

MAY 20, 2022

PROJECT NO: 2292-6393

**SENT VIA: EMAIL
JASONKRTEK@GMAIL.COM**

MoveRight Real Estate, Brokerage
15 Lock Street, Suite 101
St. Catharines, ON L2N 5B6

**Attention: Jason Krtek
Broker of Record**

**RE: TRANSPORTATION BRIEF
11210 LAKESHORE ROAD
TOWNSHIP OF WAINFLEET, NIAGARA REGION**

Dear Jason,

We have composed the following Transportation Brief in support of the Draft Plan of Subdivision and Severance applications for the proposed residential development located at 11210 Lakeshore Road in the Township of Wainfleet, Niagara Region.

This letter reviews the following elements of the proposed development from a transportation perspective:

- The trip generation characteristics of the proposed residential development.
- Analysis of potential access points with regards to sightlines, access spacing and access geometry.

1.0 Introduction

1.1 Development Lands

The subject lands cover an area of approximately 3.3 acres and currently consists of a single parcel located on vacant lands. The subject property is zoned as Residential Lakeshore (RLS-C10). The site is located on the northwest bend of Lakeshore Road and Harborview Road.

Figure 1 provides an illustration of the study area.

1.2 Development Proposal

The elements envisioned for this residential development include a total of three (3) building envelopes (each approximately 1.0, 1.1, and 1.2 acres in size, labelled as properties 1, 2, and 3 in Figure 1. Individual accesses to each residence are proposed.



PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Project		11210 LAKESHORE ROAD TOWN OF WAINFLEET		 2800 HIGH POINT DRIVE SUITE 100 MILTON, ON, L9T 6P4 905-875-0026 T 905-875-4915 F WWW.CFCROZIER.CA INFO@CFCROZIER.CA					
Drawing		SITE LOCATION							
Drawn By		T.K.	Design By	T.K.	Project	2292-6393			
Scale		N.T.S.	Date	MAY/05/2022		Check By	F.C.	Drawing	FIG.01

1.3 Study Roadways

Golf Course Road/Harbourview Road is a north-south roadway with a two-lane rural cross-section. The roadway has a posted speed limit of 60 km/h in the study area. It is noted that the segment of Golf Course Road north of Churchill Avenue has previously been under the jurisdiction of Niagara Region (as Regional Road 30), however the Region's list and map of Regional Roads (see Appendix A) at the time of writing has not included this road. As such, it is expected that Golf Course Road is under the jurisdiction of the Township of Wainfleet. The roadway does not have any pedestrian or cyclist facilities.

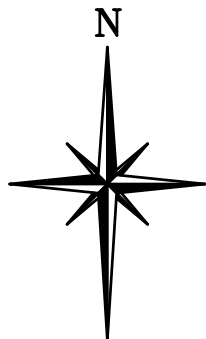
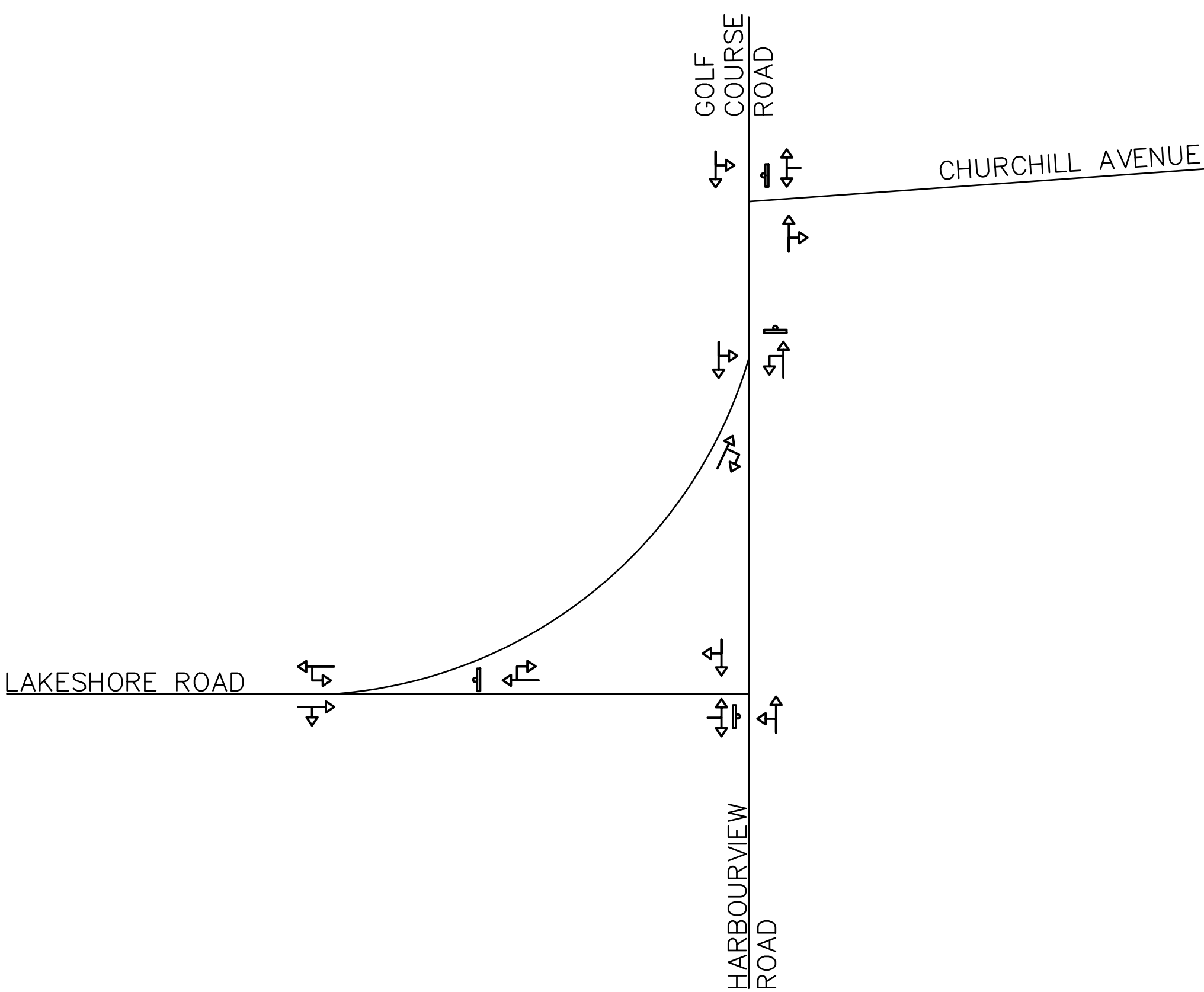
Lakeshore Road is a two-lane roadway with a rural cross-section and is generally oriented in the east-west direction in the study area. The roadway has a posted speed limit of 60 km/h in the study area, with a warning sign speed limit of 50 km/h along the bend on the northwest quadrant at the intersection with Golf Course Road/Harbourview Road. The roadway is under the jurisdiction of the Township of Wainfleet in the study area.

1.4 Study Intersections

The intersection of **Lakeshore Road** at **Golf Course Road/Harbourview Road** consists of two three-legged intersections, as Lakeshore Road diverts into the northwest bend intersecting with Golf Course Road, approximately 100 meters north of the perpendicular intersection with Harbourview Road.

- The intersection of Lakeshore Road at Harbourview Road (S) consists of a T-intersection with stop control on the minor-road approach along Lakeshore Road. Each approach consists of a single through/turning lane.
- The intersection of Lakeshore Road at Golf Course Road/Harbourview Road (N) consists of a Y-intersection, with stop control on the south leg (Harbourview Road). Each approach consists of a single shared through/turning lane.

Figure 2 illustrates the study roadways.



PRELIMINARY
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Legend		Project		CROZIER CONSULTING ENGINEERS ADAMIRAL BUILDING 1 FIRST STREET, SUITE 200 COLLINGWOOD, ON, L9Y 1A1 705-446-3510 T 705-446-3520 F WWW.CFCROZIER.CA INFO@CFCROZIER.CA						
		11210 LAKESHORE ROAD TOWN OF WAINFLEET								
 STOP CONTROL		Drawing		Drawn By		T.K.	Design By	T.K.	Project	2292-6393
		STUDY ROADWAYS		Scale	N.T.S.	Date	MAY/05/2022	Check By	F.C.	Drawing

2.0 Trip Generation

2.1 ITE Trip Generation

The site-generated trips at the proposed residential development were forecasted using data from the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition.

Land Use Code 210 "Single Family Detached Housing" was determined most appropriate land use to forecast the site-generated trips associated with the proposed development, tabulated in Table 1: ITE Trip Generation. Relevant excerpts from the ITE Trip Generation Manual are provided in Appendix B.

Table 1: ITE Trip Generation

Table 4-12 Trip Generation						
Land Use	Units	Peak Hour	Equation	In	Out	Total
Single Family Detached Housing LUC 210	3 Units	A.M.	$\text{Ln}(T) = 0.91 \text{ Ln}(X) + 0.12$	1	2	3
		P.M.	$\text{Ln}(T) = 0.94 \text{ Ln}(X) + 0.27$	2	1	3
Total				3	3	6

Per the results summarized above, the subject development is expected to generate 3, two-way trips during the A.M. and P.M. peak. The number of peak trips generated by the proposed development is not expected to materially impact the operations on the surrounding roadways.

In consideration of the above, traffic operations analysis on the surrounding road network was not found to be necessary, as the study road network is expected to operate the same with and without the site generated traffic.

The proposed development can be supported from a traffic operations perspective.

3.0 Access Review

The purpose of this section is to evaluate the feasibility and potential location of accesses along Lakeshore Road to the three proposed residential properties. The Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (GDGCR) (June 2017) was used as a reference within this report.

3.1 Access Location Review

Per the TAC GDGCR Section 8.4.1, it is noted that accesses along horizontal curves should be avoided, when possible, and should be spaced a distance of at least 150 meters from the end of the curve. If this spacing cannot be met, accesses can intersect the curved road, and sight lines should be verified.

Additionally, per Figure 8.9.2 of the TAC GDGCR, the suggested minimum spacing between driveways is 1.0 meters.

Considering the above recommendations, it is feasible to provide accesses to properties 1 and 2 at the existing Y-intersections at both ends of the curve. Additionally, while not meeting the 150-meter spacing recommendation, spacing the access of property 3 at the northern end of the property line to the west should be sufficiently spaced from the end of the curve, per the sightline analysis in the subsequent section. The locations of these accesses would meet access spacing to existing adjacent accesses.

Figure 3 illustrates the recommended locations of accesses to each of the proposed residential properties.



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Legend



DRIVEWAY



BUILDING ENVELOPE

Project

11210 LAKESHORE ROAD
TOWN OF WAINFLEET

Drawing

RECOMMENDED DRIVEWAY LOCATIONS



ADMIRAL BUILDING
1 FIRST STREET, SUITE 200
COLLINGWOOD, ON, L9Y 1A1
705-446-3510 T
705-446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By	T.K.	Design By	C.C.C./D.D.D.	Project	2292-6393
Scale	1:750	Date	MAY/05/2022	Check By	F.C.
					Drawing
					FIG.03

3.2 Sightline Analysis

The available sightlines at the proposed site access were measured and compared to the standards set out in the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (GDGCR), June 2017. Sight distance was measured for each of the recommended access locations:

- A standard driver eye height of 1.08 m for a passenger car.
- A 4.4 m setback from the approximate extension of the outer curb to represent a vehicle waiting to exit the Site.

Intersection sight distance is calculated using Equation 9.9.1 from the GDGCR as outlined below:

$$ISD = 0.278 * V_{major} * tg$$

Where;

ISD = Intersection Sight Distance

V major = design speed of roadway (km/h)

tg = assumed time gap for vehicles to turn from stop onto roadway (s)

It is noted that

Table 2 summarizes the required sight lines for each of the accesses.

Table 2: Sight Distance Analysis

Feature	Site Access(es) off Lakeshore Road
Access Type	Full-Movement
Assumed Speed Limit of Roadway	60 km/h (straight)
Assumed Design Speed	70 km/h
Base Time Gap	7.5 seconds (left turn) ¹ 6.5 seconds (right turn) ²
Grade of Roadway	Less than 3%
Horizontal Alignment of Roadway	Curve
Required Sight Distance (left turn) ²	150 m
Required Sight Distance (right turn) ²	130 m

Note 1: Time gap for a passenger vehicle from a stop onto a two-lane highway with no median and with a grade less than 3%. Value from Table 9.9.5 in the TAC-GDGCR.

Note 2: Sight distance values calculated from Intersection Sight Distance equation 9.9.1 in the GDGCR.

Figure 4 demonstrates the sightlines for each of the recommended access locations. It is noted that the left-turn sight distance was used to verify sightlines in both directions (as a driver should check both sides before making a left turn). As the required left-turn sight distances are larger than the required right-turn sight distance, the right-turn sight distances were not shown.



SIGHT DISTANCE CALCULATION

FEATURE	DESCRIPTION
ACCESS TYPE	FULL MOVEMENT
DESIGN SPEED	70 km/h
BASE TIME GAP ¹	7.5 s (LEFT-TURN)
GRADE OF ROADWAY	STRAIGHT
HORIZONTAL ALIGNMENT OF ROADWAY	CURVED
REQUIRED SIGHT DISTANCE (LEFT/RIGHT)	150 m / 150 m
AVAILABLE SIGHT DISTANCE (LEFT/RIGHT)	150 m / 150 m

NOTE 1: TIME GAP FOR LEFT-TURNING VEHICLES FROM A STOP ONTO A TWO-LANE ROAD WITH NO MEDIAN AND WITH A GRADE LESS THAN 3% VALUE FROM TABLE 9.9.5. IN THE TAC-GDGCCR

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Legend	
	SIGHT LINE
	BUILDING ENVELOPE
	PASSENGER VEHICLE

Project
11210 LAKESHORE ROAD
TOWN OF WAINFLEET

Drawing
SIGHT LINE ANALYSIS



2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON L9T 6P4
905-875-0026 T
905-875-4915 F
WWW.CROZIER.CA
INFO@CROZIER.CA

Drawn By T.K.	Design By C.C.C./D.D.D.	Project 2292-6393
Check By F.C.	Check By F.C.	Scale 1:750
		Drawing FIG.04

As shown in Figure 4, adequate sightlines can be provided at each of the recommended access location.

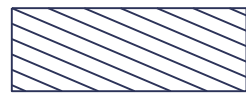
However, it is noted that the building envelopes would need to be slightly adjusted to ensure that these sightlines are kept clear of obstructions (trees, tall shrubbery, buildings) that would obstruct a driver's view. Figure 5 illustrates the hatched area that buildings or tall landscaping cannot be placed to ensure that adequate sight distance triangles are maintained, and that this hatched area should be excluded from the building envelope.

As such, the locations of the three accesses may be supported, contingent on the condition that the building envelopes have been rectified to ensure that sight lines are met.



PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Legend



NO-BUILD ZONE



BUILDING ENVELOPE

Project
**11210 LAKESHORE ROAD
TOWN OF WAINFLEET**

Drawing
RECOMMENDED NO-BUILD ZONE

		2800 HIGH POINT DRIVE SUITE 100 MILTON, ON, L9T 6P4 905-875-0026 T 905-875-4915 F WWW.CFCROZIER.CA INFO@CFCROZIER.CA	
Drawn By	T.K.	Design By	C.C.C./D.D.D.
Scale	1:750	Date	MAY/05/2022
Check By	F.C.	Project	2292-6393
		Drawing	FIG.05

4.0 Conclusion

The analysis contained within this report pertaining to the proposed residential development at 11210 Lakeshore Road, in the Township of Wainfleet can be summarized with the following key findings:

- The proposed development is forecasted to generate three peak hour trips during the A.M. and P.M. peak hours. The Three trips are not be indicative of causing an impact to traffic operations within the surrounding road network.
- A review of potential access points determined locations that would enable sufficient sight lines, provided that the building envelopes are rectified to ensure a no vertical obstructions are present within the sight triangles illustrated.
- The proposed development may be supported from a traffic operation and safety perspective with the above noted conditions.

Should you have any questions or require any further information, please do not hesitate to contact the undersigned.

Respectfully submitted by,

C.F. CROZIER & ASSOCIATES INC.



Farah Tasnim Choudhury, EIT
Engineering Intern, Transportation

C.F. CROZIER & ASSOCIATES INC.



Ian Lindley, MSc., EIT
Engineering Intern, Transportation

C.F. CROZIER & ASSOCIATES INC.



R. Aaron Wignall
Associate, Transportation

AW/ft/il

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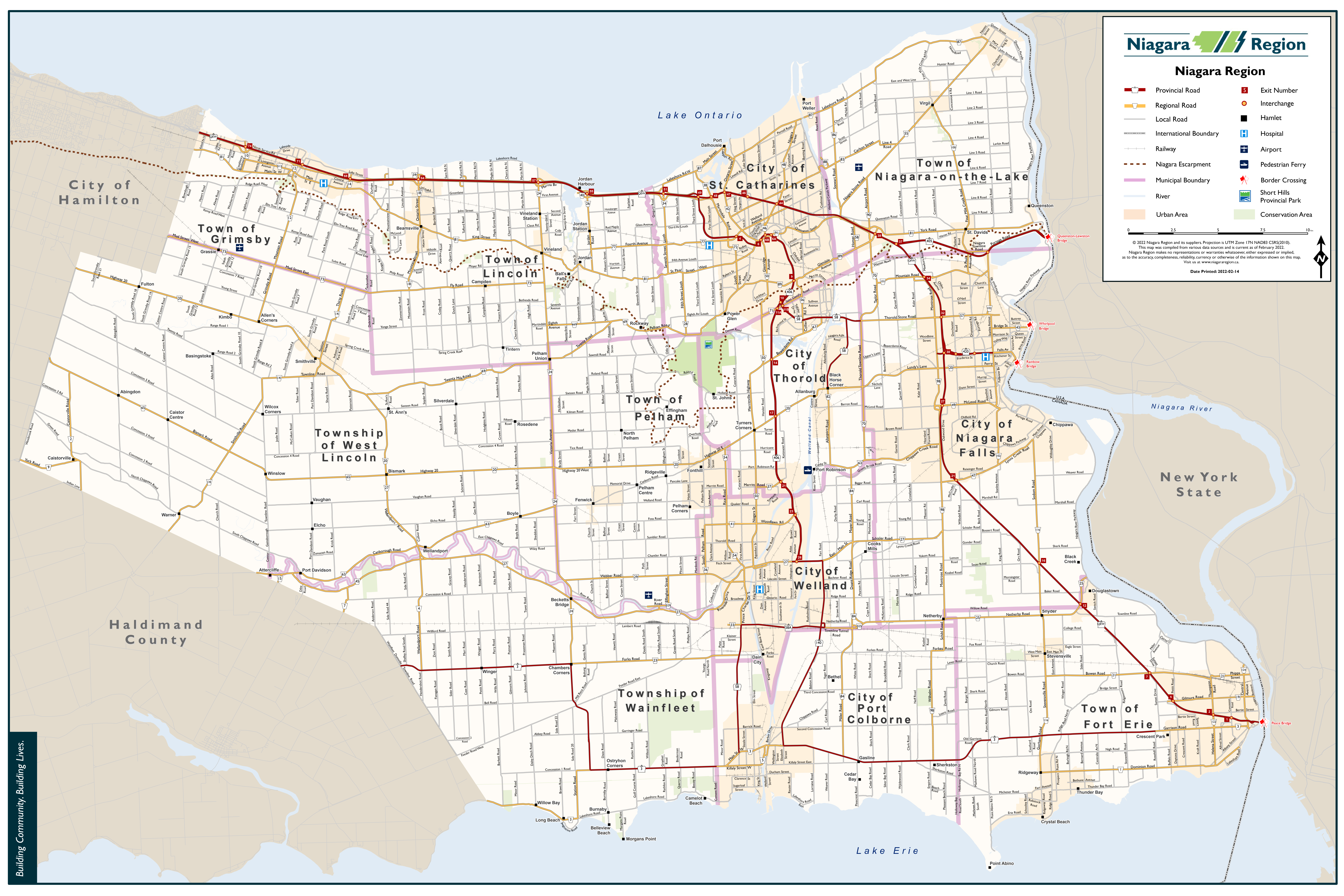
APPENDIX A

Niagara Regional Road Map

Niagara Region

- Provincial Road
- Regional Road
- Local Road
- International Boundary
- Railway
- Niagara Escarpment
- Municipal Boundary
- River
- Urban Area
- Exit Number
- Interchange
- Hamlet
- Hospital
- Airport
- Pedestrian Ferry
- Border Crossing
- Short Hills Provincial Park
- Conservation Area

0 2.5 5 7.5 10
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This map was compiled from various data sources and is current as of February 2022.
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Date Printed: 2022-02-14



APPENDIX B

ITE Trip Generation Manual Excerpts

Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units

**On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.**

Setting/Location: General Urban/Suburban

Number of Studies: 192

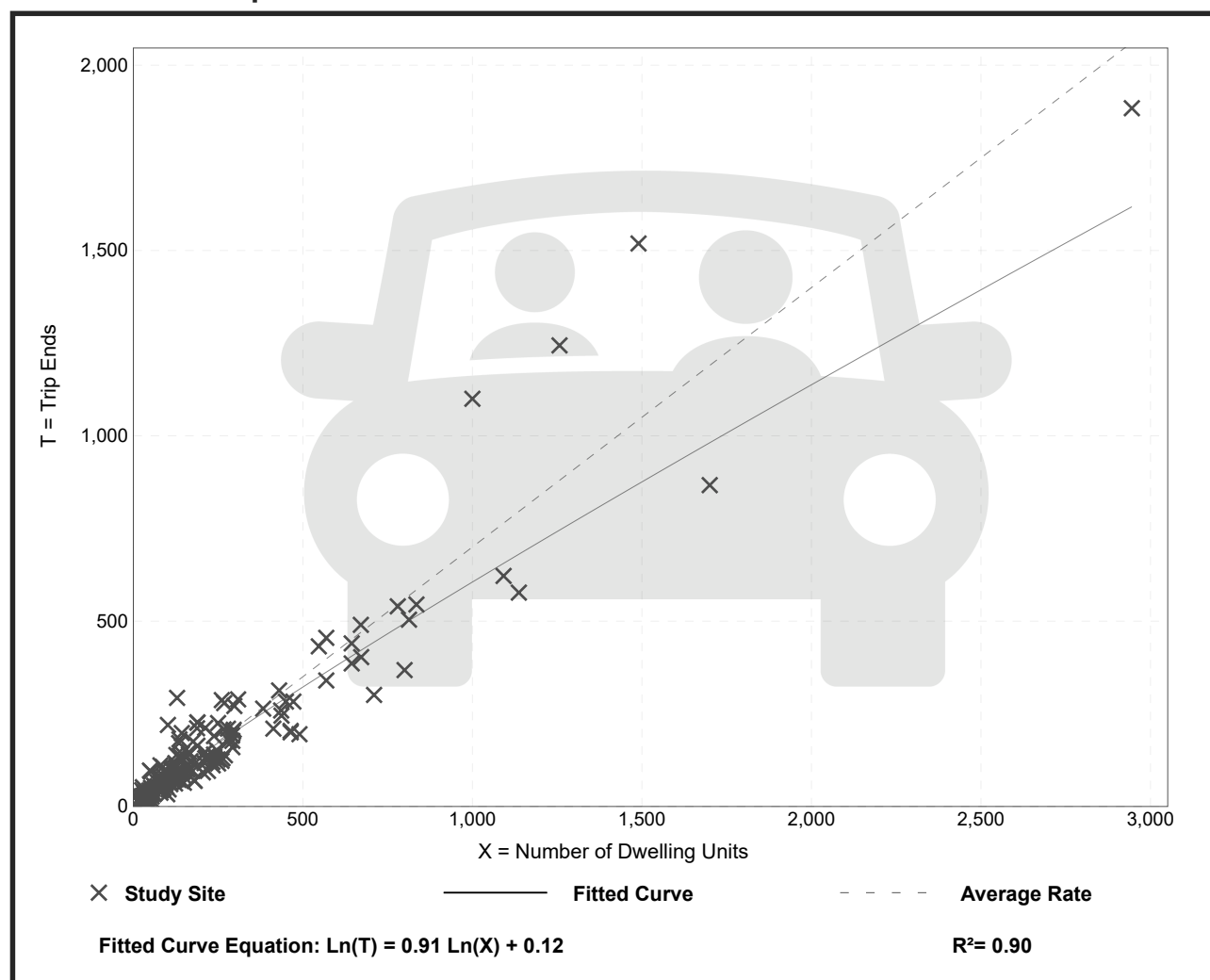
Avg. Num. of Dwelling Units: 226

Directional Distribution: 26% entering, 74% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.70	0.27 - 2.27	0.24

Data Plot and Equation



Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 208

Avg. Num. of Dwelling Units: 248

Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.94	0.35 - 2.98	0.31

Data Plot and Equation

