56 Actuated Cycle Length (s) Sum of lost time (s) 19.7 63.6 Intersection Capacity Utilization 59.2% ICU Level of Service В Analysis Period (min) 15

c Critical Lane Group

04/20/2021

	۶	-	+	•	1	∢		
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations		र्स	ĥ		¥			
Traffic Volume (veh/h)	1	360	72	3	10	6		
Future Volume (Veh/h)	1	360	72	3	10	6		
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)	1	391	78	3	11	7		
Pedestrians								
Lane Width (m)								
Walking Speed (m/s)								
Percent Blockage								
Right turn flare (veh)								
Median type		None	None					
Median storage veh)								
Upstream signal (m)			95					
pX, platoon unblocked								
vC, conflicting volume	81				472	80		
vC1, stage 1 conf vol								
vC2, stage 2 conf vol								
vCu, unblocked vol	81				472	80		
tC, single (s)	4.1				6.4	6.2		
tC, 2 stage (s)								
tF (s)	2.2				3.5	3.3		
p0 queue free %	100				98	99		
cM capacity (veh/h)	1529				553	986		
Direction, Lane #	EB 1	WB 1	SB 1					
Volume Total	392	81	18					
Volume Left	1	0	11					
Volume Right	0	3	7					
cSH	1529	1700	667					
Volume to Capacity	0.00	0.05	0.03					
Queue Length 95th (m)	0.0	0.0	0.7					
Control Delay (s)	0.0	0.0	10.5					
Lane LOS	А		В					
Approach Delay (s)	0.0	0.0	10.5					
Approach LOS			В					
Intersection Summary								
Average Delay			0.4					
Intersection Capacity Utiliz	ation		29.7%	IC	U Level o	of Service	A	
Analysis Period (min)			15					

Queues 3: Coleraine Drive/Emil Kolb Parkway & Harvest Moon Drive/King Street West

04/20/2021

	-	\mathbf{i}	1	+	•	1	Ť	1	1	Ļ	
Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
Lane Group Flow (vph)	110	159	46	112	236	372	787	202	132	386	
v/c Ratio	0.39	0.40	0.12	0.24	0.41	0.48	0.59	0.27	0.35	0.63	
Control Delay	31.2	8.8	16.9	21.0	5.6	10.3	19.7	3.9	11.5	18.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	31.2	8.8	16.9	21.0	5.6	10.3	19.7	3.9	11.5	18.7	
Queue Length 50th (m)	13.3	0.0	3.9	10.9	0.0	24.9	46.4	0.0	8.3	14.8	
Queue Length 95th (m)	30.7	15.6	11.9	25.5	15.6	47.5	72.2	12.8	19.0	26.0	
Internal Link Dist (m)	69.3			279.6			122.1			104.4	
Turn Bay Length (m)		45.0	115.0		100.0	60.0		70.0	150.0		
Base Capacity (vph)	1199	1163	380	1588	1375	823	2271	1153	410	1144	
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	0.14	0.12	0.07	0.17	0.45	0.35	0.18	0.32	0.34	
Intersection Summary											

HCM Signalized Intersection Capacity Analysis

3: Coleraine Drive/Emil Kolb Parkwa	V & Harvest Moon Drive/Kind Street West
	, ,

04/20/2021

	≯	-	\mathbf{r}	-	+	•	1	1	1	1	Ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		<u>ل</u> ه	1	5	•	1	5	* *	1	5	Ata	
Traffic Volume (vph)	19	82	146	42	103	217	342	724	186	229	234	14
Future Volume (vph)	19	82	146	42	103	217	342	724	186	229	234	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.1	7.1	3.0	7.1	7.1	3.0	6.6	6.6	3.0	6.6	
Lane Util. Factor		1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.91	0.91	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected		0.99	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	
Satd. Flow (prot)		1882	1599	1687	1900	1599	1787	3374	1615	1610	2966	
Flt Permitted		0.91	1.00	0.53	1.00	1.00	0.51	1.00	1.00	0.35	0.64	
Satd. Flow (perm)		1720	1599	948	1900	1599	969	3374	1615	600	1912	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	89	159	46	112	236	372	787	202	249	254	15
RTOR Reduction (vph)	0	0	133	0	0	174	0	0	124	0	2	0
Lane Group Flow (vph)	0	110	26	46	112	62	372	787	78	132	384	0
Heavy Vehicles (%)	0%	0%	1%	7%	0%	1%	1%	7%	0%	2%	20%	11%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)		10.5	10.5	17.1	17.1	17.1	34.6	25.2	25.2	22.1	22.1	
Effective Green, g (s)		10.5	10.5	17.1	17.1	17.1	34.6	25.2	25.2	22.1	22.1	
Actuated g/C Ratio		0.16	0.16	0.26	0.26	0.26	0.53	0.39	0.39	0.34	0.34	
Clearance Time (s)		7.1	7.1	3.0	7.1	7.1	3.0	6.6	6.6	3.0	6.6	
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)		276	256	288	496	418	711	1300	622	301	749	
v/s Ratio Prot				0.01	c0.06		c0.13	c0.23		0.04	0.05	
v/s Ratio Perm		c0.06	0.02	0.03		0.04	0.15		0.05	0.11	0.12	
v/c Ratio		0.40	0.10	0.16	0.23	0.15	0.52	0.61	0.13	0.44	0.51	
Uniform Delay, d1		24.6	23.4	18.4	19.0	18.6	9.2	16.1	13.0	15.6	17.3	
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		0.9	0.2	0.3	0.2	0.2	0.7	0.8	0.1	1.0	0.6	
Delay (s)		25.6	23.6	18.7	19.2	18.7	9.9	16.9	13.1	16.6	17.9	
Level of Service		С	С	В	В	В	А	В	В	В	В	
Approach Delay (s)		24.4			18.8			14.4			17.6	
Approach LOS		С			В			В			В	
Intersection Summary												
HCM 2000 Control Delay			16.8	Н	CM 2000	Level of	Service		В			
HCM 2000 Volume to Capacity	ratio		0.54									
Actuated Cycle Length (s)			65.4	S	um of los	t time (s)			19.7			
Intersection Capacity Utilization	۱		58.0%	IC	CU Level	of Service	9		В			
Analysis Period (min)			15									
c Critical Lane Group												

	≯	-	←	•	1	∢	
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		र्स	ţ,		Y		
Traffic Volume (veh/h)	4	241	448	12	7	3	
Future Volume (Veh/h)	4	241	448	12	7	3	
Sign Control		Free	Free		Stop		
Grade		0%	0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	4	262	487	13	8	3	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None	None				
Median storage veh)							
Upstream signal (m)			93				
pX, platoon unblocked	0.81				0.81	0.81	
vC, conflicting volume	500				764	494	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	262				588	254	
tC, single (s)	4.1				6.4	6.2	
tC, 2 stage (s)							
tF (s)	2.2				3.5	3.3	
p0 queue free %	100				98	100	
cM capacity (veh/h)	1061				382	638	
Direction, Lane #	EB 1	WB 1	SB 1				
Volume Total	266	500	11				
Volume Left	4	0	8				
Volume Right	0	13	3				
cSH	1061	1700	429				
Volume to Capacity	0.00	0.29	0.03				
Queue Length 95th (m)	0.1	0.0	0.6				
Control Delay (s)	0.2	0.0	13.6				
Lane LOS	А		В				
Approach Delay (s)	0.2	0.0	13.6				
Approach LOS			В				
Intersection Summary							
Average Delay			0.2				
Intersection Capacity Utiliza	tion		34.3%	IC	CU Level o	of Service	Α
Analysis Period (min)			15				