3089 Greenfield Road Traffic Impact and Parking Study Report

Township of North Dumfries, Ontario

Project Number: PTRAN2026008

Date: June 17, 2026

Prepared for:
Greenfield Mill Co.
3089 Greenfield Road
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Document Revision History

Rev	Description	Prepared/ Revised By	Reviewed By	Approved By	Date Issued (M/D/Y)
R0	Report for Submission	R. Oh, C. Wan, V. Liu,	R. Sooklall	R. Sooklall	6/16/2026
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1.0 Introduction

TraffMobility Engineering Inc. (TraffMobility) was retained to undertake a Traffic Impact and Parking Study (TIPS) to support the Official Plan Amendment (OPA) and Zoning By-law Amendment (ZBA) application for a proposed Event Venue and Restaurant development at 3089 Greenfield Road (subject site) in the Township of North Dumfries (Township), Ontario. The existing historic Mill building will be redeveloped to provide an event venue space, restaurant, retail space/office, coffee shop, wine cellar, and other suites for the event venue space. Access will be via Greenfield Road, and a total of 110 surface parking spaces will be provided for the proposed development.

The analysis approach, results, and findings are documented in this report. The study scope was discussed and confirmed with Township staff and the approved terms of reference (TOR) with confirmation emails are provided in **Appendix A**.

1.1 Study Area

The subject site is located on the south side of Greenfield Road, approximately 235 metres west of the Northumberland Street and Greenfield Road intersection, north of Ayr community, as shown in **Figure 1**.

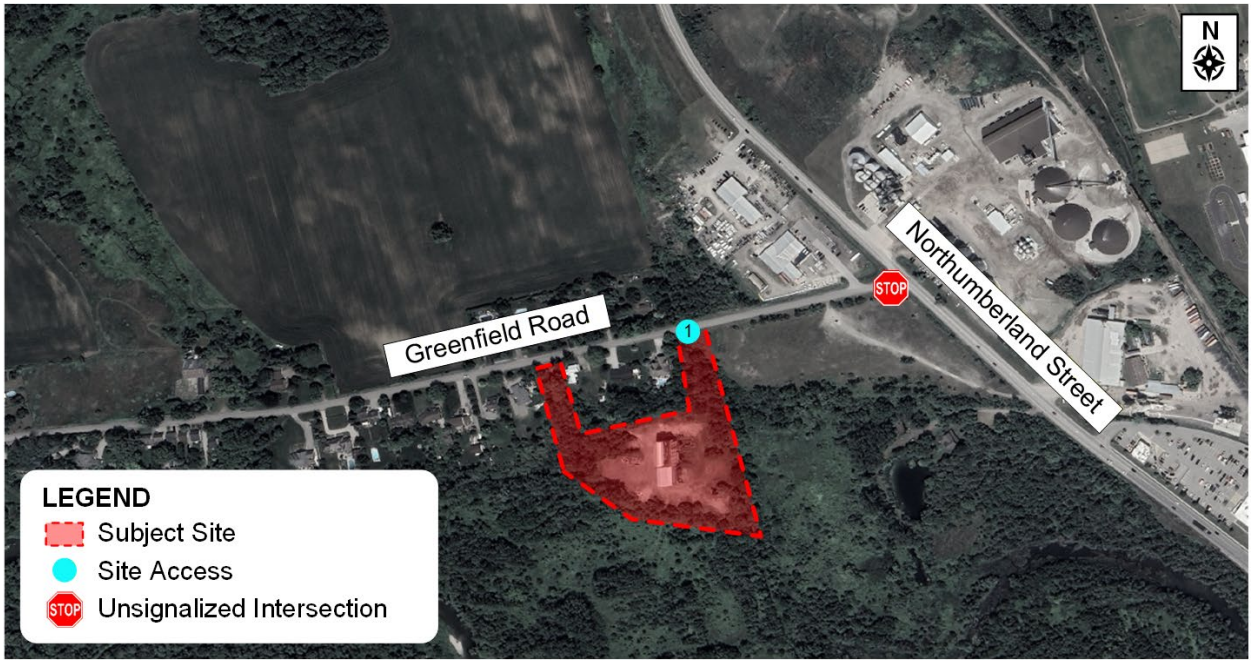


Figure 1: Study Area

The study area for the traffic impact analysis includes the following key intersections:

- Northumberland Street and Greenfield Road (unsignalized)
- Greenfield Road and Site Access (unsignalized)

1.2 Study Methodology

The study conducted a thorough review of the existing and future planned transportation infrastructure for all travel modes within the study area including connectivity to the adjacent transportation network. Analyses were conducted to identify transportation infrastructure required to support and connect the proposed development to the adjacent transportation network.

The study was conducted based on the *"Transportation Impact Study Guidelines (2014)"* and "*Transportation Impact Studies Requirements for Capacity Analysis*, *Roundabouts, Signal Warrants (2013)*" by the Region of Waterloo.

1.2.1 Active Transportation and Transit Assessment

Existing and planned active transportation infrastructure within the vicinity of the proposed development were reviewed to determine connectivity and convenience for pedestrians and cyclists. Accessibility to existing and future transit service from the proposed development was reviewed.

1.2.2 Traffic Operations Assessment

The study assessed traffic operations under existing (2026) conditions and the following future horizon years:

- Future (2031) Background Conditions (without the proposed development site traffic)
- Future (2031) Total Conditions (with the proposed development site traffic)

Intersection operations were assessed using the Synchro 12 software which utilizes the Highway Capacity Manual ("HCM") methodology published by the Transportation Research Board National Research Council. Synchro 12 can analyze both signalized and unsignalized intersections in a road corridor or network considering the spacing, interaction, queues, and operations between intersections.

Intersection operations performance metrics are reported in terms of Level of Service (LOS), volume to capacity (v/c) ratios, and 95th percentile queues. Level of Service is based on the average control delay per vehicle for a given movement. Delay is an indicator of how long a vehicle must wait to complete a movement and is represented by a letter between 'A' and 'F', with 'F' being the longest delay. **Table 1** summarizes the LOS criteria for unsignalized intersections.

Table 1: Intersection Level of Service Criteria

Level of Service	Average Control Delay per Vehicle (second / vehicle)
	Unsignalized Intersection
A	≤ 10
B	>10 and ≤ 15
C	> 15 and ≤ 25
D	> 25 and ≤ 35
E	> 35 and ≤ 50
F	> 50

The following Synchro parameters used in the analysis are based on the Region of Waterloo's "*Transportation Impact Studies Requirements for Capacity Analysis*, *Roundabouts, Signal Warrants (2013)*":

- Lane Width (m): 3.5
- Peak Hour Factor (PHF): 1.0
- Ideal Saturation Flow (vphpl): Based on the Saturation Flow Values table of the guidelines

Critical movements were identified based on the following criteria as outlined in the Region of Waterloo's *"Transportation Impact Study Guidelines (2014)"*:

- The average control delay for individual movements is greater than 55 seconds

- Estimated 95th percentile queue length exceeds the available storage space

A compound growth rate of 2.0% was applied to all movements at the study intersections and this growth rate was confirmed with the Township.

1.3 Data Collection

Existing turning movement counts were obtained from traffic counts commissioned by TraffMobility during the weekday AM peak period (7:00 am to 9:00 am), weekday PM peak period (4:00 pm to 6:00 pm), and Saturday peak period (10:00 am to 2:00 pm). A summary of the traffic data collected is provided in **Table 2**. A copy of the existing turning movement counts is provided in **Appendix B**.

Table 2: Turning Movement Counts Summary

Intersection	Count Date	Source
Northumberland Street and Greenfield Road (unsignalized)	Thursday, May 28, 2026	Traffic-Survey-Analysis Inc.
	Saturday, May 30, 2026	

2.0 Existing Conditions

2.1 Pedestrian and Cyclist Infrastructure

No sidewalks are currently provided along Greenfield Road or Northumberland Street within the study area road network. Paved shoulders along Northumberland Street serve as the existing cycling infrastructure in the area.

2.2 Transit Services

Currently, the study area road network is not served by transit.

2.3 Existing Intersection Operations

Traffic operations under existing conditions were analyzed for the peak hours during the weekday AM (7:00 am to 9:00 am), the weekday PM (4:00 pm to 6:00 pm), and the Saturday (10:00 am to 2:00 pm) peak periods using Synchro 12 software.

Existing intersection operations were analyzed using the lane configurations illustrated in **Figure 2** and the existing (2026) traffic volumes shown in **Figure 3**. The analysis results are provided in **Table 3** and detailed calculations are provided in **Appendix C**.

The analysis results in **Table 3** indicate that all movements are operating with acceptable level of service and residual capacity during the weekday AM, weekday PM, and Saturday peak hours under existing conditions.

Moreover, the results in **Table 3** indicate that the 95th percentile queues can be accommodated within the available storage under existing conditions for all peak hours.

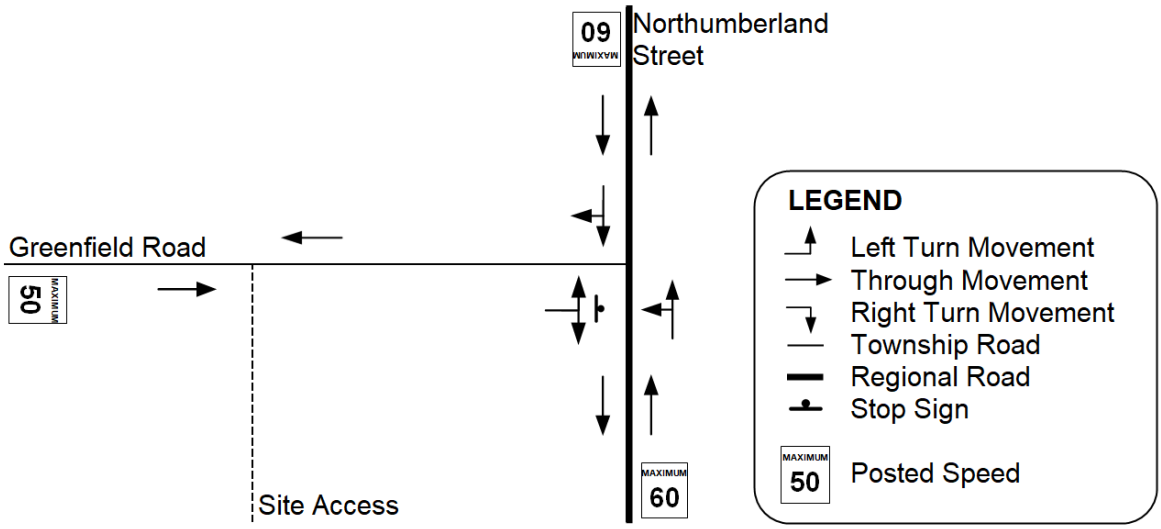


Figure 2: Existing Intersection Lane Configuration

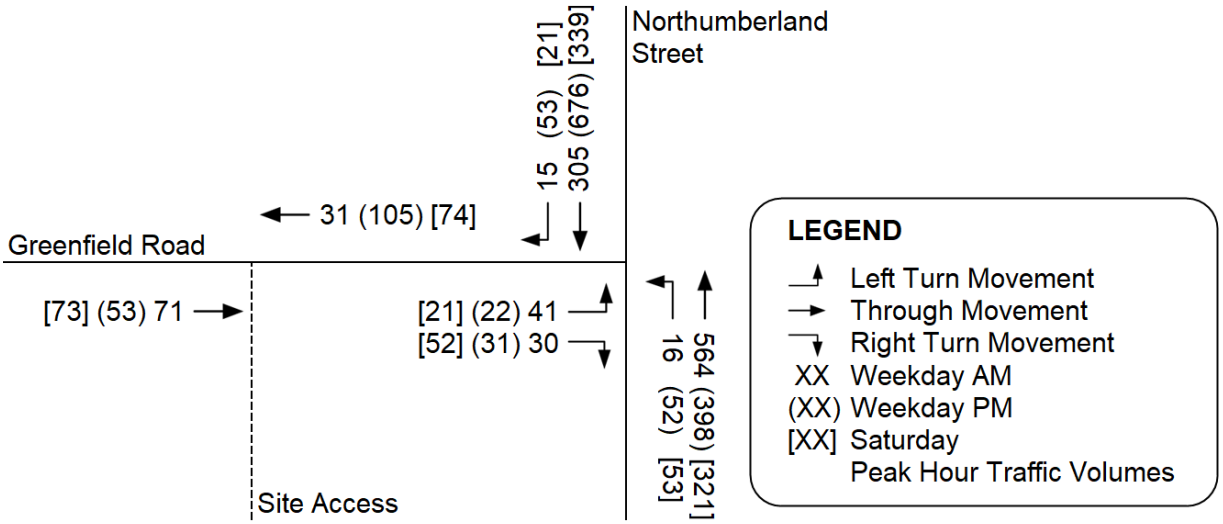


Figure 3: Existing (2026) Traffic Volumes

Table 3: Existing Conditions Intersection Operations

Analysis Period	Intersection	Analysis Period Control Type	Measure	Direction / Movement / Approach															
				Eastbound				Westbound				Northbound				Southbound			
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach
AM Peak Hour	Northumberland Street and Greenfield Road	One-Way Stop Control	LOS	C		>	C					<	A		A		A	>	A
			Delay	16		>	16					<	0		0		0	>	0
			V/C	0.18		>	-					<	0.01		-		0.19	>	-
			Q	<7		>	-					<	<7		-		<7	>	-
			Ex	>200		>	-					<	>200		-		>200	>	-
			Avail	>200		>	-					<	>200		-		>200	>	-
PM Peak Hour	Northumberland Street and Greenfield	One-Way Stop Control	LOS	C		>	C					<	A		A		A	>	A
			Delay	20		>	20					<	2		2		0	>	0
			V/C	0.18		>	-					<	0.06		-		0.43	>	-
			Q	<7		>	-					<	<7		-		<7	>	-
			Ex	>200		>	-					<	>200		-		>200	>	-
			Avail	>200		>	-					<	>200		-		>200	>	-
SAT Peak Hour	Northumberland Street and Greenfield Road	One-Way Stop Control	LOS	B		>	B					<	A		A		A	>	A
			Delay	13		>	13					<	2		2		0	>	0
			V/C	0.13		>	-					<	0.04		-		0.21	>	-
			Q	<7		>	-					<	<7		-		<7	>	-
			Ex	>200		>	-					<	>200		-		>200	>	-
			Avail	>200		>	-					<	>200		-		>200	>	-

Note: LOS – level of service, V/C – volume to capacity ratio, Q – 95th percentile queue (m), Ex – existing storage (m), Avail – available storage in metres (existing – queue), < or > - shared movement

3.0 Future Background Conditions

Traffic operations under future background conditions were analyzed for the weekday AM, the weekday PM, and the Saturday peak hours using Synchro 12 software. The analysis was conducted for the 2031 future horizon year.

Future background traffic for the study area consists of two components: traffic growth outside the study area and adjacent development site traffic within the study area. The future background conditions assessment is based on projected background traffic growth and transportation improvements planned for the study area corresponding to the horizon year.

3.1 Future Planned Transportation Improvements

No future planned transportation improvements were identified in the vicinity of the study area to be considered within the 2031 future horizon year for the study.

3.2 Future Traffic Growth

A compound annual growth rate (CAGR) of 2.0% per annum was applied to all movements at the Northumberland Street and Greenfield Road to determine the traffic growth component of future background traffic for the horizon years. The growth rate was confirmed by the Township.

3.3 Future Background Developments

Currently, there are no planned background developments in the vicinity of the subject site.

3.4 Future (2031) Background Intersection Operations

Future (2031) background traffic volumes were estimated by applying the growth rate to the existing traffic volumes (**Figure 3**) and the resulting future (2031) background traffic volumes are illustrated in **Figure 4**.

Future (2031) background intersection operations were analyzed using the existing lane configurations illustrated in **Figure 2** and the future (2031) background traffic volumes from **Figure 4**. The analysis results are summarized in **Table 4** and detailed calculations are provided in **Appendix D**.

The analysis results in **Table 4** indicate that all movements are expected to operate with acceptable level of service and residual capacity during the weekday AM, weekday PM, and Saturday peak hours under future (2031) background conditions.

Moreover, the results in **Table 4** indicate that the 95th percentile queues can be accommodated within the available storage under future (2031) background conditions for all peak hours.

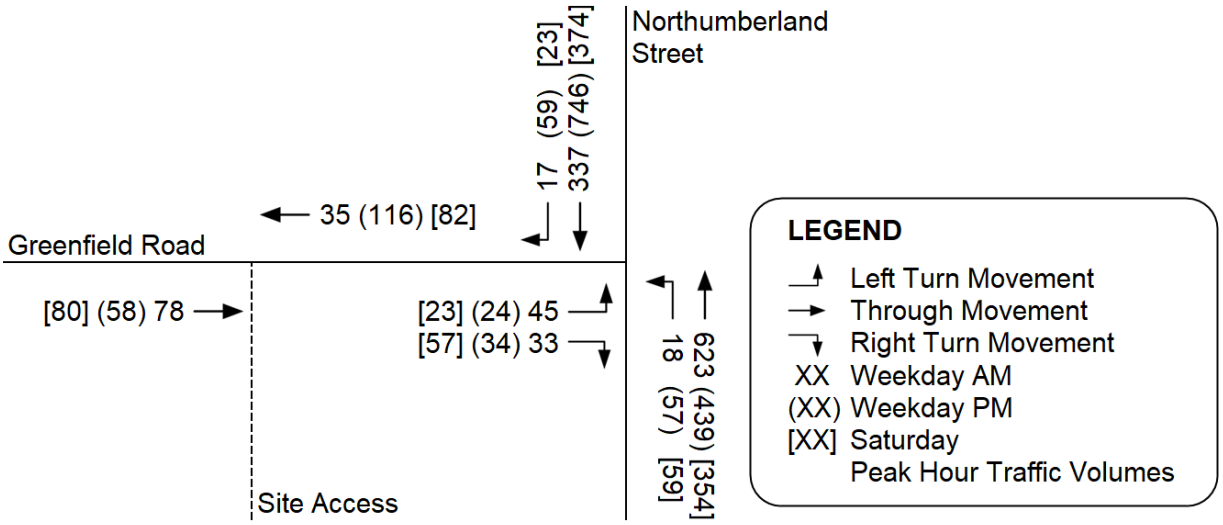


Figure 4: Future (2031) Background Traffic Volumes

Table 4: Future (2031) Background Conditions Intersection Operations

Analysis Period	Intersection	Analysis Period Control Type	Measure	Direction / Movement / Approach															
				Eastbound				Westbound				Northbound				Southbound			
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach
AM Peak Hour	Northumberland Street and Greenfield Road	One-Way Stop Control	LOS	C		>	C					<	A		A		A	>	A
			Delay	18		>	18					<	0		0		0	>	0
			V/C	0.22		>	-					<	0.02		-		0.21	>	-
			Q	<7		>	-					<	<7		-		<7	>	-
			Ex	>200		>	-					<	>200		-		>200	>	-
			Avail	>200		>	-					<	>200		-		>200	>	-
PM Peak Hour	Northumberland Street and Greenfield	One-Way Stop Control	LOS	C		>	C					<	A		A		A	>	A
			Delay	24		>	24					<	2		2		0	>	0
			V/C	0.23		>	-					<	0.07		-		0.47	>	-
			Q	<7		>	-					<	<7		-		<7	>	-
			Ex	>200		>	-					<	>200		-		>200	>	-
			Avail	>200		>	-					<	>200		-		>200	>	-
SAT Peak Hour	Northumberland Street and Greenfield Road	One-Way Stop Control	LOS	B		>	B					<	A		A		A	>	A
			Delay	14		>	14					<	2		2		0	>	0
			V/C	0.16		>	-					<	0.05		-		0.23	>	-
			Q	<7		>	-					<	<7		-		<7	>	-
			Ex	>200		>	-					<	>200		-		>200	>	-
			Avail	>200		>	-					<	>200		-		>200	>	-

Note: LOS – level of service, V/C – volume to capacity ratio, Q – 95th percentile queue (m), Ex – existing storage (m), Avail – available storage in metres (existing – queue), < or > - shared movement

4.0 Proposed Development

4.1 Development Concept

The proposed development is an event venue with a restaurant that has complementary/supporting uses of a groom's suite, a hair salon/bridal suite, a wine cellar, a coffee shop, and retail/office space. Site statistics are provided in **Table 5**, and the site plan is shown in **Appendix E**.

A total of 110 parking spaces including 6 accessible parking spaces and 4 layby parking spaces will be provided on site. Access to and from the proposed development will be provided via a new access fronting Greenfield Road.

Table 5: Proposed Development Breakdown

No.	Type of Use	GFA (ft^2)	Capacity (person)	Operational Hours	
1	Venue Space 1	4,765	150	Friday & Saturday	3:00 pm to 1:00 am
2	Venue Space 2	2,100	80	Friday & Saturday	3:00 pm to 1:00 am
3	Groom's suite	1,355	20	Friday & Saturday	12:00 pm to 3:00 pm
4	Hair Salon / Bridal Suite	1,185	20	Monday to Thursday	9:00 am to 7:00 pm
				Friday & Saturday	7:00 am to 3:00 pm
5	Wine Cellar	1,755	30	Everyday	11:00 am to 10:00 pm
6	Restaurant	2,275	75	Everyday	11:00 am to 10:00 pm
7	Coffee Shop	365	15	Everyday	7:00 am to 2:00 pm
8	Retail Space / Office	2,185	30	Monday to Friday	8:00 am to 5:00 pm
	Total	**15,985**	**420**		

4.2 Trip Generation

Only the land uses expected to be operational during each analysis period were included in the trip generation assessment, as summarized in **Table 6**. Trips associated with the Groom's Suite and Hair Salon / Bridal Suite were treated as interactive trips between the venue spaces and these supporting uses.

Although the venue spaces are expected to operate from 3:00 p.m. on Saturdays, trips associated with the venue spaces were included in the Saturday analysis. This provides a conservative assessment, as the Saturday analysis period from 10:00 a.m. to 2:00 p.m. typically represents the peak period for Saturday traffic on the adjacent road network.

Table 6: Land Uses included in Trip Generation by Analysis Period

Type of Use	Weekday AM (7:00 to 9:00 am)	Weekday PM (4:00 to 6:00 pm)	Saturday (10:00 am - 2:00 pm)
Venue Space 1		✓	✓
Venue Space 2		✓	✓
Groom's Suite			Internal Trips
Hair Salon / Bridal Suite		Internal Trips	Internal Trips
Wine Cellar		✓	✓
Restaurant		✓	✓

Type of Use	Weekday AM (7:00 to 9:00 am)	Weekday PM (4:00 to 6:00 pm)	Saturday (10:00 am - 2:00 pm)
Coffee Shop	✓		✓
Retail Space / Office	✓	✓	

The trip generation estimates for the proposed development were prepared using the Institute of Transportation Engineers (ITE) Trip Generation Manual, 12th Edition, where applicable. The relevant excerpts from the ITE Trip Generation Manual are provided in **Appendix F**.

4.2.1 Coffee Shop, Wine Cellar, and Retail Space / Office

The coffee shop and retail space / office components were estimated using ITE Land Use Code 936 (Coffee/Donut Shop without Drive-Through Window) and ITE Land Use Code 712 (Small Office Building) respectively.

For the wine cellar, ITE Land Use Code 970 (Wine Tasting Room) was applied. Although it is anticipated that 50% of the wine cellar capacity will be occupied by event venue guests during the event venues operational hours, no trip reduction was applied, and the full capacity was used in the trip generation calculations to provide a conservative assessment.

4.2.2 Restaurant

For the restaurant, ITE Land Use Code 931 (Fine Dining Restaurant) was applied. Trip generation estimates were prepared based on both gross floor area and person capacity, and the person-capacity-based estimate was carried forward, as it resulted in a higher trip estimate. The restaurant was included in the weekday PM and Saturday analysis periods, when the venue spaces are expected to be operational. As 50% of the restaurant capacity is anticipated to be occupied by event venue guests during the event venues operational hours, the trip generation estimate based on the full restaurant capacity is considered to provide a reasonable and conservative representation of restaurant-related traffic activity.

4.2.3 Venue Space

For the venue spaces, the ITE Trip Generation Manual does not include a specific land use code that directly represents the proposed event venue use. Therefore, trip generation for the venue spaces was estimated using a first-principles approach based on the maximum event capacity of 230 persons. Based on the operator's industry experience, approximately 50% to 60% of event guests are expected to use pre-arranged transportation, including taxis, rideshare services, shuttles, or other shared vehicle arrangements. Accordingly, it was assumed that 60% of event guests would use pre-arranged transportation, rideshare, taxi, shuttle, or shared vehicle arrangements, while the remaining 40% of guests would generate individual vehicle trips. The inbound/outbound directional distribution for the venue spaces was referenced from ITE Land Use Code 310 (Hotel).

4.2.4 Groom's Suite and Hair Salon / Bridal Suite

Trips associated with the Groom's Suite and Hair Salon / Bridal Suite are considered internal to the event venue use, as these spaces are expected to serve guests already attending events at the venue. As such, no separate external trip generation was applied to these supporting uses.

4.2.5 Trip Generation Summary

It was assumed that all trips generated by the proposed development will consist of auto trips and no non-auto reduction was considered, except for the proposed venue spaces. The projected trip

generation for the proposed development during the weekday AM, weekday PM, and Saturday peak hours are summarized in **Table 7**.

As detailed in **Table 7**, the proposed development is expected to generate 65 new vehicle trips during the weekday AM peak hour (45 trips in / 20 trips out), 166 new vehicle trips during the weekday PM peak hour (84 trips in / 82 trips out), and 200 new vehicle trips during the Saturday peak hour (102 trips in / 98 trips out).

Table 7: Trip Generation Summary

Land Use	GFA / Persons	Parameter	AM Peak Hour			PM Peak Hour			Saturday		
			In	Out	Total	In	Out	Total	In	Out	Total
Coffee/Donut Shop without Drive-Through Window (LU Code 936)											
Coffee Shop	365 ft²	Average Rate	91.02			-			55.64		
		Gross Trips	17	16	33	-	-	-	10	10	20
		Net Vehicle Trips	**17**	**16**	**33**	-	-	-	**10**	**10**	**20**
Small Office Building (LU Code 712)											
Retail Space / Office	30 Persons	Average Rate	1.06			1.08			-		
		Gross Trips	28	4	32	11	21	32	-	-	-
		Net Vehicle Trips	**28**	**4**	**32**	**11**	**21**	**32**	-	-	-
Wine Tasting Room (LU Code 970)											
Wine Cellar	1,755 ft²	Average Rate	-			9.84			35.02		
		Gross Trips	-	-	-	9	8	17	29	32	61
		Net Vehicle Trips	-	-	-	**9**	**8**	**17**	**29**	**32**	**61**
Fine Dining Restaurant (LU Code 931)											
Restaurant	75 Persons	Average Rate	-			0.33			0.36		
		Gross Trips	-	-	-	17	8	25	16	11	27
		Net Vehicle Trips	-	-	-	**17**	**8**	**25**	**16**	**11**	**27**
Venue Space*											
Venue Space	230 Persons	Average Rate	-			40%			40%		
		Gross Trips	-	-	-	47	45	92	47	45	92
		Net Vehicle Trips	-	-	-	**47**	**45**	**92**	**47**	**45**	**92**
Total Net Vehicle Trips			**45**	**20**	**65**	**84**	**82**	**166**	**102**	**98**	**200**

* ITE Trip Generation Manual does not include a specific land use code that directly represents the proposed event venue use

4.3 Trip Distribution

The trip distribution for the proposed development is based on the existing travel patterns, the surrounding roadway network and the characteristics of the proposed development.

The resulting trip distribution is summarized in **Table 8** and **Table 9** and the site generated trips for the proposed development assigned to the road network are illustrated in **Figure 5**. Site trips by individual land use type assigned to the roadway network are provided in **Appendix G**.

Table 8: Trip Distribution Summary for Weekday AM and Weekday PM

From/To	Via	Inbound / Outbound Trip Distribution for Venue Space, Restaurant, Wine Cellar	Inbound / Outbound Trip Distribution for Coffee Shop, Retail Space/Office
North	Northumberland Street	60%	35%
South	Northumberland Street	35%	60%
West	Greenfield Road	5%	5%
Total		**100%**	**100%**

Table 9: Trip Distribution Summary for Saturday

From/To	Via	Inbound / Outbound Trip Distribution for Venue Space, Restaurant, Wine Cellar	Inbound / Outbound Trip Distribution for Coffee Shop, Retail Space/Office
North	Northumberland Street	60%	45%
South	Northumberland Street	35%	45%
West	Greenfield Road	5%	10%
Total		**100%**	**100%**

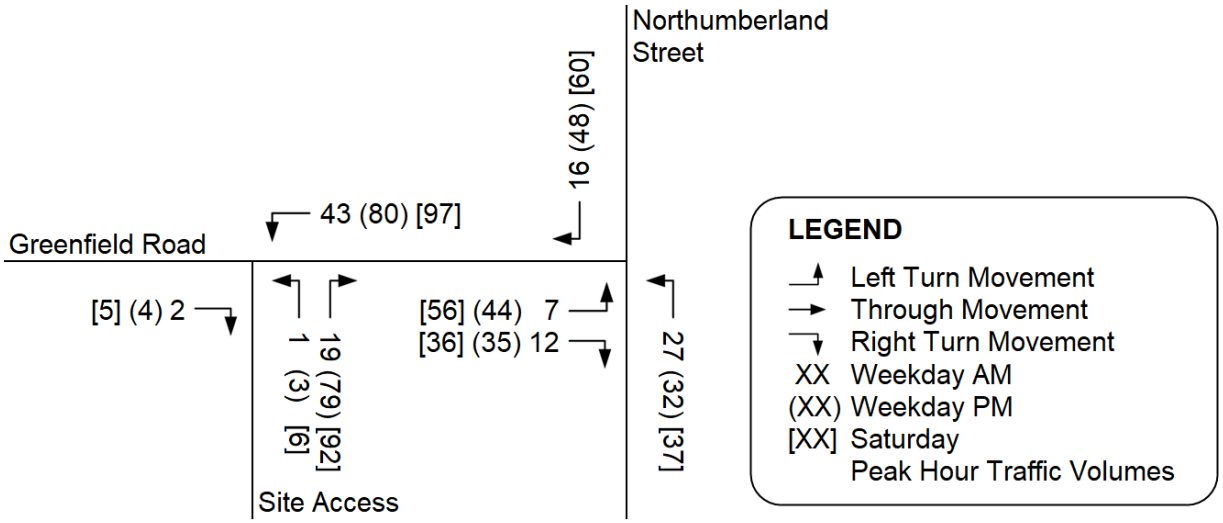


Figure 5: Site Traffic

5.0 Future Total Conditions

Traffic operations under future (2031) total conditions were analyzed for the weekday AM, weekday PM, and Saturday peak hours using Synchro 12 software.

5.1 Future (2031) Total Intersection Operations

The future (2031) total traffic volumes were estimated by adding site traffic (**Figure 5**) to future (2031) background volumes (**Figure 4**) and the resulting future (2031) total traffic volumes are illustrated in **Figure 7**.

Future (2031) total intersection operations were analyzed using the future lane configurations illustrated in **Figure 6**. The future (2031) total traffic volume analysis results are summarized in **Table 10** and detailed calculations are provided in **Appendix H**.

The analysis results in **Table 10** indicate that all movements are operating with acceptable level of service and residual capacity during the weekday AM, weekday PM, and Saturday peak hours under future (2031) total conditions, except for the eastbound shared left-right-turn movement at the Northumberland Street and Greenfield Road intersection during the weekday PM peak hour.

Moreover, the results in **Table 10** indicate that the 95th percentile queues can be accommodated within the available storage during all peak hours under future (2031) total conditions.

While the eastbound shared left-right turn movement at the Northumberland Street and Greenfield Road intersection is projected to operate at LOS F during the weekday PM peak hour, the average control delay of 54 seconds remains below the threshold of 55 seconds. Given that the intersection is stop-controlled and the 95th percentile queue length is expected to be contained within the available storage length, no mitigation measures are required to support the proposed development.

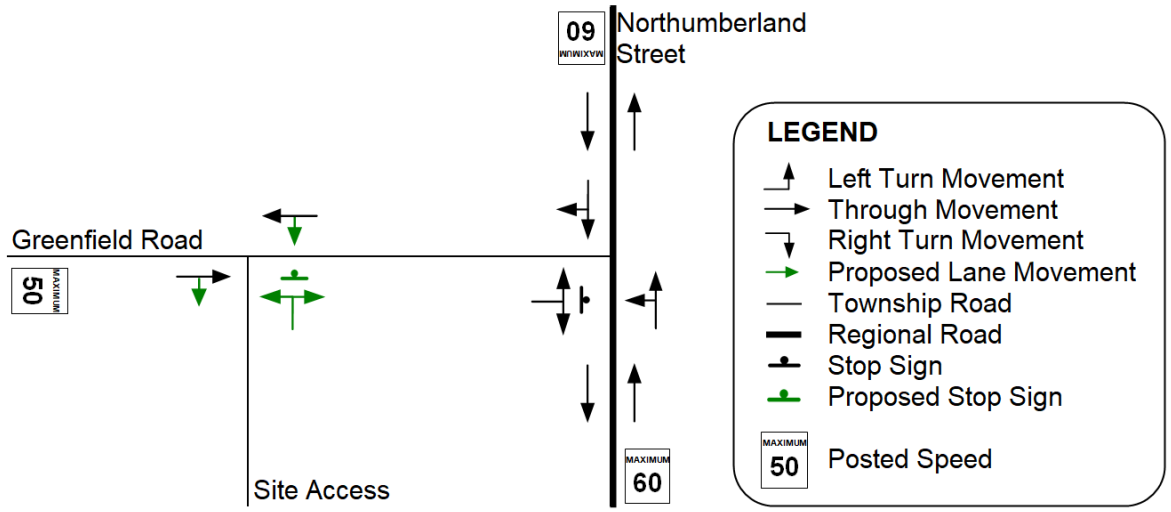


Figure 6: Future Intersection Lane Configuration

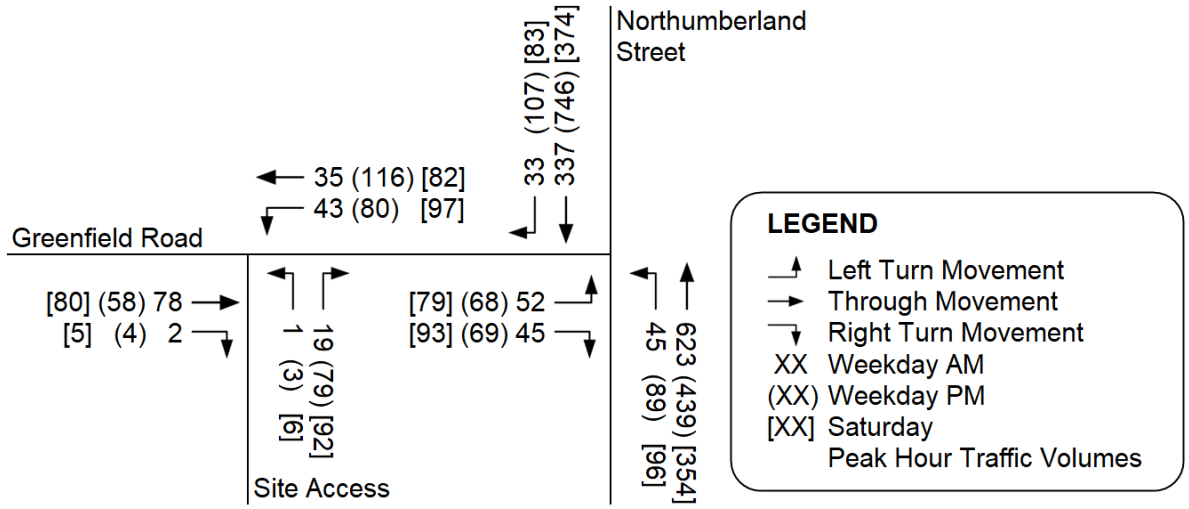


Figure 7: Future (2031) Total Traffic Volumes

Table 10: Future (2031) Total Conditions Intersection Operations

Analysis Period	Intersection	Analysis Period Control Type	Measure	Direction / Movement / Approach															
				Eastbound				Westbound				Northbound				Southbound			
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach
AM Peak Hour	Northumberland Street and Greenfield Road	One-Way Stop Control	LOS	C		>	C					<	A		A		A	>	A
			Delay	20		>	20					<	1		1		0	>	0
			V/C	0.28		>	-					<	0.04		-		0.22	>	-
			Q	9		>	-					<	<7		-		<7	>	-
			Ex	>200		>	-					<	>200		-		>200	>	-
			Avail	>191		>	-					<	>200		-		>200	>	-
PM Peak Hour	Northumberland Street and Greenfield	One-Way Stop Control	LOS	**F**		>	**F**					<	A		A		A	>	A
			Delay	54		>	54					<	3		3		0	>	0
			V/C	0.68		>	-					<	0.11		-		0.50	>	-
			Q	32		>	-					<	<7		-		<7	>	-
			Ex	>200		>	-					<	>200		-		>200	>	-
			Avail	>168		>	-					<	>200		-		>200	>	-
SAT Peak Hour	Northumberland Street and Greenfield Road	One-Way Stop Control	LOS	C		>	C					<	A		A		A	>	A
			Delay	22		>	22					<	3		3		0	>	0
			V/C	0.45		>	-					<	0.09		-		0.27	>	-
			Q	17		>	-					<	<7		-		<7	>	-
			Ex	>200		>	-					<	>200		-		>200	>	-
			Avail	>183		>	-					<	>200		-		>200	>	-

Analysis Period	Intersection	Analysis Period Control Type	Measure	Direction / Movement / Approach															
				Eastbound				Westbound				Northbound				Southbound			
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach
AM Peak Hour	Northumberland Street and Site Access	One-Way Stop Control	LOS		A	>	A	<	A		A	A		>	A				
			Delay		0	>	0	<	4		4	9		>	9				
			V/C		0.05	>	-	<	0.03		-	0.02		>	-				
			Q		<7	>	-	<	<7		-	<7		>	-				
			Ex		>200	>	-	<	>200		-	>100		>	-				
			Avail		>200	>	-	<	>200		-	>100		>	-				
PM Peak Hour	Northumberland Street and Site Access	One-Way Stop Control	LOS		A	>	A	<	A		A	A		>	A				
			Delay		0	>	0	<	3		3	9		>	9				
			V/C		0.04	>	-	<	0.05		-	0.08		>	-				
			Q		<7	>	-	<	<7		-	<7		>	-				
			Ex		>200	>	-	<	>200		-	>100		>	-				
			Avail		>200	>	-	<	>200		-	>100		>	-				
SAT Peak Hour	Northumberland Street and Site Access	One-Way Stop Control	LOS		A	>	A	<	A		A	A		>	A				
			Delay		0	>	0	<	4		4	9		>	9				
			V/C		0.05	>	-	<	0.06		-	0.10		>	-				
			Q		<7	>	-	<	<7		-	<7		>	-				
			Ex		>200	>	-	<	>200		-	>100		>	-				
			Avail		>200	>	-	<	>200		-	>100		>	-				

Note: LOS – level of service, V/C – volume to capacity ratio, Q – 95th percentile queue (m), Ex – existing storage (m), Avail – available storage in metres (existing – queue), < or > - shared movement

6.0 Site Circulation and Geometric Review

6.1 Site Circulation

A swept path analysis was undertaken for the site plan to assess the site circulation using the following design vehicles and the resulting vehicle manoeuvring diagrams are provided in **Appendix I**.

1. Front-End Garbage Truck (NCHRP 659, 2010)
2. Pumper Fire Truck (NCHRP 659, 2010)
3. Passenger Car (TAC Geometric Design Guide for Canadian Roads, 1999)

The vehicle manoeuvring diagrams in **Appendix I** indicate that the garbage truck and the pumper fire truck can be accommodated at the site accesses and internally through the site. Moreover, the swept path analysis results in **Appendix I** also indicate that the passenger car can generally be accommodated at the designated parking spaces. It is noted that refinements to the hammerhead turning area at the corner parking spaces are required to accommodate vehicle manoeuvring, which will be addressed through the site plan approval process.

6.2 Sightline Review

A desktop sightline review was carried out based on the requirements outlined in the *"TAC - Geometric Design Guide for Canadian Roads"* to determine if the alignment of the Northumberland Street and Greenfield Road intersection meets the minimum requirements to support the future eastbound traffic demand generated by the proposed development. The desktop sightline review results are provided in **Appendix J**.

As shown in **Appendix J**, the Northumberland Street and Greenfield Road intersection is skewed at an approximate angle of 56.5°, which is below the 60° threshold identified in TAC Section 9.9.2.4 as requiring evaluation of adjustments to the intersection sight distance assessment. In accordance with TAC Section 9.9.2.4, the adjusted major road path length W_2 was calculated using the relationship $W_2 = W_1/\sin\theta$, where W_1 is the total width of the major road lanes to be crossed (13.2 m) and θ is the intersection angle of 56.5°, resulting 15.81 m for W_2. The excess path length ($W_2 - W_1 = 2.61$ m) is less than the 3.6 m threshold identified in TAC Section 9.9.2.4; therefore, no adjustment to the number of lanes to be crossed is required. As a result, the standard intersection sight distance values from the TAC manual were applied without modification.

The design requirements for intersection sight distance for a passenger car with a design speed of 70 km/h (posted speed limit of 60 km/h) from the TAC manual are summarized in **Table 11** for turning sight distances and in **Table 12** for stopping sight distances. As shown in **Table 11** and **Table 12**, the proposed site access meets the minimum turning and stopping sight distances.

It is noted that the intersection skew angle of 56.5° falls outside the desirable range of 80° to 100° identified in TAC Section 9.7.2. While the sightline review confirms that adequate sight distances are available, it is recommended that proper care be taken to ensure that no obstructions (i.e., trees etc.) are placed within the sight triangles of the intersection.

Table 11: Turning Sight Distance Verification Summary for a Passenger Vehicle

Design Speed (km/h)	TAC Requirements (m)		Available Turning Sight Distance (m)	
	Left-Turn Sight Distance	Right-Turn Sight Distance	North of Greenfield Road	South of Greenfield Road
70	150 m	130 m	>200 m	>200 m

Table 12: Stopping Sight Distance Verification Summary for a Passenger Vehicle

Design Speed (km/h)	TAC Requirements (m)	Available Stopping Sight Distance (m)	
	Stopping Sight Distance	North of Greenfield Road	South of Greenfield Road
70	105 m	>200 m	>200 m

6.3 Turn Lanes Warrant Analysis

6.3.1 Left Turn Lanes

A left turn warrant analysis was conducted based on the criteria outlined in the "*MTO Design Supplement for TAC Geometric Design for Canadian Roads (2023)*" to determine if left turn lanes are warranted at the Northumberland Street and Greenfield Road intersection. A design speed of 70 km/h (posted speed of 60 km/h) was considered in the analysis.

The analysis results indicate that a northbound left turn lane is warranted at the Northumberland Street and Greenfield Road intersection during the weekday AM, weekday PM, and Saturday peak hours under all horizon years, including existing (2026) conditions, as summarized in **Table 13**. The weekday PM peak hour governs the required storage length across all horizon years, with a storage length of 25 m warranted under existing (2026) conditions, increasing to 30 m under future (2031) background conditions and 40 m under future (2031) total conditions. It is noted that no left turn lane currently exists at this intersection. Detailed left turn warrant calculations are provided in **Appendix K**.

Table 13: Left Turn Warrant Summary at Greenfield Road and Northumberland Street Intersection

Analysis Factor	Traffic Data – Northumberland Street and Greenfield Road Intersection								
Main Road	Northumberland Street								
Minor Road	Greenfield Road								
Direction	Northbound								
Design Speed	70 km/h								
Horizon Year	Existing (2026)			Future Background (2031)			Future Total (2031)		
Peak Hour	AM	PM	SAT	AM	PM	SAT	AM	PM	SAT
Opposing Volume	320	729	360	354	805	397	370	853	457
Advancing Volume	580	450	374	641	496	413	668	528	450
Left Turning Volume	16	52	53	18	57	59	45	89	96
Warranted	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Storage Length (m)	15	25	15	15	30	15	15	40	25

6.3.2 Right Turn Lanes

As summarized in **Table 14**, under future (2031) total conditions, the eastbound shared left-right turn movement and the southbound shared through-right turn movement are expected to operate with acceptable levels of service, residual capacity, and 95th percentile queue lengths within the available storage during all peak hours, with the exception of the eastbound shared left-right turn movement during the weekday PM peak hour. As discussed in **Section 5.1**, the average control delay for this

movement remains below the threshold of 55 seconds and the 95th percentile queue is expected to be contained within the available storage length.

As per the MTO Design Supplement for TAC Geometric Design for Canadian Roads (2023), a right turn lane is warranted only when right turn volumes are sufficiently high to create operational concerns or impact intersection capacity. Given that the intersection is stop-controlled and the level of service of the eastbound shared left-right turn movement is governed by the left-turn traffic waiting for an acceptable gap in oncoming traffic rather than the right turn volume, a right turn lane is not required to support the operation of the Northumberland Street and Greenfield Road intersection.

Table 14: Future (2031) Total Conditions Intersection Operations Summary at Northumberland Street and Greenfield Road Intersection

Analysis Period	Measure	Eastbound Shared Left-Right Turn Movement		Southbound Shared Through-Right Turn Movement	
AM Peak Hour	Volume	Left-Turn: 52	Right-Turn: 45	Through: 337	Right-Turn: 33
	LOS	C		A	
	Delay	20		0	
	V/C	0.28		0.22	
	Q	9		<7	
PM Peak Hour	Volume	Left-Turn: 68	Right-Turn: 69	Through: 746	Right-Turn: 107
	LOS	F		A	
	Delay	54		0	
	V/C	0.68		0.50	
	Q	32		<7	
SAT Peak Hour	Volume	Left-Turn: 79	Right-Turn: 93	Through: 374	Right-Turn: 83
	LOS	C		A	
	Delay	22		0	
	V/C	0.45		0.27	
	Q	17		<7	

Note: LOS – level of service, V/C – volume to capacity ratio, Q – 95th percentile queue (m)

7.0 Parking Assessment

A review of the applicable parking requirements and proposed parking supply was conducted, and the proposed parking supply is reviewed based on the Township's Zoning By-law 689-83. Relevant excerpts from the Zoning By-law are provided in **Appendix L**.

7.1 Zoning By-law Requirement

7.1.1 Vehicle Parking

A total of 110 parking spaces including six (6) accessible parking spaces are provided on site. The proposed perpendicular parking spaces have a width of 2.8 m and a length of 5.5 m. The parallel parking spaces proposed on the north side of the building have a length of 7 metres and a width of 3 metres.

The following parking rates outlined in the Township's Zoning By-law Section 6.13.5 are the applicable parking standards for the subject site:

- Church, Auditorium, Community Stadium or any use involving assembly of persons
  - 1 space for every 7 seats or 8 Centre, spaces for each 100 m^2 (1,075 ft^2) of floor area available to the public, whichever is greater
- Restaurant or place for dispensing refreshments to the public
  - 1 space for each 4.5 m^2 (50 ft^2) of floor area devoted to public use
- Commercial floor area devoted to retail sales or merchandising
  - 1 space for each 18.5 m^2 (200 ft^2) of such floor area

The proposed rates and corresponding supply as per the Township's By-law requirements, are summarized in **Table 15**. It is noted that the proposed parking supply has a deficiency of 59 spaces.

Table 15: Zoning By-law Vehicular Parking Requirement

Land Use	Area (ft^2) / Capacity (person)	By-law Requirement	Calculated Parking Supply per By-law
Church, Auditorium, Community Stadium or any use involving assembly of persons			
Venue Space 1	4,765 ft^2 (150 persons)	1 space for every 7 seats or 8 Centre, spaces for each 100 m^2 (1,075 ft2) of floor area available to the public, whichever is greater	70
Venue Space 2	2,100 ft^2 (80 persons)		
Hair Salon / Bridal Suite	1,185 ft^2 (20 persons)		
Groom's Suite	1,355 ft^2 (20 persons)		
Restaurant or place for dispensing refreshments to the public			
Restaurant	2,275 ft^2	1 space for each 4.5 m^2 (50 ft^2) of floor area devoted to public use	88
Coffee Shop	365 ft^2		
Wine Cellar	1,755 ft^2		
Commercial floor area devoted to retail sales or merchandising			
Retail Space / Office	2,185 ft^2	1 space for each 18.5 m^2 (200 ft^2) of such floor area	11
		Total Minimum Required Parking Spaces	**169**
		Proposed Parking Spaces	**110**
		Surplus (Deficiency)	**(59)**

7.1.2 Accessible Parking

The Township of North Dumfries Zoning By-law 689-83 does not provide a specific accessible parking supply rate. Accordingly, the minimum accessible parking supply has been reviewed based on the requirements of O. Reg. 191/11 under the Accessibility for Ontarians with Disabilities Act, which sets out the minimum number and type of accessible parking spaces for new or redeveloped off-street parking facilities, as summarized in **Table 16**. The proposed accessible parking supply meets the O. Reg. 191/11 requirement.

Under O. Reg. 191/11, a minimum width of 3.4 m is required for Type A accessible parking spaces, and a minimum width of 2.4 m is required for Type B accessible parking spaces, with a minimum 1.5 m access aisle. The proposed Type A accessible parking space has dimensions of 5.5 m in length and 4.5 m in width, and the proposed Type B accessible parking space has dimensions of 5.5 m in length and 3.4 m in width, with a 1.5 m access aisle provided adjacent to the Type B spaces.

It is noted that the access aisle for the Type A accessible parking space is not currently shown on the site plan. However, given that the proposed Type A space width of 4.5 m exceeds the minimum requirement of 3.4 m, shared access aisle for Type A accessible parking spaces can be accommodated, which will be addressed during the site plan approval process.

Table 16: Accessible Parking Requirement

Number of Proposed Parking Spaces	By-law Requirement	Calculated Parking Supply per By-law	Proposed Parking Supply	Surplus (Deficiency)
110	1 space plus 3% of the total spaces, where there are between 101 and 200 parking spaces	5	6	1
	Total	**5**	**6**	**1**

7.1.3 Loading Space

Based on the requirement outlined in the Section 6.12 of the Township's Zoning By-law, a minimum of one (1) loading space is required for each 2,300 m^2 (25,000 ft^2) or part thereof of building floor area.

The gross floor area of the proposed development is 2,251 m^2 (24,230 ft^2), which requires a minimum of one (1) loading space. The site plan provides one loading space with a length of 10.0 m and a width of 3.5 m. The proposed width meets the minimum dimensional requirement outlined in Section 6.12.3 of the Zoning By-law; however, the proposed length is below the required 10.5 m. This dimensional deficiency will be addressed through the site plan approval process.

7.2 Parking Justification

The Township of North Dumfries Zoning By-law 689-83 does not include a shared parking methodology or time-of-day parking reduction provisions. As such, the by-law parking requirement of 169 spaces (**Table 15**), represents a conservative estimate that assumes all land uses operate simultaneously at full parking demand. In practice, the proposed development comprise of uses with varying operating hours (**Table 5**), which significantly reduces the likelihood of all uses reaching peak parking demand concurrently.

The minimum parking requirement for each land use based on its respective operating hours is summarized in **Table 17**. As shown in **Table 17**, the peak parking demand occurs on Friday evenings

between 3:00 pm and 1:00 am, with a total requirement of 145 spaces, resulting in a deficiency of 35 spaces relative to the proposed supply of 110 spaces. It is noted that several uses are non-operational during this peak period, including hair salon / bridal suite, groom's suite, and coffee shop.

During event hours, a significant portion of restaurant and wine cellar customers are expected to be event venue guests who are already accounted for under the venue parking demand. It is expected that the restaurant and wine cellar capacity will be at 50% capacity during events and taking this into consideration, the adjusted parking requirements are summarized in **Table 18**. Under this scenario, the peak parking demand is reduced to 118 spaces on Friday afternoons (prior to 3:00 pm), representing a deficiency of 8 spaces. During all other time periods, the proposed supply of 110 spaces exceeds the adjusted parking requirement.

Table 17: Minimum Parking Requirements Based on Operating Hours

Land Use	Monday - Thursday	Friday		Saturday		Sunday
		Prior to 3:00 pm	3:00 pm to 1:00 am	Prior to 3:00 pm	3:00 pm to 1:00 am	
Venue Space	-	-	52	-	52	-
Hair Salon / Bridal Suite	9	19	-	19	-	-
Groom's Suite	-		-		-	-
Restaurant	88	88	46	88	46	88
Coffee Shop			-		-	
Wine Cellar			36		36	
Retail Space / Office	11	11	11	-	-	-
Total	**108**	**118**	**145**	**107**	**134**	**88**
Surplus (Deficiency)	**2**	**(8)**	**(35)**	**3**	**(24)**	**22**

Table 18: Minimum Parking Requirements Based on Operating Hours with Venue Guest Capture Adjustment

Land Use	Monday - Thursday	Friday		Saturday		Sunday
		Prior to 3:00 pm	3:00 pm to 1:00 am	Prior to 3:00 pm	3:00 pm to 1:00 am	
Venue Space	-	-	52	-	52	-
Hair Salon / Bridal Suite	9	19	-	19	-	-
Groom's Suite	-		-		-	-
Restaurant	88	88	23	88	23	88
Coffee Shop			-		-	
Wine Cellar			18		18	
Retail Space / Office	11	11	11	-	-	-
Total	**108**	**118**	**104**	**107**	**93**	**88**
Surplus (Deficiency)	**2**	**(8)**	**6**	**3**	**17**	**22**

The deficiency of 8 spaces occurs on Friday afternoons prior to 3:00 pm, a period during which the venue spaces are not yet operational, and parking demand is generated by the hair salon / bridal suite,

groom's suite, restaurant, wine cellar, coffee shop, and retail space / office. The coffee shop is not a standalone destination use but rather a complementary amenity serving customers of the on-site hair salon / bridal suite, groom's suite, and restaurant. With a floor area of 365 ft², the coffee shop is subject to the *"Restaurant or place for dispensing refreshments to the public"* parking rate of 1 space per 50 ft² of floor area, resulting in a requirement of 8 spaces or 7.3 spaces. Given the ancillary nature of the coffee shop, its parking demand is largely captured within the broader on-site population and does not represent an independent parking generator during peak periods.

It is also noted that the proposed parking supply reflects site-specific physical constraints that limit the total achievable parking area on the subject property. The proposed layout has been optimized within these constraints to maximize the available parking supply.

In consideration of the varying operating hours of the proposed uses, the internal capture of restaurant and wine cellar demand by event venue guests, the ancillary nature of the coffee shop, and the site constraints affecting parking supply, the proposed parking supply of 110 spaces is considered appropriate and adequate to serve the proposed development.

8.0 Transportation Demand Management (TDM) Plan

Transportation demand management (TDM) is a set of strategies and initiatives used to improve transportation efficiency (i.e., reduce congestion), encourage use of alternative travel modes, and reduce reliance on single vehicle occupancy. The following TDM measures can be considered to further reduce the parking demand for the proposed development.

Pre-Arranged Transportation

The operator of the proposed development is experienced in managing event venues and through established partnerships with hotels in Cambridge, Kitchener, and Waterloo, the majority of event guests are expected to use pre-arranged transportation such as shuttle services, Uber, and taxis for travel to and from their accommodations to the event venue. Based on industry experience of the operator, it is estimated that 50% to 60% of event guests will arrive via pre-arranged transportation rather than private vehicles. This significantly reduces the effective parking demand generated by the venue spaces during peak event periods on Friday and Saturday evenings.

Carpooling

It is recommended that employees of the proposed developments be encouraged to carpool, particularly on Fridays when the co-occurrence of daytime retail / office operations and early afternoon activity from other on-site uses results in the highest non-event parking demand. A carpooling program could be implemented through designated preferred parking spaces for carpooling vehicles and communication of the program to tenants and employees as part of the site's overall TDM strategy.

9.0 Conclusions

Based on the analysis results, the following conclusions can be made:

Existing Conditions

- The analysis results indicate that all movements at study intersections are operating with acceptable level of service and residual capacity during the weekday AM, weekday PM, and Saturday peak hours under existing conditions.

- The analysis results indicate that queues can be accommodated within the available storage during all peak hours under existing conditions.

Future Background Conditions

- The analysis results indicate that all movements at study intersections are operating with acceptable level of service and residual capacity during the weekday AM, weekday PM, and Saturday peak hours under future (2031) background conditions.
- The analysis results indicate that queues can be accommodated within the available storage during all peak hours under future (2031) background conditions.

Traffic Trip Generation

- The site is expected to generate 65 new vehicle trips during the weekday AM peak hour, 166 new vehicle trips during the weekday PM peak hour, and 200 new vehicle trips during the Saturday peak hour.

Future Total Conditions

- The analysis results indicate that all movements at study intersections are operating with acceptable level of service and residual capacity during the weekday AM, weekday PM, and Saturday peak hours under future (2031) total conditions.
    - While the eastbound shared left-right turn movement at the Northumberland Street and Greenfield Road intersection is projected to operate at LOS F during the weekday PM peak hour, the average control delay of 54 seconds remains below the threshold of 55 seconds.
- The analysis results indicate that queues can be accommodated within the available storage during all peak hours under future (2031) total conditions.
- No mitigation measures are required to support the proposed development.

Site Circulation and Geometric Review

- Based on the swept path analysis, it is observed that the garbage truck and the pumper fire truck, and the passenger vehicles can be accommodated at the site access and internally through the site.
    - It is noted that refinements to the hammerhead turning area at the corner parking spaces are required to accommodate vehicle manoeuvring, which will be addressed through the site plan approval process
- The existing alignment of the Northumberland Street and Greenfield Road intersection meets the minimum sight distance requirements for the shared eastbound left-right-turn movement.
    - It is noted that the intersection skew angle of 56.5° falls outside the desirable range of 80° to 100° identified in TAC Section 9.7.2. While the sightline review confirms that adequate sight distances are available, it is recommended that proper care be taken to ensure that no obstructions (i.e., trees etc.) are placed within the sight triangles of the intersection.
- A northbound left-turn lane is warranted at the Northumberland Street and Greenfield Road intersection during all study peak hours and horizon years, including under existing (2026) conditions. A storage length of 25 m, 30 m, and 40 m is warranted under existing (2026), future (2031) background, and future (2031) total conditions, respectively.

- Eastbound and southbound right-turn lanes are not recommended at the Northumberland Street and Greenfield Road intersection under future (2031) total conditions based on the results of operational analysis.
    - Although the eastbound shared left-right turn movement is projected to operate at LOS F during the weekday PM peak hour, the average control delay remains below the 55-second threshold and the 95th percentile queue is expected to be contained within the available storage length. The delay experienced by the eastbound movement is governed by the left turn movement waiting for an acceptable gap in traffic on the stop-controlled approach, rather than the right turn volume.

Parking Supply

- The proposed parking supply for the development is below the Township's Zoning by-law requirement. The findings from a detailed parking justification study supplemented with a site-specific transportation demand management (TDM) plan show that the subject site's expected parking demand can be accommodated by the proposed parking supply.
- The deficiency in the accessible parking space and loading space dimensions will be addressed during the site plan approval stage.

Appendix A

Terms of Reference and Confirmation Emails

TRAFFMOBILITY

MEMO

To: Michael Campos (Township of North Dumfries)

From: Rudy Sooklall

cc: Caroline Baker (Baker Planning Group)

Date: April 17, 2026

Subject: Terms of Reference for 3089 Greenfield Road Traffic Impact and Parking Study

1.0 Introduction

TraffMobility Engineering Inc. (TraffMobility) was retained to undertake a Traffic Impact and Parking Study (TIPS) to support the Official Plan Amendment (OPA) and Zoning By-law Amendment (ZBA) applications for a proposed Event Venue and Restaurant development at 3089 Greenfield Road in the Township of North Dumfries (Township), Ontario.

The existing historic Mill building will be redeveloped to provide an Event Space Venue (1,394 m^2), Restaurant (465 m^2), Kitchen (465 m^2) and Common/Shared/Storage (465 m^2). Access will be via Greenfield Road and surface parking spaces will be provided including barrier-free parking. A copy of the conceptual site plan is provided in **Attachment 1**.

2.0 Terms of Reference

The proposed Terms of Reference (TOR) for the Traffic Impact and Parking Study is provided below.

2.1 Study Area

The subject site is located on the south side of Greenfield Road approximately 235 metres west of Northumberland Street as shown in **Figure 1** and the proposed study intersections are:

- Greenfield Road / Northumberland Street (unsignalized)
- Greenfield Road / Proposed Site Access

2.2 Data Collection and Analysis Period

The analysis periods will be the weekday AM, weekday PM and Saturday peak periods for the study intersections shown in **Figure 1**. Additional traffic information will be collected from the Township including proposed adjacent background development details and site trips, and prevailing growth rates in the study area.

TraffMobility will undertake the traffic capacity analyses for the horizon years as outlined in **Section 2.4** for the weekday AM (7:00 AM to 9:00 AM), weekday PM (4:00 PM to 6:00 PM) and Saturday (10:00 AM to 2:00 PM) peak periods.

Figure 1: Site Location and Study Intersections

2.3 Existing Transportation Network in the Study Area

The study will provide an overview of the existing conditions within the study area by providing descriptions of key transportation elements. These items will include as applicable roadway classification, posted speed, number of lanes, transit service, sidewalk, and bike lane provisions.

2.4 Horizon Years for the Traffic Analysis

TraffMobility proposes to undertake the traffic analysis for the following three (3) conditions for the purpose of this study:

- 2026 Existing Conditions
- 2031 Future Background Conditions (without the proposed development site traffic)
- 2031 Future Total Conditions (with the proposed development site traffic)

2.5 Site Trip Generation

Peak hours trip generation for the proposed development will be forecasted using the Institute of Transportation Engineers (ITE) Trip Generation Manual, 12th Edition for the Restaurant and the person capacity for the Event Venue.

Access to the adjacent road network and existing traffic patterns will be used to determine the proposed development auto site trips distribution.

2.6 Background Growth and Development Information

It is requested that the Township identify and provide any planned adjacent development site traffic volumes which should be included in the forecast of future background traffic volumes. Moreover, it is

requested the Township provide the growth rate to be used in the study or provide the historical traffic counts of adjacent roads to estimate the growth rate.

2.7 Capacity Analysis Software

TraffMobility will use the Synchro 12 software for the traffic analyses at the proposed study intersections. This study will use the Highway Capacity Manual (HCM) outputs and any improvements required to support the proposed development will be identified.

2.8 Parking Study

A parking study will be conducted to support the proposed parking supply for the proposed development which will include a benchmarking analysis of Zoning By-laws in other municipalities for venue space. The operations of the proposed development including operating hours for each land use and the person capacity of the Event Venue will be considered in the forecast of parking demand for the site.

The operators of the proposed development are experienced in managing event venues and in partnerships with hotels in Cambridge, Kitchener and Waterloo most guests to an event venue will use pre-arranged transport such as shuttle service, Uber and taxis for travel to and from their accommodations to an event venue. This will be detailed in the parking study.

2.9 Documentation

TraffMobility will prepare a draft Traffic Impact and Parking Study report documenting the methodology, assumptions, and findings of the study. The draft Traffic Impact and Parking Study Report will be sent to the Township for review and comments. The report will be finalized by addressing comments received from the Township.

3.0 Traffic Data Request

TraffMobility is requesting the following data from the Township for use in this study:

- Planned adjacent development site traffic volumes to be considered.
- Traffic growth rate to be used in the study or historical traffic counts of adjacent roads to determine growth rates.

Thank you for your time and please feel free to contact the undersigned should you have any questions.

Sincerely,

TraffMobility Engineering Inc.

Rudy Sooklall, M.A.Sc., P.Eng.
Director of Transportation
cell: 416-526-8408
email: rudy.sooklall@traffmobility.com

Attachments:
Attachment 1: Conceptual Site Plan

Outlook

RE: File No: PC-18/24 - Terms of Reference for 3089 Greenfield Road Traffic Impact and Parking Study

From Michael Campos <mcampos@northdumfries.ca>
Date Wed 5/20/2026 8:47 AM
To Rudy Sooklall <Rudy.Sooklall@traffmobility.com>
Cc Caroline Baker <caroline@bakerpg.com>; Planning <planning@northdumfries.ca>

Hi Rudy,

Apologies – I was off during the first week of May and missed sending this to you. Thank you for following up.

Our Engineering Consultant (RJ Burnside) has reviewed the TOR and have provided the following comments:

- The Township should confirm if they have any historical traffic counts on Greenfield Road and Northumberland Street to base growth on. If not, we suggest using growth of 2% per annum, compounded.
- On-site circulation should be confirmed with AutoTURN analysis for waste vehicles and fire trucks.
- Northumberland Street intersects Waterloo Regional Road 58 on a skew. Confirm safety of skewed alignment.
- Northumberland Street is Regional Road 58. Comments should be provided from the Region.
- Review MTO warrants for a left turn lane or right turn lane/taper at the intersection of Northumberland Street / Greenfield Road.
- The TOR proposes to use the ITE Trip Generation Manual to forecast the restaurant traffic. We assume that it is intended to use ITE LUC 931 (Fine Dining Restaurant), although this is not specified in the TOR. Due to the small number of studies for LUC 931, we recommend that additional information be provided to confirm restaurant operations (e.g., staffing, seating capacity etc.). We also assume that the restaurant can operate concurrently with the event venue (i.e., total trip generation and total parking requirements to be based on such each operating during peak periods).
- The TOR proposes to base trip generation for the event venue on the person capacity. Considering the potential for a wide variety of event types, any assumptions with respect to the number of persons per vehicle should be supported by the event type proposed.
- The TOR proposes to forecast parking demand based on benchmarking with Zoning By-laws in other municipalities, the person capacity of the event venue and the potential transport to the site via other modes (e.g., shuttle service, Uber, taxis). Considering the unique nature of such event venues, it will be difficult to find applicable land use types that are representative in Zoning By-laws from other municipalities. Unless the specific types of events can be confirmed and/or parking demands at similar developments can be used as proxy sites, the parking demands should be based on a first principles analysis of the proposed operations (staffing, patrons, etc.). Reductions in parking demand due to transport via other modes should not be used to reduce parking demand since they cannot be relied upon.

Should you have any questions, I can connect you with our Traffic Engineer.

Thank you!

Michael

Michael Campos, BES, RPP, MCIP
Manager of Planning

The Corporation of the Township of North Dumfries
106 Earl Thompson Road, 3rd Floor
P.O. Box 1060
Ayr, Ontario N0B 1E0

☎ 519-632-8800 ext. 132 🖷 519-632-8700
✉ mcampos@northdumfries.ca

Website: https://www.northdumfries.ca

Do you really need to print? Think green.

From: Rudy Sooklall <Rudy.Sooklall@traffmobility.com>
Sent: May 19, 2026 6:31 PM
To: Michael Campos <mcampos@northdumfries.ca>
Cc: Caroline Baker <caroline@bakerpg.com>
Subject: Re: File No: PC-18/24 - Terms of Reference for 3089 Greenfield Road Traffic Impact and Parking Study

Hi Michael,

Can you please provide an update on our TOR?

Thank you!

Regards,

Rudy Sooklall, M.A.Sc., P.Eng.
President and Director of Transportation

direct: 416-526-8408
email: rudy.sooklall@traffmobility.com
www.traffmobility.com

From: Michael Campos <mcampos@northdumfries.ca>
Sent: Friday, April 17, 2026 10:20 AM
To: Rudy Sooklall <Rudy.Sooklall@traffmobility.com>
Cc: Caroline Baker <caroline@bakerpg.com>
Subject: RE: File No: PC-18/24 - Terms of Reference for 3089 Greenfield Road Traffic Impact and Parking Study

Hi Rudy,

Thank you for forwarding the Terms of Reference. I will circulate this to our engineering consultant for review and will provide any comments once received.

I will be in touch as soon as I hear back.

Thank you!

Michael

Michael Campos, BES, RPP, MCIP

Manager of Planning

The Corporation of the Township of North Dumfries

106 Earl Thompson Road, 3rd Floor

P.O. Box 1060

Ayr, Ontario N0B 1E0

☎ 519-632-8800 ext. 132 7 519-632-8700

✉ mcampos@northdumfries.ca

Website: https://www.northdumfries.ca

The TOWNSHIP of NORTH DUMFRIES

Do you really need to print? Think green.

From: Rudy Sooklall <Rudy.Sooklall@traffmobility.com>
Sent: April 17, 2026 9:31 AM
To: Michael Campos <mcampos@northdumfries.ca>
Cc: Caroline Baker <caroline@bakerpg.com>
Subject: File No: PC-18/24 - Terms of Reference for 3089 Greenfield Road Traffic Impact and Parking Study

Hello Michael,

TraffMobility was retained to conduct a Traffic Impact and Parking Study (TIPS) to support the development application for 3089 Greenfield Road. Our proposed Terms of Reference for the TIPS is attached for the Township's review and approval.

Regards,

Rudy Sooklall, M.A.Sc., P.Eng.
President and Director of Transportation

TRAFFMOBILITY

direct: 416-526-8408
email: rudy.sooklall@traffmobility.com
www.traffmobility.com

Appendix B

Existing Turning Movement Counts

Greenfield Road & Northumberland Street

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:30:00
To: 8:30:00

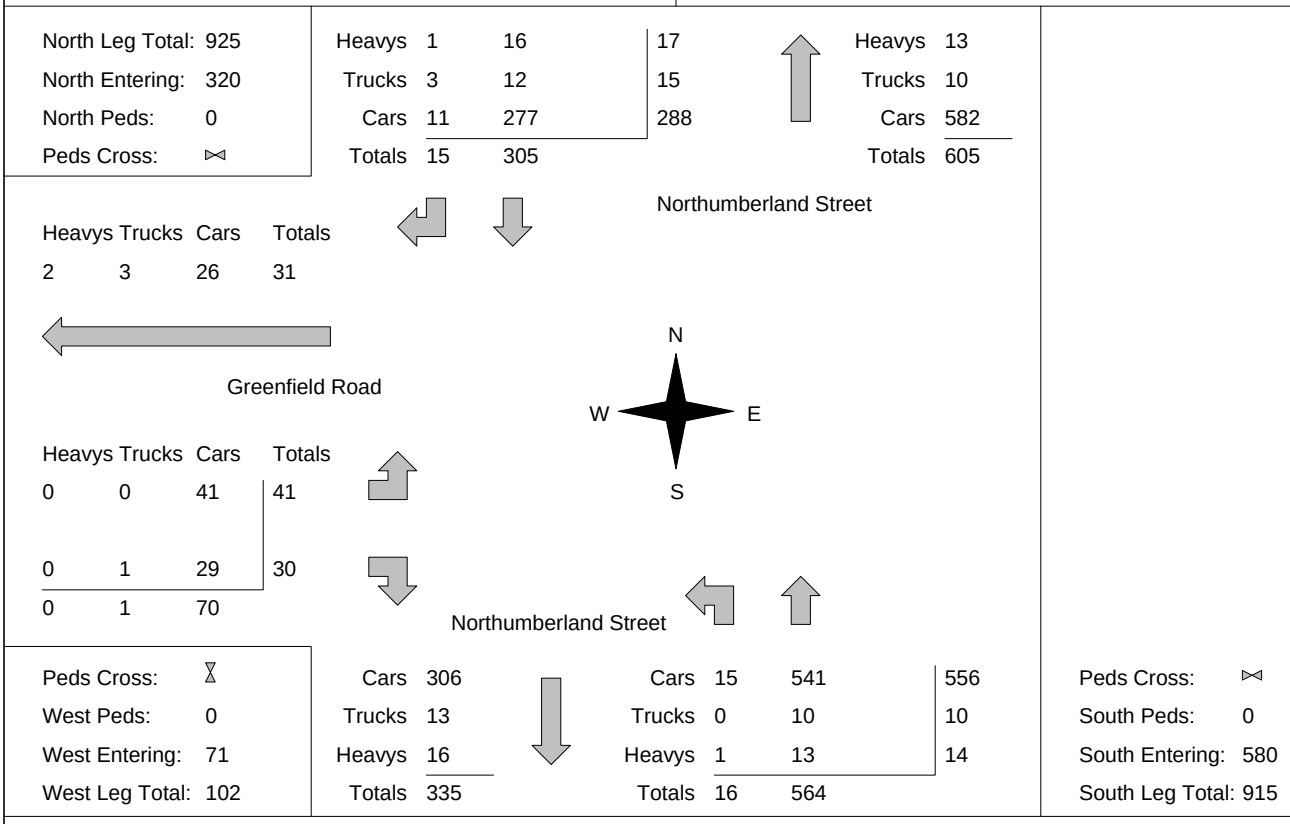
Municipality: North Dumfries
Site #: 0000004200
Intersection: Northumberland Street & Greenfield
TFR File #: 1
Count date: 28-May-2026

Weather conditions:
Clear

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Northumberland Street runs N/S



Comments

There were no Cyclists.

Greenfield Road & Northumberland Street

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 16:30:00
To: 17:30:00

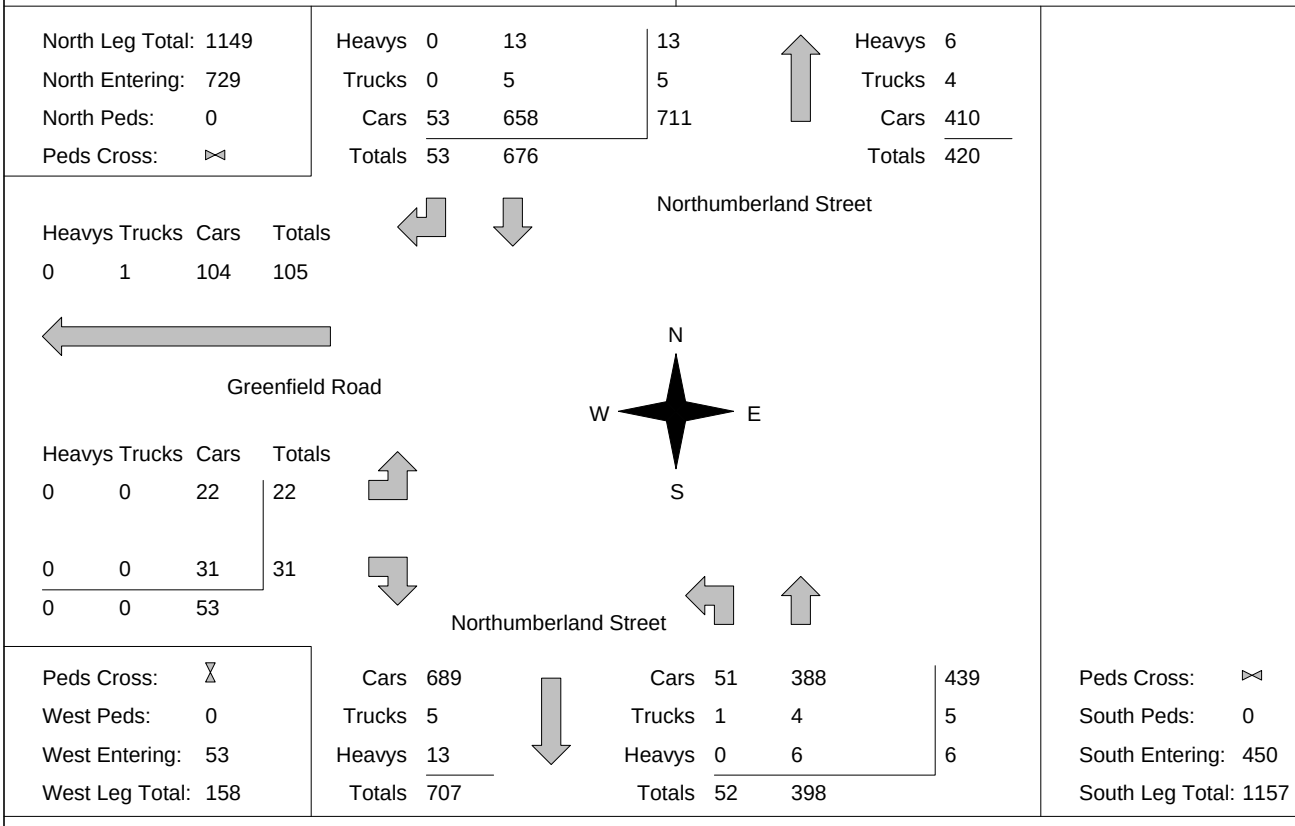
Municipality: North Dumfries
Site #: 0000004200
Intersection: Northumberland Street & Greenfield
TFR File #: 1
Count date: 28-May-2026

Weather conditions:
Clear

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Northumberland Street runs N/S



Comments

There were no Cyclists.

Greenfield Road & Northumberland Street

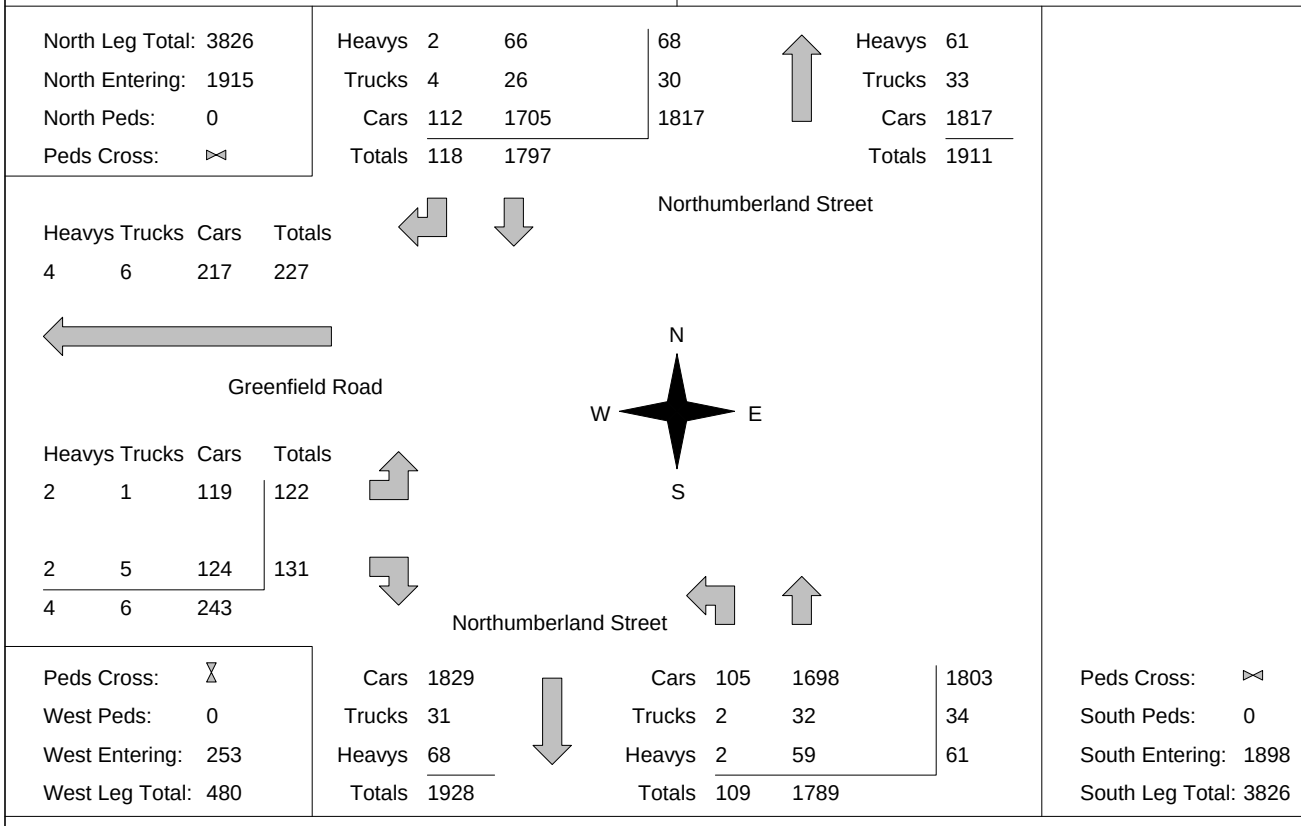
Total Count Diagram

Municipality: North Dumfries
Site #: 0000004200
Intersection: Northumberland Street & Greenfield
TFR File #: 1
Count date: 28-May-2026

Weather conditions:
Clear
Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Northumberland Street runs N/S



Comments

There were no Cyclists.

Greenfield Road & Northumberland Street
Traffic Count Summary

Intersection: Northumberland Street & Greenfiel | **Count Date:** 28-May-2026 | **Municipality:** North Dumfries

North Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds	North/South Total Approaches
7:00:00	0	0	0	0	0	0
8:00:00	0	259	14	273	0	807
9:00:00	0	274	14	288	0	826
16:00:00	0	0	0	0	0	0
17:00:00	0	642	47	689	0	1126
18:00:00	0	622	43	665	0	1054
Totals:	0	1797	118	1915	0	3813

South Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0
8:00:00	6	528	0	534	0
9:00:00	22	516	0	538	0
16:00:00	0	0	0	0	0
17:00:00	39	398	0	437	0
18:00:00	42	347	0	389	0
Totals:	109	1789	0	1898	0

East Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds	East/West Total Approaches
7:00:00	0	0	0	0	0	0
8:00:00	0	0	0	0	0	72
9:00:00	0	0	0	0	0	55
16:00:00	0	0	0	0	0	0
17:00:00	0	0	0	0	0	61
18:00:00	0	0	0	0	0	65
Totals:	0	0	0	0	0	253

West Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0
8:00:00	48	0	24	72	0
9:00:00	22	0	33	55	0
16:00:00	0	0	0	0	0
17:00:00	31	0	30	61	0
18:00:00	21	0	44	65	0
Totals:	122	0	131	253	0

Calculated Values for Traffic Crossing Major Street

Hours Ending:	7:00	8:00	9:00	16:00	17:00	17:00	18:00	18:00
Crossing Values:	0	48	22	0	31	31	21	21

Greenfield Road & Northumberland Street

Mid-day Peak Diagram

Specified Period
From: 10:00:00
To: 14:00:00

One Hour Peak
From: 11:15:00
To: 12:15:00

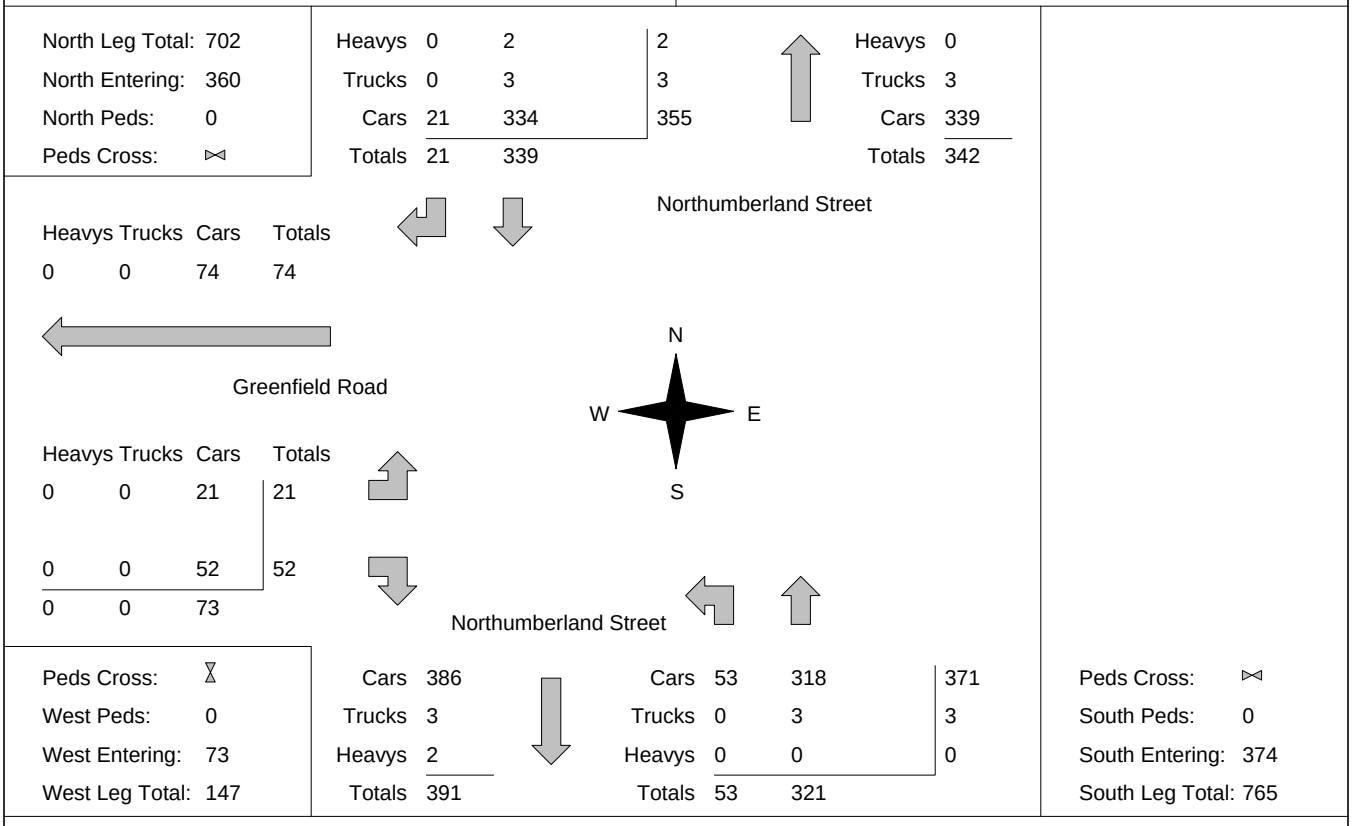
Municipality: North Dumfries
Site #: 0000004200
Intersection: Northumberland Street & Greenfield
TFR File #: 1
Count date: 30-May-2026

Weather conditions:
Clear

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Northumberland Street runs N/S



Comments

Greenfield Road & Northumberland Street

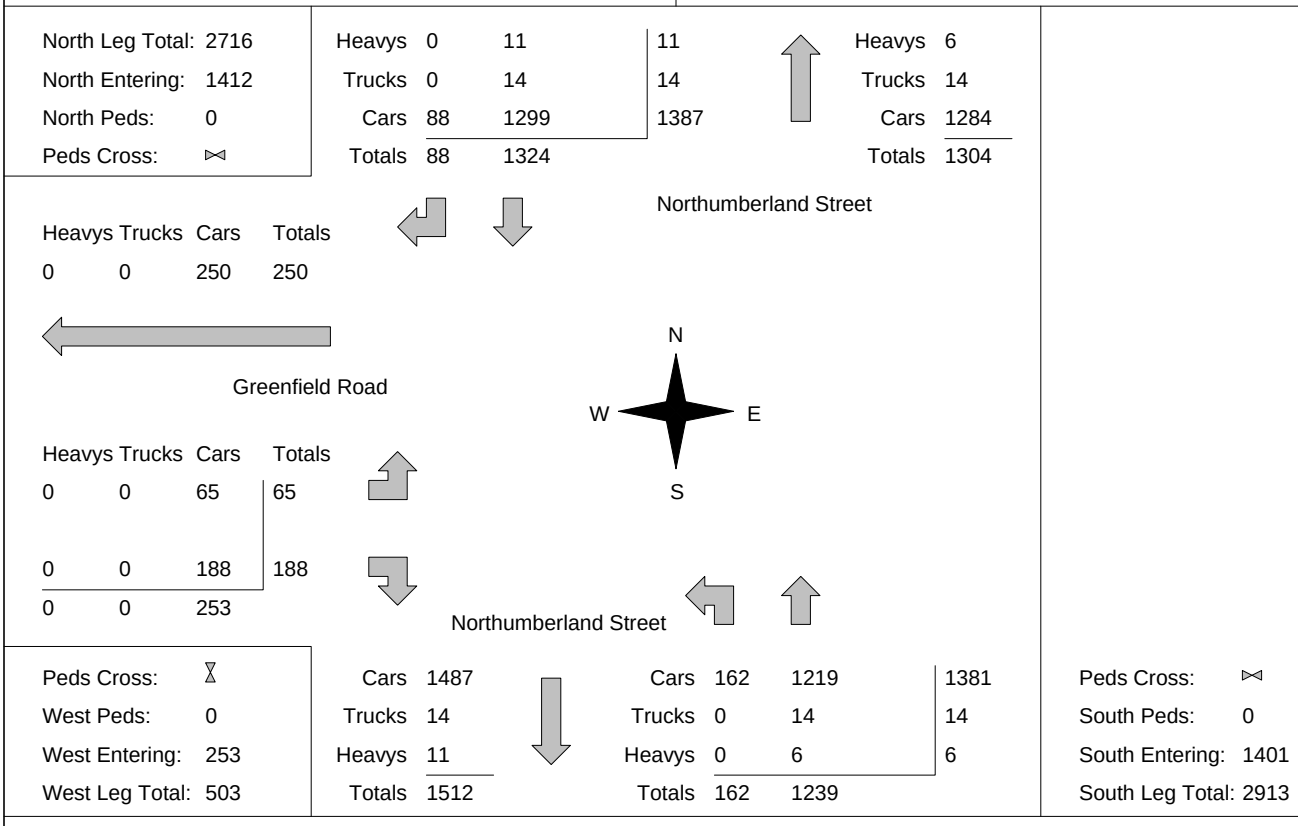
Total Count Diagram

Municipality: North Dumfries
Site #: 0000004200
Intersection: Northumberland Street & Greenfield
TFR File #: 1
Count date: 30-May-2026

Weather conditions:
Clear
Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Northumberland Street runs N/S



Comments

Greenfield Road & Northumberland Street
Traffic Count Summary

Intersection: Northumberland Street & Greenfiel | **Count Date:** 30-May-2026 | **Municipality:** North Dumfries

North Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds	North/South Total Approaches
10:00:00	0	0	0	0	0	0
11:00:00	0	278	29	307	0	652
12:00:00	0	316	19	335	0	705
13:00:00	0	347	21	368	0	730
14:00:00	0	383	19	402	0	726
Totals:	0	1324	88	1412	0	2813

South Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds
10:00:00	0	0	0	0	0
11:00:00	38	307	0	345	0
12:00:00	48	322	0	370	0
13:00:00	37	325	0	362	0
14:00:00	39	285	0	324	0
Totals:	162	1239	0	1401	0

East Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds	East/West Total Approaches
10:00:00	0	0	0	0	0	0
11:00:00	0	0	0	0	0	70
12:00:00	0	0	0	0	0	75
13:00:00	0	0	0	0	0	59
14:00:00	0	0	0	0	0	49
Totals:	0	0	0	0	0	253

West Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds
10:00:00	0	0	0	0	0
11:00:00	21	0	49	70	0
12:00:00	23	0	52	75	0
13:00:00	10	0	49	59	0
14:00:00	11	0	38	49	0
Totals:	65	0	188	253	0

Calculated Values for Traffic Crossing Major Street

Hours Ending:	10:00	11:00	12:00	12:00	13:00	13:00	14:00	14:00
Crossing Values:	0	21	23	23	10	10	11	11

Greenfield Road & Northumberland Street

Mid-day Peak Diagram

Specified Period
From: 10:00:00
To: 14:00:00

One Hour Peak
From: 10:45:00
To: 11:45:00

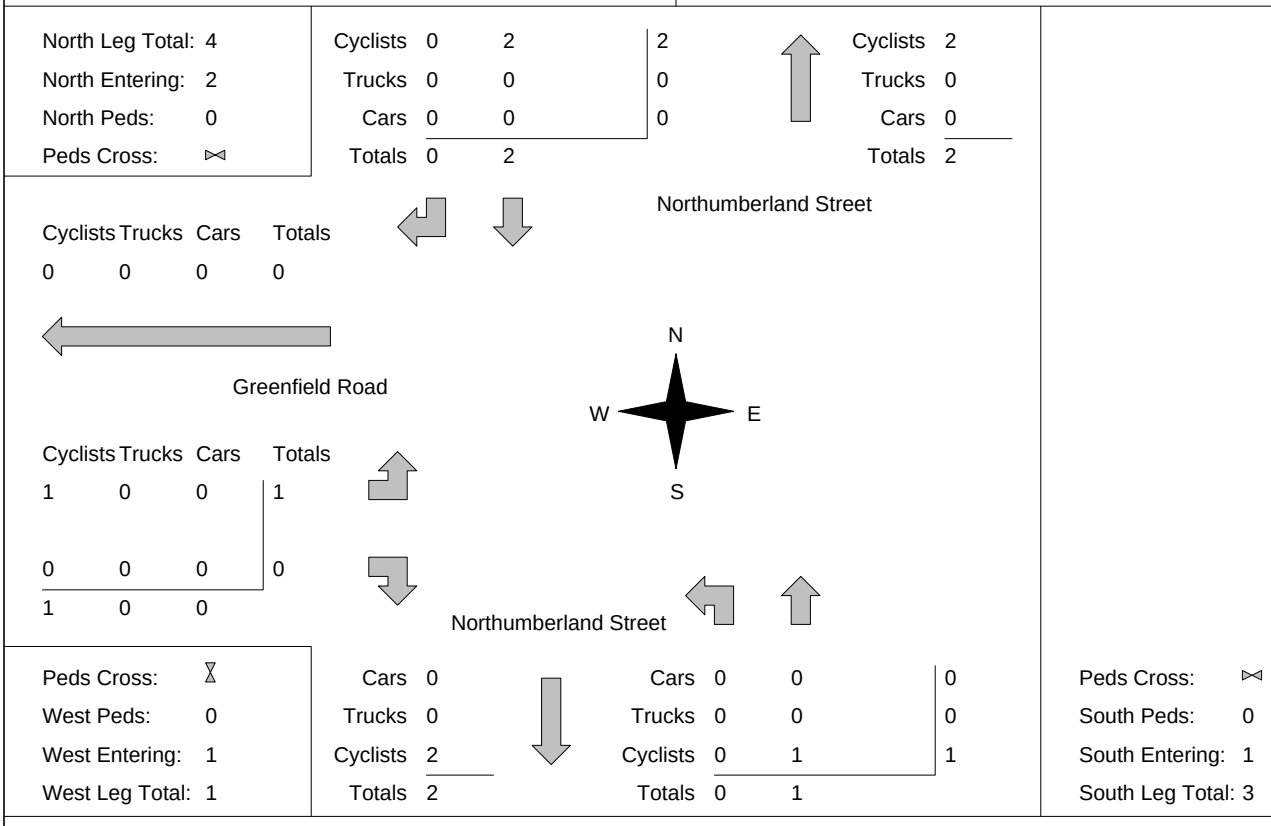
Municipality: North Dumfries
Site #: 5000004200
Intersection: Northumberland Street & Greenfield
TFR File #: 1
Count date: 30-May-2026

Weather conditions:
Clear

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Northumberland Street runs N/S



Comments

Greenfield Road & Northumberland Street

Total Count Diagram

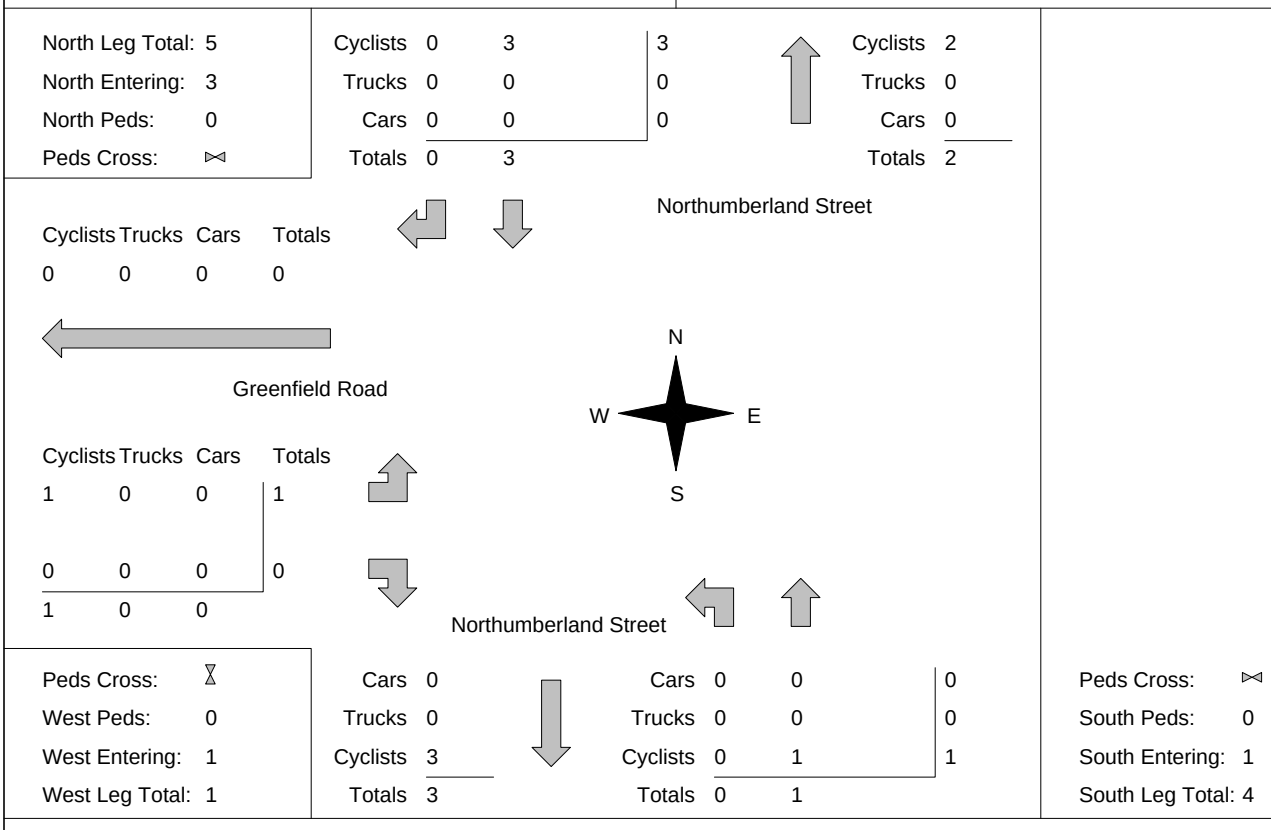
Municipality: North Dumfries
Site #: 5000004200
Intersection: Northumberland Street & Greenfield
TFR File #: 1
Count date: 30-May-2026

Weather conditions:
Clear

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Northumberland Street runs N/S



Comments

Greenfield Road & Northumberland Street
Traffic Count Summary

Intersection: Northumberland Street & Greenfiel | **Count Date:** 30-May-2026 | **Municipality:** North Dumfries

North Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds	North/South Total Approaches
10:00:00	0	0	0	0	0	0
11:00:00	0	1	0	1	0	2
12:00:00	0	1	0	1	0	1
13:00:00	0	1	0	1	0	1
14:00:00	0	0	0	0	0	0
Totals:	0	3	0	3	0	4

South Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds
10:00:00	0	0	0	0	0
11:00:00	0	1	0	1	0
12:00:00	0	0	0	0	0
13:00:00	0	0	0	0	0
14:00:00	0	0	0	0	0
	0	1	0	1	0

East Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds	East/West Total Approaches
10:00:00	0	0	0	0	0	0
11:00:00	0	0	0	0	0	0
12:00:00	0	0	0	0	0	1
13:00:00	0	0	0	0	0	0
14:00:00	0	0	0	0	0	0
Totals:	0	0	0	0	0	1

West Approach Totals

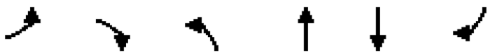
Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds
10:00:00	0	0	0	0	0
11:00:00	0	0	0	0	0
12:00:00	1	0	0	1	0
13:00:00	0	0	0	0	0
14:00:00	0	0	0	0	0
	1	0	0	1	0

Calculated Values for Traffic Crossing Major Street

Hours Ending:	10:00	11:00	12:00	12:00	13:00	13:00	14:00	14:00
Crossing Values:	0	0	1	1	0	0	0	0

Appendix C

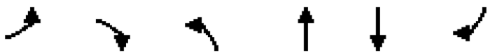
Existing Intersection Operation Calculations (Synchro)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	41	30	16	564	305	15
Future Volume (Veh/h)	41	30	16	564	305	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	41	30	16	564	305	15
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	909	313	320			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	909	313	320			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	87	96	99			
cM capacity (veh/h)	304	725	1218			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	71	580	320
Volume Left	41	16	0
Volume Right	30	0	15
cSH	403	1218	1700
Volume to Capacity	0.18	0.01	0.19
Queue Length 95th (m)	4.8	0.3	0.0
Control Delay (s/veh)	15.8	0.4	0.0
Lane LOS	C	A	
Approach Delay (s/veh)	15.8	0.4	0.0
Approach LOS	C		

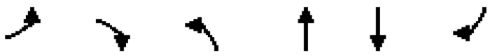
Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	22	31	52	398	676	53
Future Volume (Veh/h)	22	31	52	398	676	53
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	22	31	52	398	676	53
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1205	703	729			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1205	703	729			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	93	94			
cM capacity (veh/h)	193	441	875			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	53	450	729
Volume Left	22	52	0
Volume Right	31	0	53
cSH	288	875	1700
Volume to Capacity	0.18	0.06	0.43
Queue Length 95th (m)	5.0	1.4	0.0
Control Delay (s/veh)	20.3	1.7	0.0
Lane LOS	C	A	
Approach Delay (s/veh)	20.3	1.7	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		



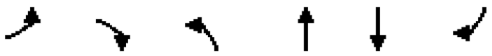
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	21	52	53	321	339	21
Future Volume (Veh/h)	21	52	53	321	339	21
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	21	52	53	321	339	21
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	777	350	360			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	777	350	360			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	93	96			
cM capacity (veh/h)	352	698	1210			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	73	374	360
Volume Left	21	53	0
Volume Right	52	0	21
cSH	545	1210	1700
Volume to Capacity	0.13	0.04	0.21
Queue Length 95th (m)	3.5	1.0	0.0
Control Delay (s/veh)	12.6	1.5	0.0
Lane LOS	B	A	
Approach Delay (s/veh)	12.6	1.5	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	59.5%	ICU Level of Service	B
Analysis Period (min)	15		

Appendix D

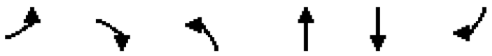
Future (2031) Background Intersection Operation Calculations (Synchro)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	45	33	18	623	337	17
Future Volume (Veh/h)	45	33	18	623	337	17
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	45	33	18	623	337	17
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1005	346	354			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1005	346	354			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	83	95	98			
cM capacity (veh/h)	266	695	1183			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	78	641	354
Volume Left	45	18	0
Volume Right	33	0	17
cSH	360	1183	1700
Volume to Capacity	0.22	0.02	0.21
Queue Length 95th (m)	6.2	0.4	0.0
Control Delay (s/veh)	17.7	0.4	0.0
Lane LOS	C	A	
Approach Delay (s/veh)	17.7	0.4	0.0
Approach LOS	C		

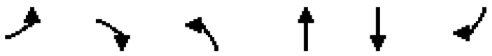
Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	24	34	57	439	746	59
Future Volume (Veh/h)	24	34	57	439	746	59
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	24	34	57	439	746	59
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1329	776	805			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1329	776	805			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	92	93			
cM capacity (veh/h)	161	401	819			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	58	496	805
Volume Left	24	57	0
Volume Right	34	0	59
cSH	248	819	1700
Volume to Capacity	0.23	0.07	0.47
Queue Length 95th (m)	6.7	1.7	0.0
Control Delay (s/veh)	23.9	1.9	0.0
Lane LOS	C	A	
Approach Delay (s/veh)	23.9	1.9	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	92.1%	ICU Level of Service	F
Analysis Period (min)	15		



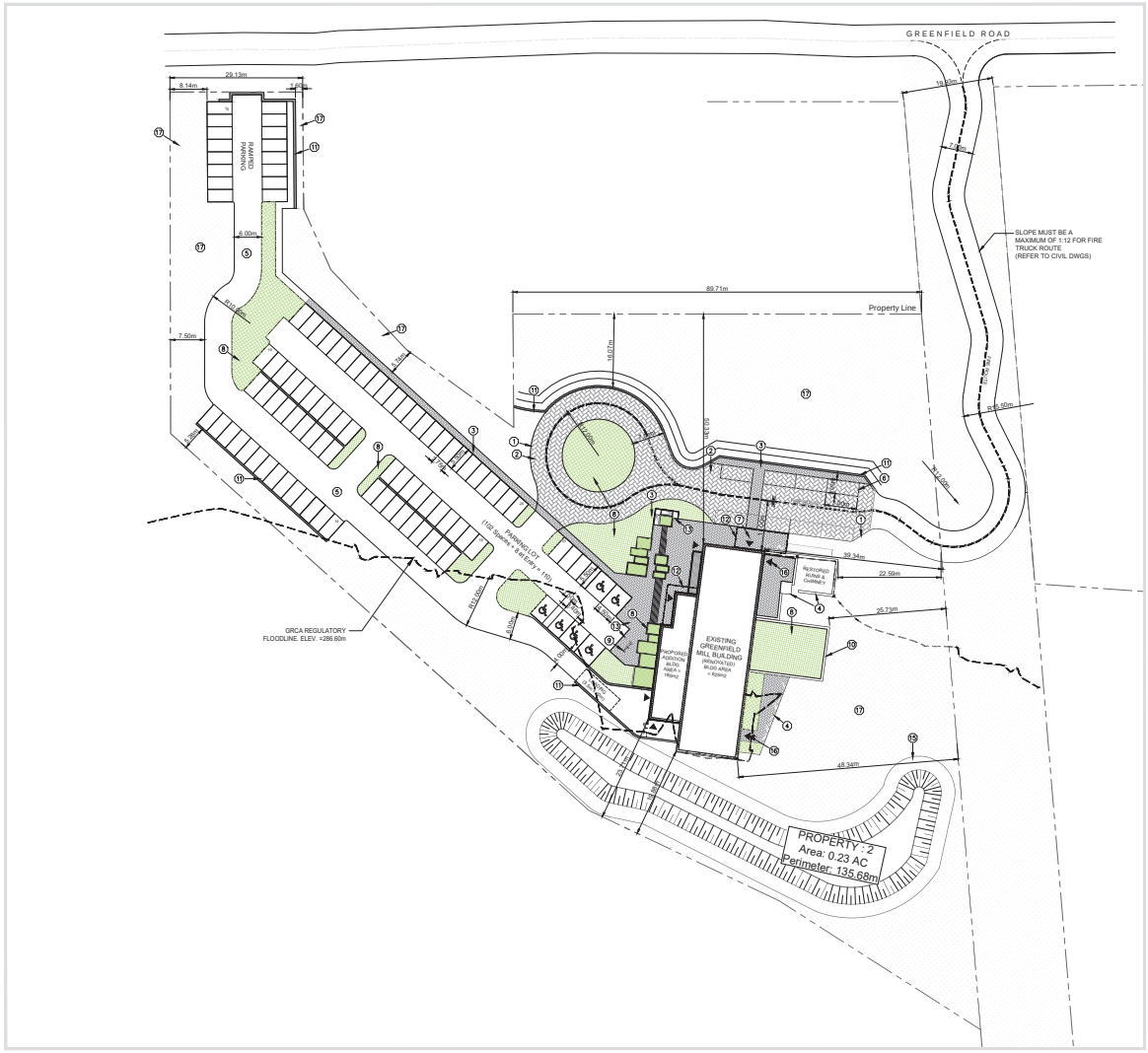
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	23	57	59	354	374	23
Future Volume (Veh/h)	23	57	59	354	374	23
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	23	57	59	354	374	23
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	858	386	397			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	858	386	397			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	93	91	95			
cM capacity (veh/h)	314	667	1173			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	80	413	397
Volume Left	23	59	0
Volume Right	57	0	23
cSH	504	1173	1700
Volume to Capacity	0.16	0.05	0.23
Queue Length 95th (m)	4.3	1.2	0.0
Control Delay (s/veh)	13.5	1.6	0.0
Lane LOS	B	A	
Approach Delay (s/veh)	13.5	1.6	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		

Appendix E

Site Plan



SITE DATA & ZONING PROPOSED

Township of North Dumfries
3089 Greenfield, Ayr
Proposed: Zone 7

Total Site Area = 17,630 m^2 or 1.763 ha
Percentage of Landscape Open Space (excludes pond) = 60.4% (10,645 m^2)
Total Building Area = 805m^2
Total GFA = 2,251 m^2

	REQUIRED	PROPOSED
Setback from Zones 2, 2a, 3, 4, 4a, 5	3.0 m of the boundary	min. 3.0 m (see below)
Buffer Strips	Required	min. 1.5 m at all side/rear yards
Minimum Lot Area	Area of the existing lot	1.763 hectares
Minimum Lot Frontage	Frontage of the existing lot	13.5 m Frontage
Maximum Building Height	Existing height	18.6 m (- 2.0 m from Exist.)
Off-Street Parking & Loading	As per zoning	110 +1 Loading
Minimum Rear Yard	7.5 m	18 m
Enclosed Buildings Requirement	All commercial uses	Event Center & Restaurant

BUILDING SETBACKS	'Front' Yard (North)	Side Yard(s)	Rear Yard (South)
Building (Existing)	50 m	38 m (min)	19.8 m
Building (Addition)	60 m	50 m (min)	23.7 m

MINIMUM REQ'D PARKING SPACES	REQUIRED	PROVIDED
•• Surface Parking Spaces	n/a	110
•• Loading (at Rear)	1	1
•• Barrier free parking (4%)	5	6
TOTAL	n/a	110 Spaces

SITE PLAN NOTES

1. CURB (LANDSCAPE DRAWING T.B.D.)
2. VEHICULAR HEAVY DUTY UNIT PAVING (LANDSCAPE DWGS T.B.D.)
3. PEDESTRIAN UNIT PAVING (LANDSCAPE DWGS T.B.D.)
4. RESTORED STONE RUIN WALLS, BRICK CHIMNEY
5. ASPHAULT PAVING
6. DROP-OFF AND TEMPORARY PARKING (8 SPACES)
7. MAIN ENTRY, FIRE DEPARTMENT ENTRY & CONNECTION
8. PLANTING BED/LANDSCAPED AREA (LANDSCAPE DWG T.B.D.)
9. BIKE RACK AREA
10. NEW RETAINING WALL TO REPLACE EXISTING IN DISREPAIR
11. NEW CONCRETE RETAINING WALL – REFER TO CIVIL DWGS
12. LINE OF ENTRY CANOPY
13. BARRIER FREE FLUSH CURB – PROVIDE TACTILE WARNING STRIPS AT CROSSWALKS (REFER TO CIVIL DWGS. T.B.D.)
14. GAS METER – T.B.D.
15. STORM WATER POND (REFER TO CIVIL DWGS)
16. RESTORED EXISTING OPENING
17. LANDSCAPE BUFFER PROVIDED (1.5 METER MIN. WIDTH)
17. NATURALIZED LANDSCAPE

SITE LEGEND:

- PROPERTY LINE
- BUILDING EXIT
  BF – BARRIER FREE
  FF – FIRE FIGHTER
  PRINCIPAL ENTRANCE
- DENOTES FIRE ROUTE MIN. 6.0m WIDE WITH MIN. 12.0m CENTRELINE RADIUS
- BARRIER FREE PARKING
- PERMEABLE PAVERS (TYPE 1)
- PERMEABLE PAVERS (TYPE 2)

NO	DATE	ISSUE
	28/05/2026	ISSUED ZPA/OPA

MARTIN SIMMONS SWEERS
200 - 113 Breithaupt Street
Kitchener, ON N2H 5G9
t 519.745.4754 f 519.745.0061

PROJECT
GREENFIELD MILL
3080 Greenfield Road, Ayr, Ontario

DRAWING
CONCEPTUAL SITE PLAN

DRAWN BY: KS
CHECKED BY:
DATE: 08/05/2026
SCALE: 1:500
DRAWING NO.: A1
PROJECT NO.:

Appendix F

ITE Trip Generation Manual Excerpts

Land Use: 936
Coffee/Donut Shop
without Drive-Through Window

Description

This land use includes any coffee and donut restaurant that does not have a drive-through window. The restaurant sells freshly brewed coffee (along with coffee-related accessories) and a variety of food and beverage products such as donuts, bagels, breads, muffins, cakes, sandwiches, wraps, salads, and other hot and cold beverages. The restaurant marketing and sales may emphasize coffee beverages over food (or vice versa). A coffee/donut shop typically maintains long store hours (more than 15 hours) with an early morning opening. Limited indoor seating is generally provided for patrons, but table service is not offered.

Additional Data

Many of the facilities in this land use were located within a shopping center or as an outparcel to a shopping center.

The sites were surveyed in the 1990s, the 2000s, the 2010s, and the 2020s in California, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Pennsylvania, and Vermont.

Specialized Land Use Data

One study provided data for two sites. The first site is a coffee/donut shop without a drive-through window that sells donuts and ice cream (source 563). The trip generating characteristics of this site differed from the sites included in this land use; therefore, trip generation information for this site is presented here and was excluded from the data plots. The site had a gross floor area of 2,400 square feet. It generated 48 vehicle trips during the weekday, PM peak hour of adjacent street traffic and 52 vehicle trips during the weekday, PM peak hour of the generator.

The second site provided data for a coffee/donut shop without a drive-through window that sells donuts and sandwiches (source 563). The trip generating characteristics of this site differed from the sites included in this land use; therefore, trip generation information for this site is presented here and was excluded from the data plots. The site had a gross floor area of 4,000 square feet. It generated 239 vehicle trips during the weekday, AM peak hour of adjacent street traffic, 52 vehicle trips during the weekday, PM peak hour of adjacent street traffic, and 111 vehicle trips during the weekday, PM peak hour of the generator.

Source Numbers

551, 555, 563, 571, 594, 617, 618, 621, 728, 863, 902, 954, 955, 982, 1020, 1236

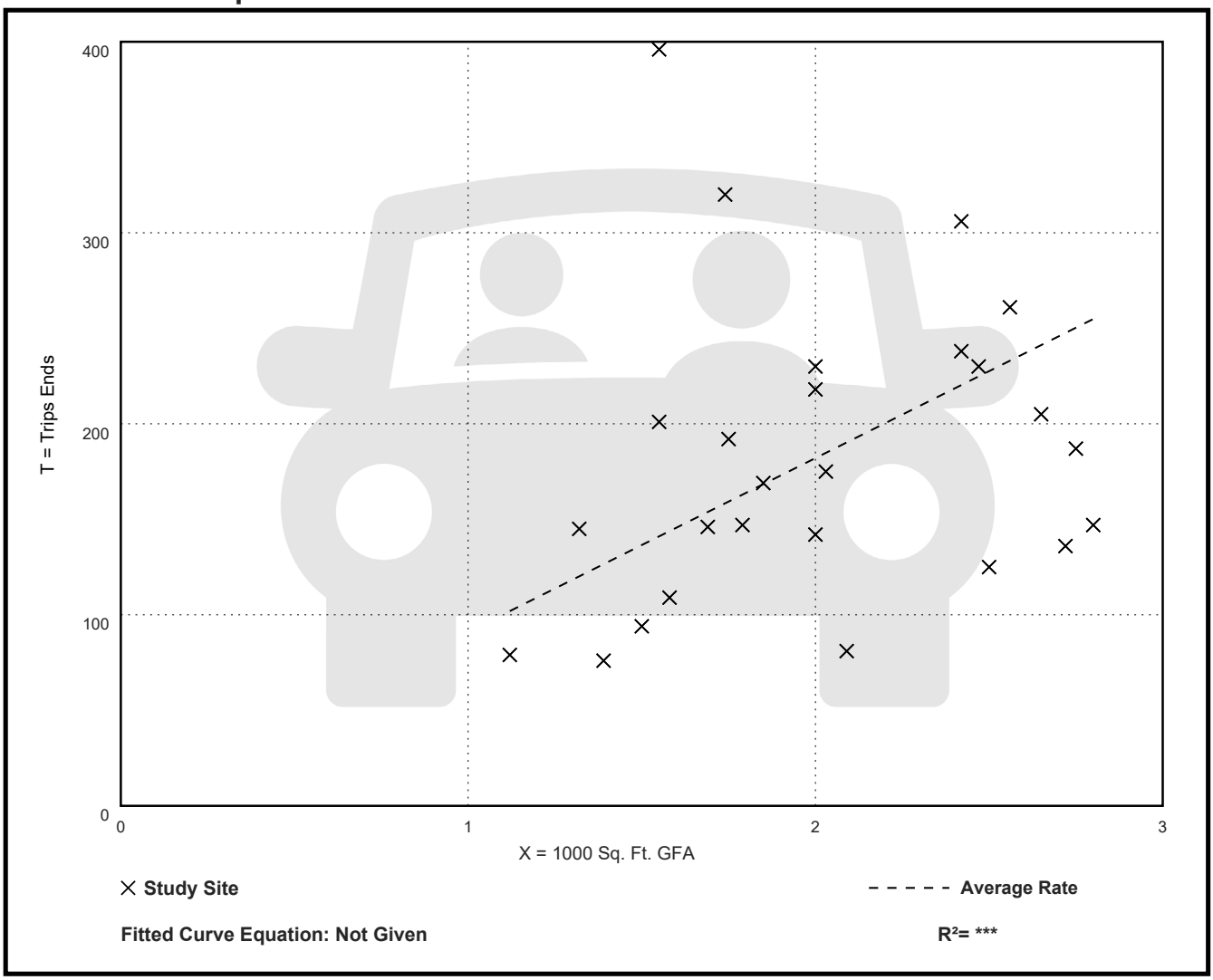
Coffee/Donut Shop without Drive-Through Window (936)

Vehicle Trip Ends vs:	**1000 Sq. Ft. GFA**
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:	26
Avg. 1000 Sq. Ft. GFA:	2
Directional Distribution:	51% entering, 49% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
91.02	38.76 - 255.48	42.68

Data Plot and Equation



Coffee/Donut Shop without Drive-Through Window (936)

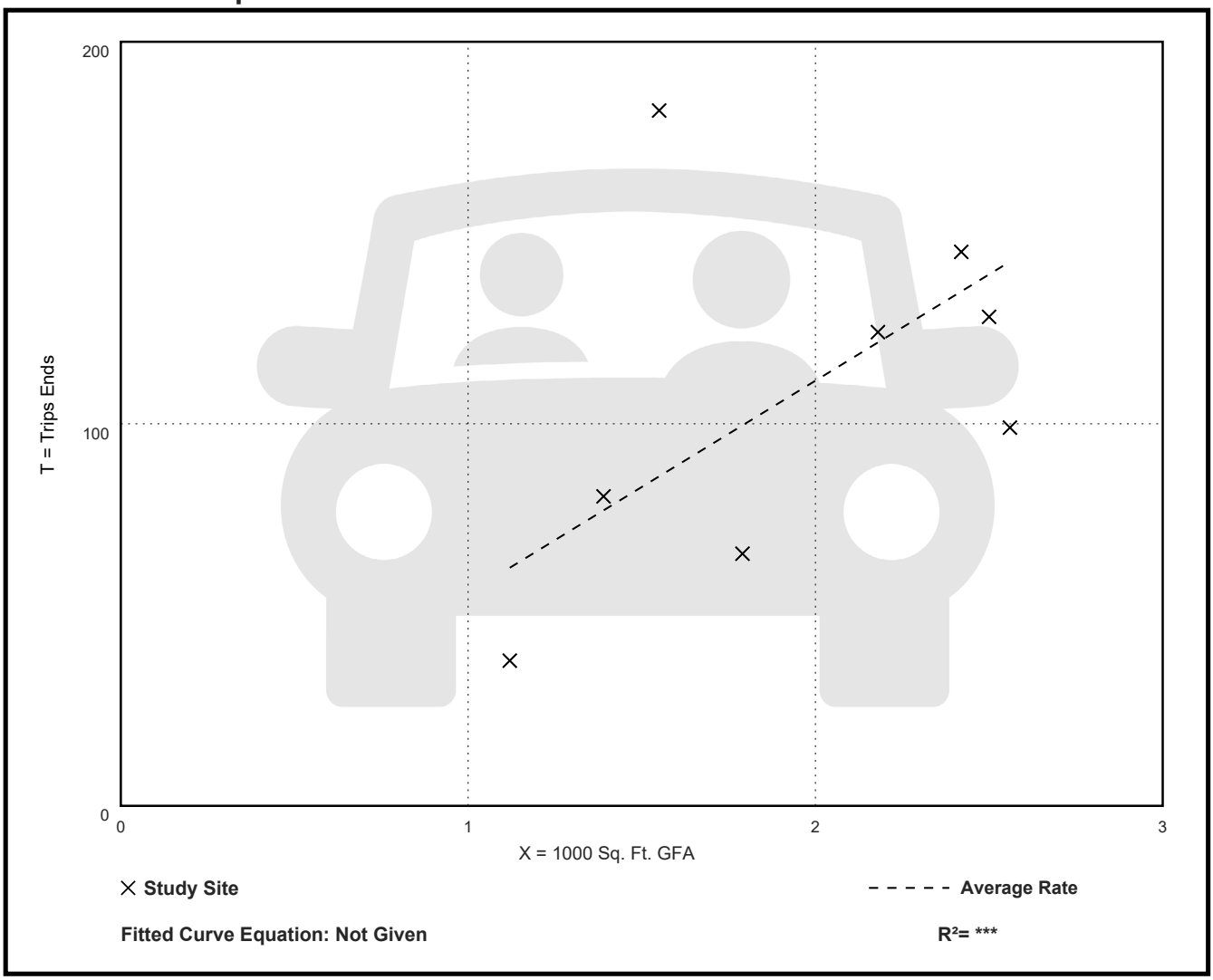
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Saturday, Peak Hour of Generator**

Setting/Location: **General Urban/Suburban**
Number of Studies: 8
Avg. 1000 Sq. Ft. GFA: 2
Directional Distribution: 49% entering, 51% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
55.64	33.93 - 117.42	24.15

Data Plot and Equation



Fitted Curve Equation: Not Given

R^2= *

Land Use: 712
Small Office Building

Description

A small office building is the same as a general office building (Land Use 710) but with less than or equal to 10,000 square feet of gross floor area. The building is a location where affairs of business, commercial or industrial organization, or professional person or firm are conducted. Specialty trade contractor (Land Use 180) is a related use.

Additional Data

Attorney office, mortgage company, financial advisor, insurance agency, home health care provider, and real estate company are examples of tenants included in the small office building database. The diversity of employer type results in a wide range in employee density in the database. Densities range from a high of 1,300 to a low of 240 square feet per employee with an overall average of nearly 600 square feet per employee (a value much larger than the average observed in general office building study sites).

In addition to the significant difference in employee density, small office buildings tend to be dominated by a single tenant (or very few) that are more service-oriented than a typical general office building. The result is more frequent and regular visitors and higher trip generation rates.

The sites were surveyed in the 1990s, the 2010s, and the 2020s in California, New Jersey, Texas, and Wisconsin.

Source Numbers

418, 890, 891, 959, 1219

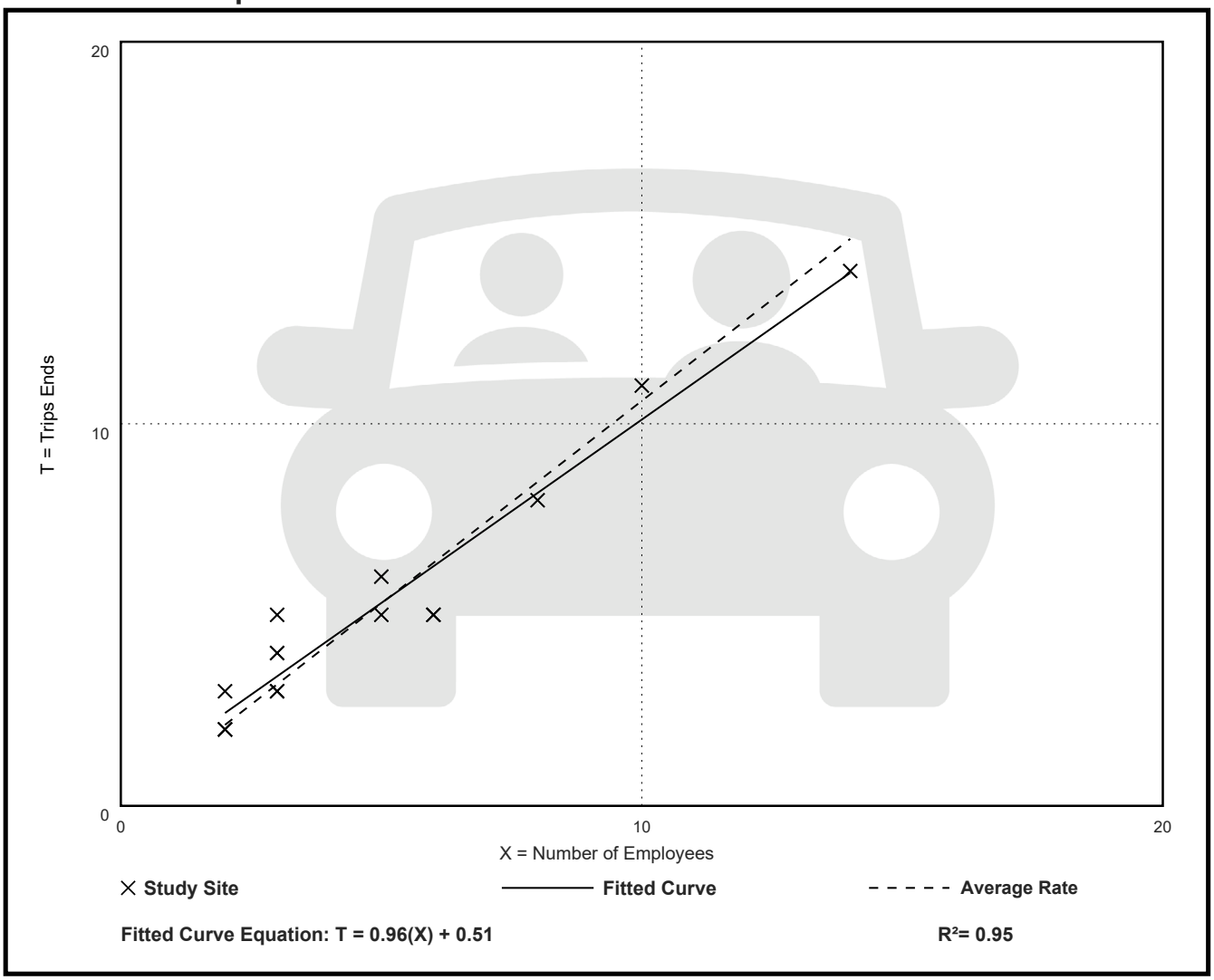
Small Office Building
(712)

Vehicle Trip Ends vs:	**Employees**
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:	16
Avg. Num. of Employees:	5
Directional Distribution:	87% entering, 13% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
1.06	0.83 - 1.67	0.20

Data Plot and Equation



Fitted Curve Equation: T = 0.96(X) + 0.51

R^2= 0.95

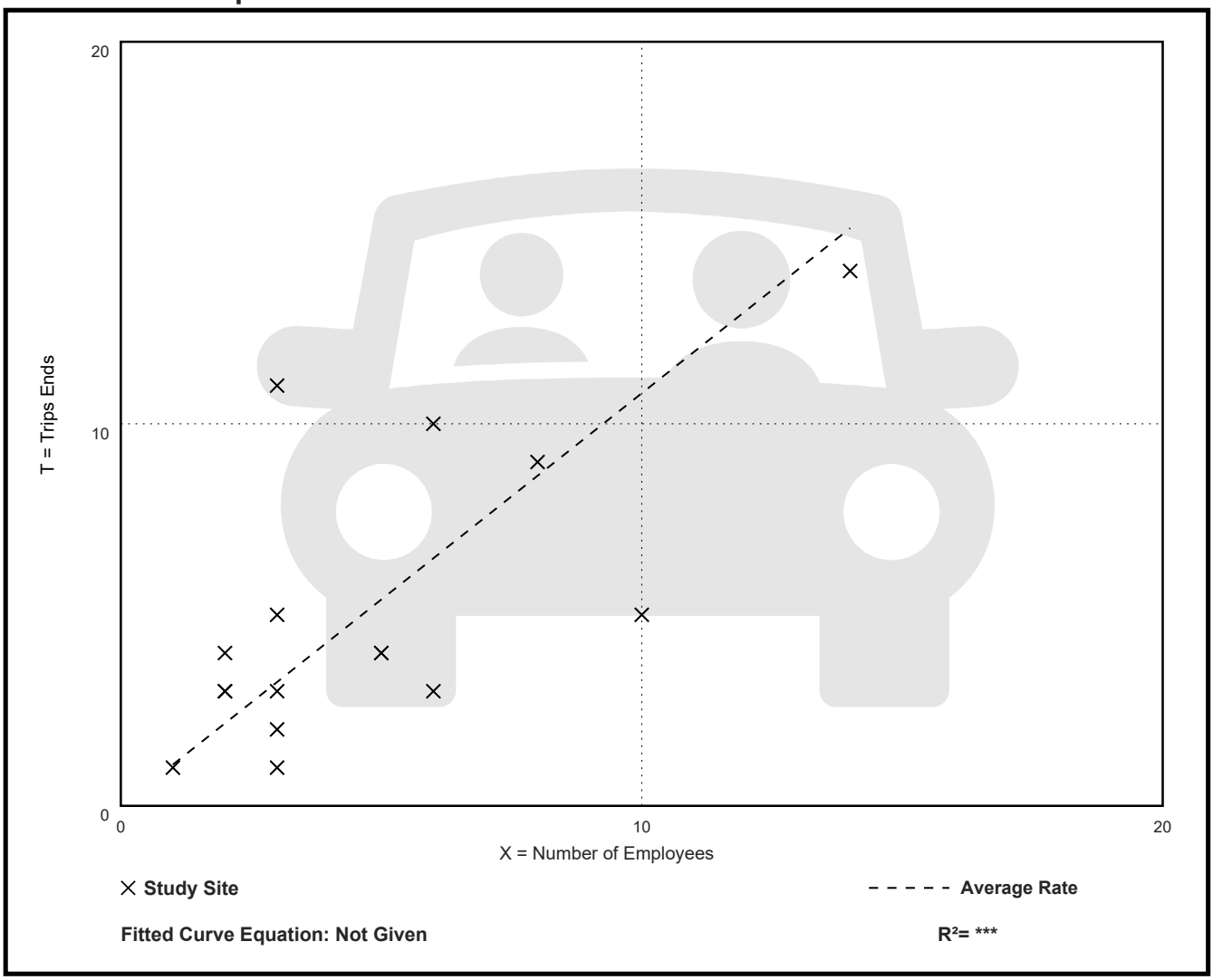
Small Office Building
(712)

Vehicle Trip Ends vs:	**Employees**
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:	16
Avg. Num. of Employees:	5
Directional Distribution:	33% entering, 67% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
1.08	0.33 - 3.67	0.69

Data Plot and Equation



Land Use: 970
Wine Tasting Room

Description

A wine tasting room is a designated area found in conjunction with a winery where customers can sample a winery's products. These rooms are typically located on-site and can be used to sell wine or related products directly to the customer. Depending on its size, a tasting room can also be used to house wedding receptions, corporate events, and other social gatherings. A wine tasting room may also be used to facilitate complimentary tours of the winery.

Additional Data

For the purposes of this land use, the independent variable "1,000 sq. foot gross floor area" refers to the square footage of the tasting room only.

The sites were surveyed in the 2010s in California, Illinois, and Virginia.

To assist in the future analysis of this land use, it is important to collect and include information on other independent variables, such as annual wine production. In data submissions, it is helpful to indicate both the gross floor area of the building that houses the tasting room and the tasting room only.

Source Numbers

807, 851, 894, 1264

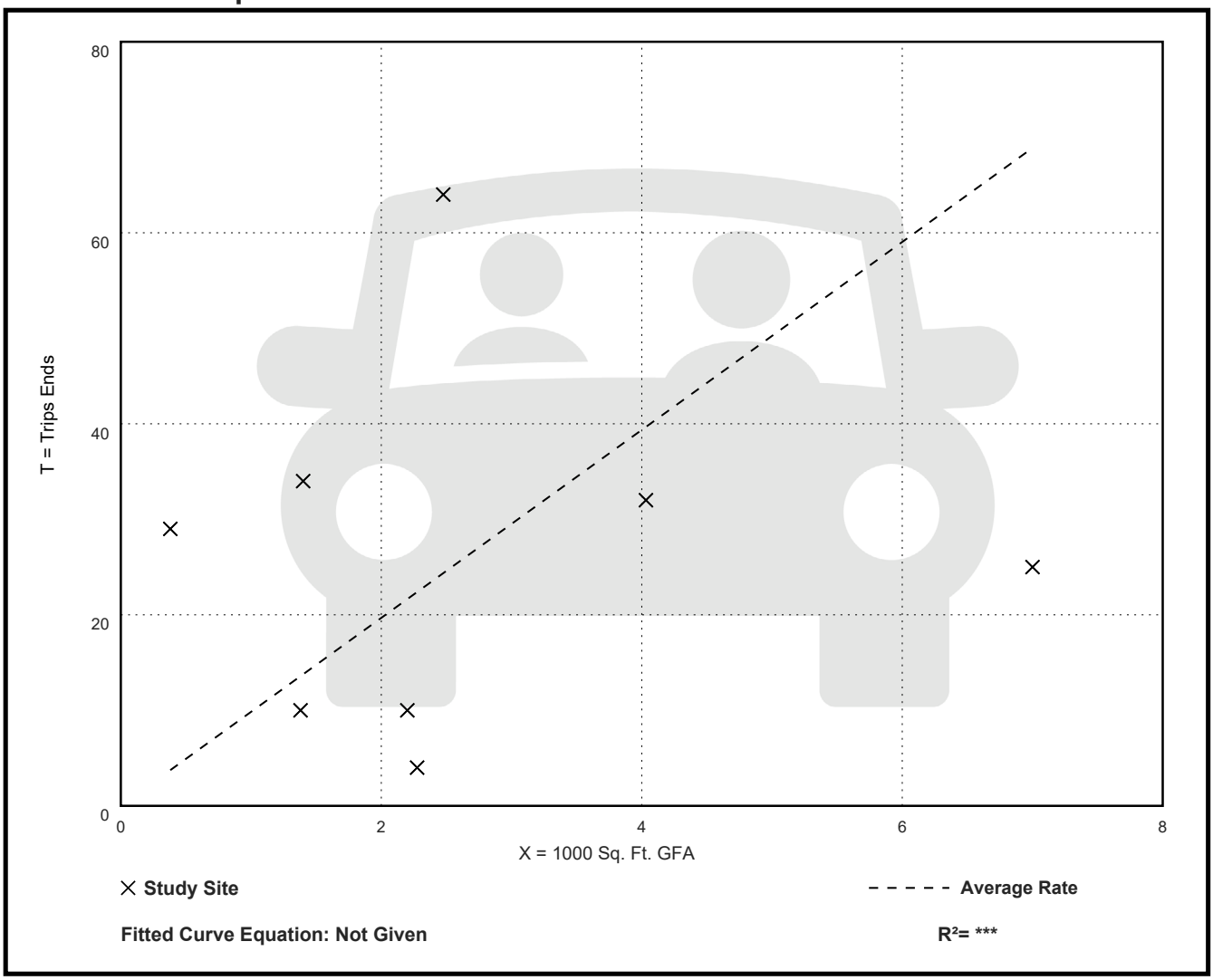
Wine Tasting Room
(970)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **Rural**
Number of Studies: 8
Avg. 1000 Sq. Ft. GFA: 3
Directional Distribution: 53% entering, 47% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
9.84	1.76 - 76.32	12.98

Data Plot and Equation



Fitted Curve Equation: Not Given

R^2= ***

Wine Tasting Room
(970)

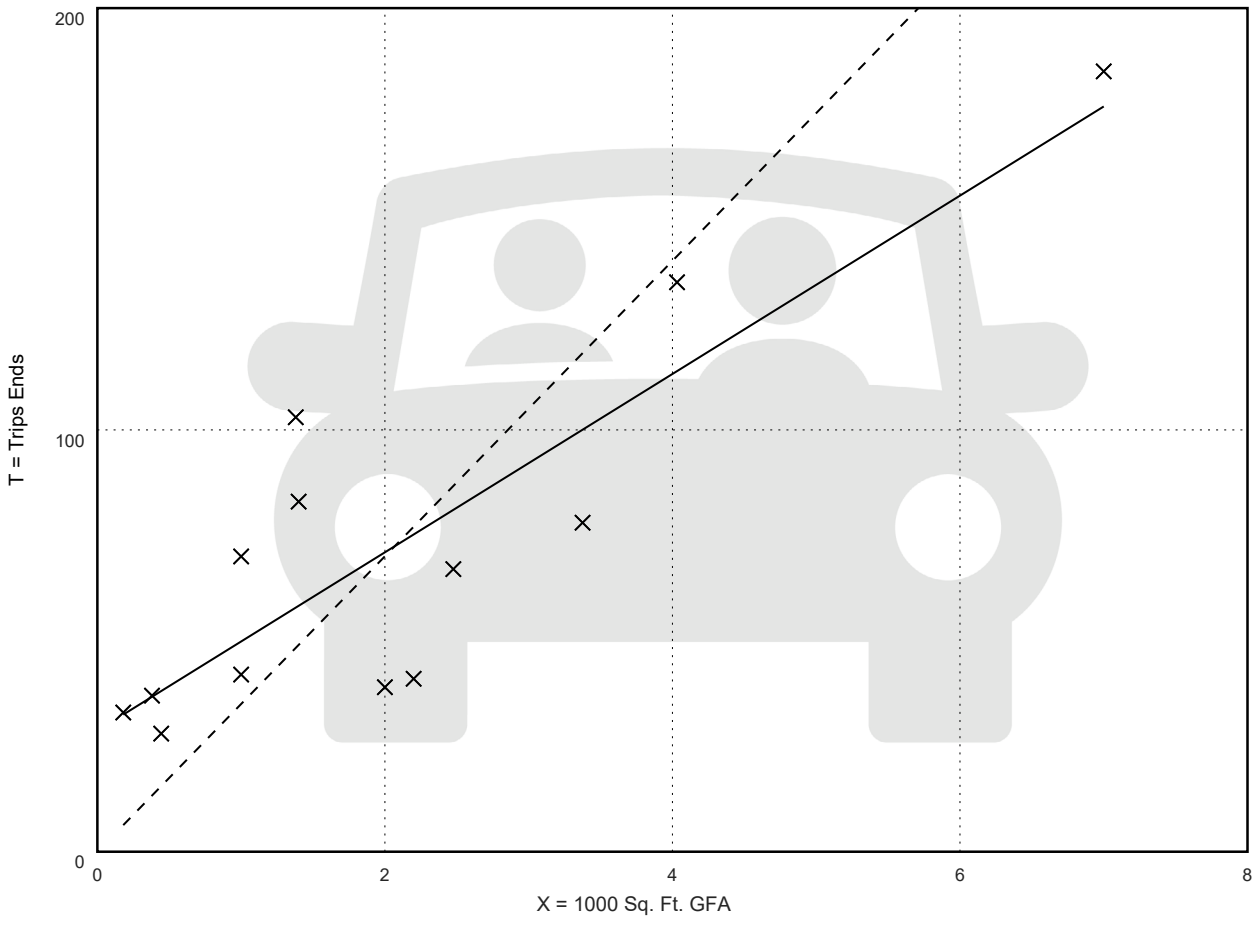
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Saturday, Peak Hour of Generator

Setting/Location: Rural
Number of Studies: 13
Avg. 1000 Sq. Ft. GFA: 2
Directional Distribution: 48% entering, 52% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
35.02	18.64 - 183.33	22.25

Data Plot and Equation



Fitted Curve Equation: T = 21.14(X) + 28.70

R^2= 0.74

Land Use: 931
Fine Dining Restaurant

Description

A fine dining restaurant is a full-service eating establishment with a typical duration of stay of at least 1 hour. A fine dining restaurant generally does not serve breakfast; some do not serve lunch; all serve dinner. This type of restaurant often requests and sometimes requires a reservation and is generally not part of a chain. A patron commonly waits to be seated, is served by wait staff, orders from a menu and pays after the meal. Some of the study sites have lounge or bar facilities (serving alcoholic beverages), but meal service is the primary draw to the restaurant.

Additional Data

If the fine dining restaurant has outdoor seating, its area is not included in the overall gross floor area. For a restaurant that has significant outdoor seating, the number of seats may be more reliable than GFA as an independent variable on which to establish a trip generation rate.

The sites were surveyed in the 1990s, the 2010s, and the 2020s in Arizona, California, Florida, Indiana, Kentucky, New Jersey, and Utah.

Source Numbers

338, 339, 368, 437, 440, 976, 1053, 1204

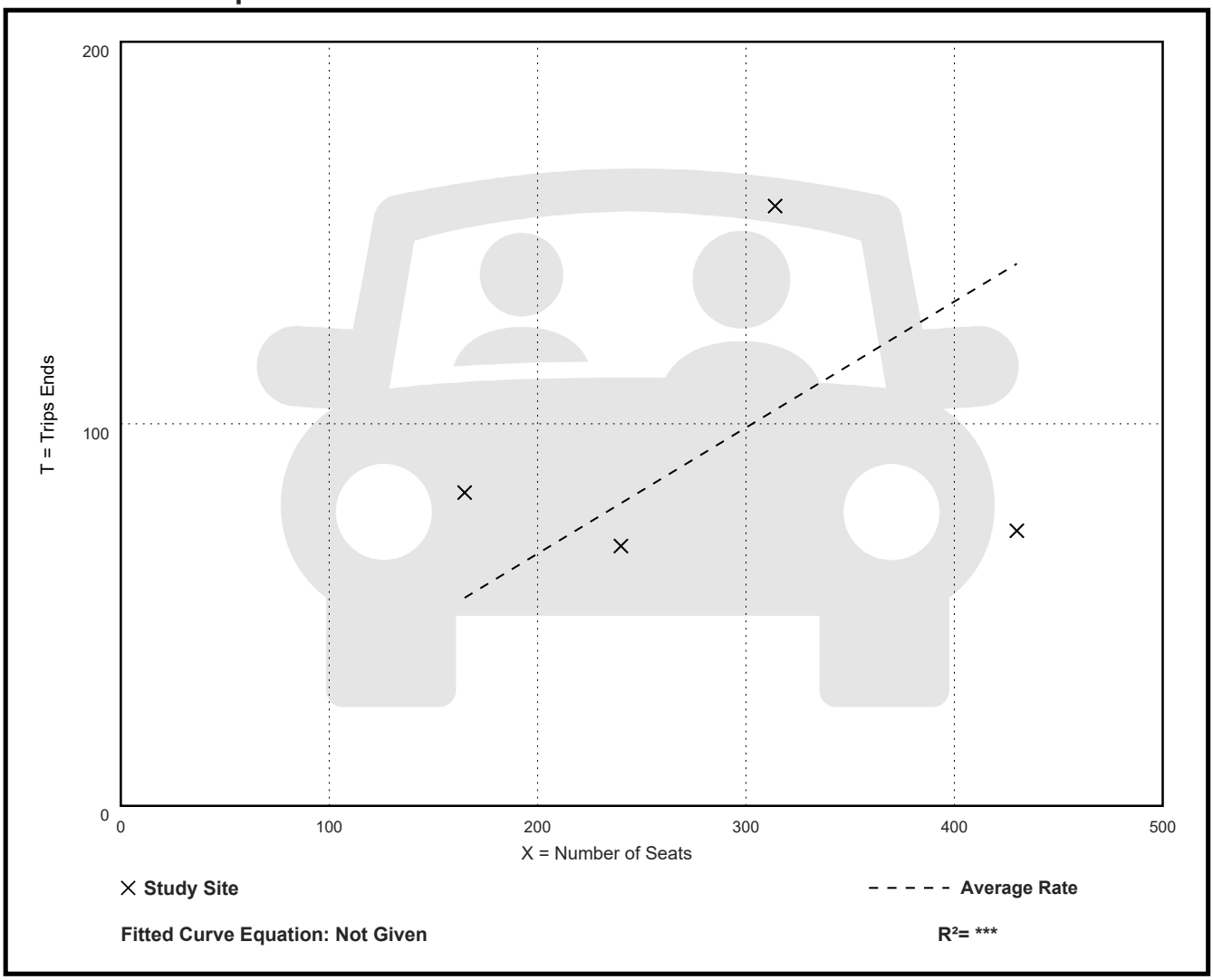
Fine Dining Restaurant
(931)

Vehicle Trip Ends vs: **Seats**
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: 4
Avg. Num. of Seats: 287
Directional Distribution: 67% entering, 33% exiting

Vehicle Trip Generation per Seat

Average Rate	Range of Rates	Standard Deviation
0.33	0.17 - 0.50	0.17

Data Plot and Equation



Fitted Curve Equation: Not Given

R^2= *

Fine Dining Restaurant
(931)

Vehicle Trip Ends vs: **Seats**
On a: **Saturday, Peak Hour of Generator**

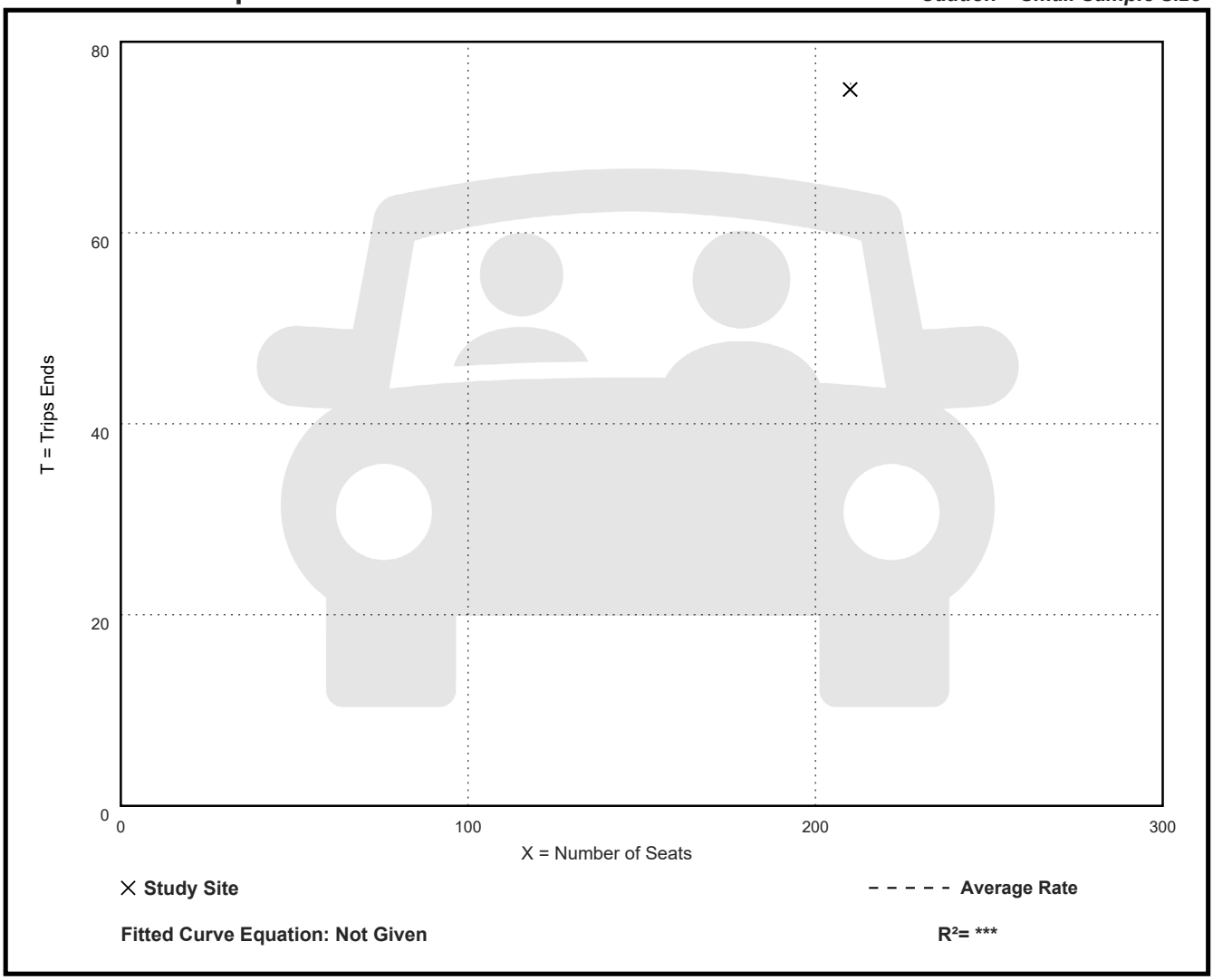
Setting/Location: **General Urban/Suburban**
Number of Studies: 1
Avg. Num. of Seats: 210
Directional Distribution: 59% entering, 41% exiting

Vehicle Trip Generation per Seat

Average Rate	Range of Rates	Standard Deviation
0.36	0.36 - 0.36	***

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: Not Given

R^2= ***

Land Use: 310
Hotel

Description

A hotel is a place of lodging that provides overnight accommodation and supporting facilities such as a full-service restaurant, concierge service, valet parking, cocktail lounge, meeting rooms, banquet room, and convention facilities. A hotel typically provides a swimming pool or another recreational facility such as a fitness room.

Additional Data

Some properties in this land use provide guest transportation services (e.g., airport shuttle, limousine service, golf course shuttle service) which may have an impact on the overall trip generation rates.

The sites were surveyed in the 1990s, the 2000s, the 2010s, and the 2020s in California, District of Columbia, Delaware, Florida, Indiana, Minnesota, New Jersey, Ontario (CAN), Pennsylvania, South Dakota, Vermont, and Washington.

Trip generation at a hotel may be related to the presence of supporting facilities such as convention space, restaurants, meeting/banquet space, and retail facilities. Future data submissions should specify the presence of these amenities. Reporting the level of activity at the supporting facilities such as full, empty, partially active, number of people attending a meeting/banquet during observation may also be useful in further analysis of this land use.

Source Numbers

357, 507, 577, 728, 867, 872, 925, 951, 1009, 1021, 1026, 1046, 1219, 1222, 1224

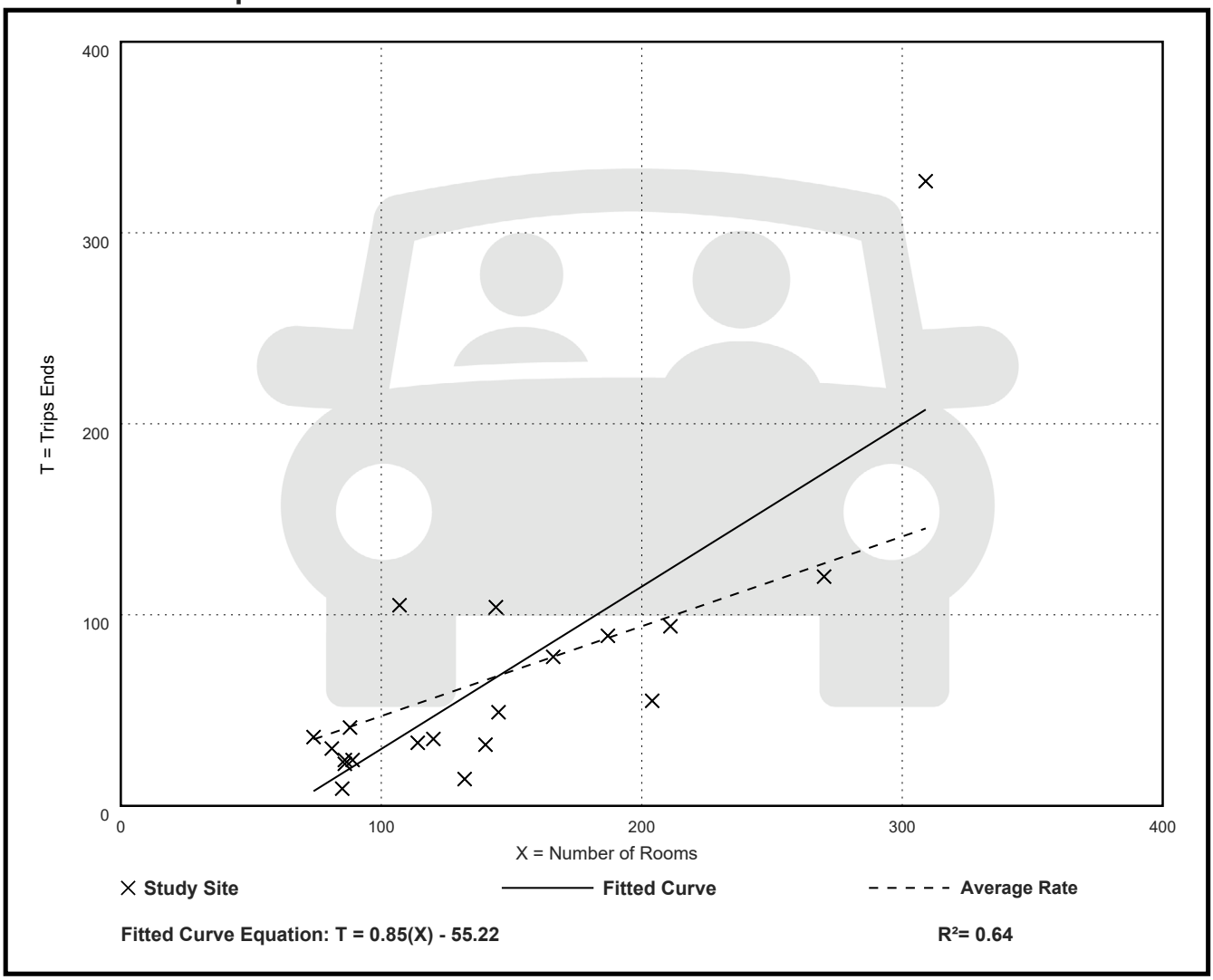
Hotel
(310)

Vehicle Trip Ends vs:	**Rooms**
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:	20
Avg. Num. of Rooms:	142
Directional Distribution:	51% entering, 49% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
0.47	0.11 - 1.06	0.28

Data Plot and Equation



Fitted Curve Equation: T = 0.85(X) - 55.22

R^2= 0.64

Hotel
(310)

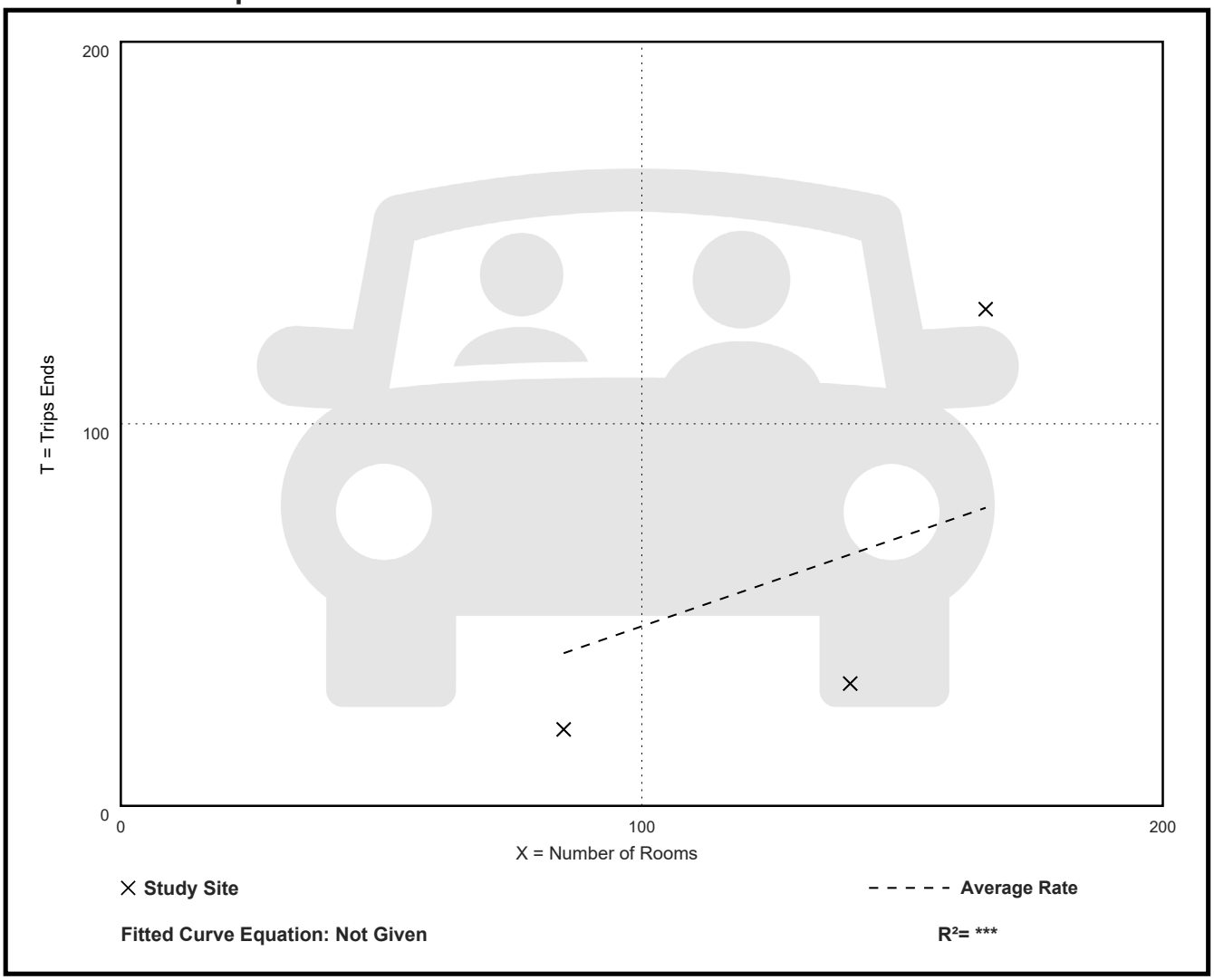
Vehicle Trip Ends vs: **Rooms**
On a: **Saturday, Peak Hour of Generator**

Setting/Location: **General Urban/Suburban**
Number of Studies: 3
Avg. Num. of Rooms: 130
Directional Distribution: 51% entering, 49% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
0.47	0.23 - 0.78	0.33

Data Plot and Equation



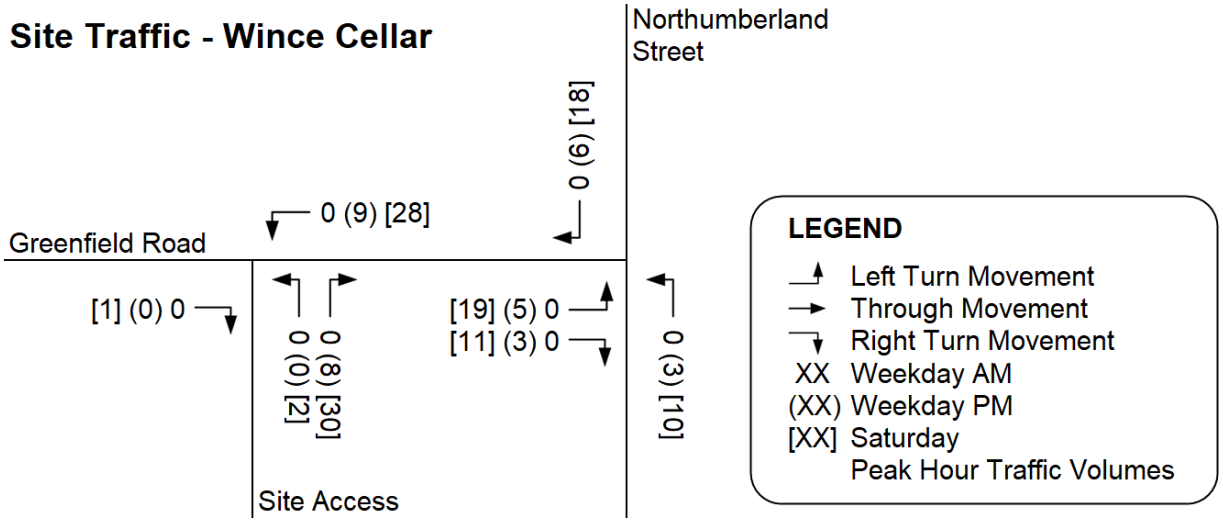
Fitted Curve Equation: Not Given

R^2= *

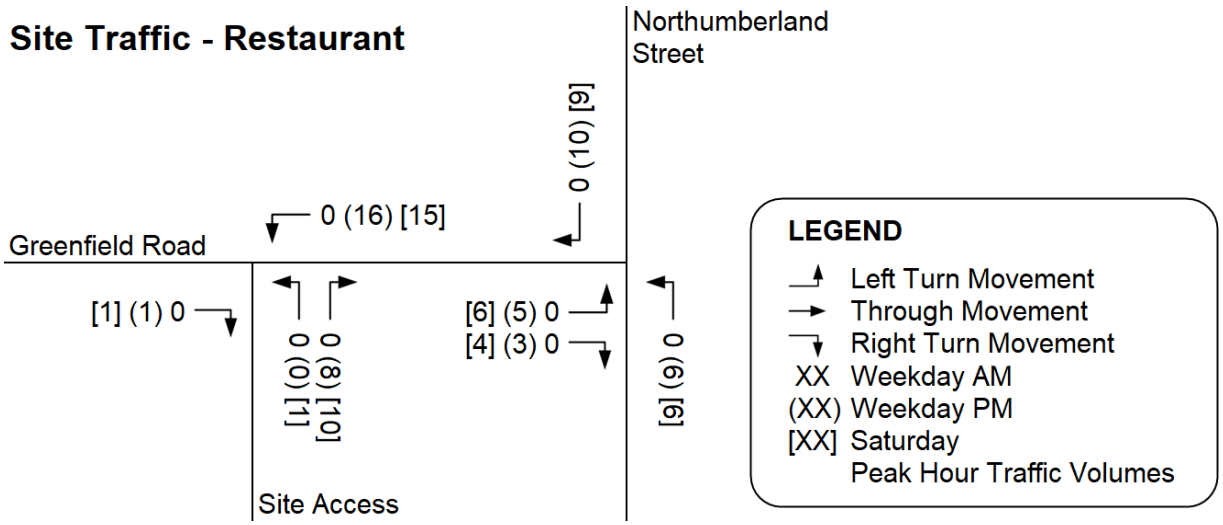
Appendix G

Site Traffic by Individual Land Use Type

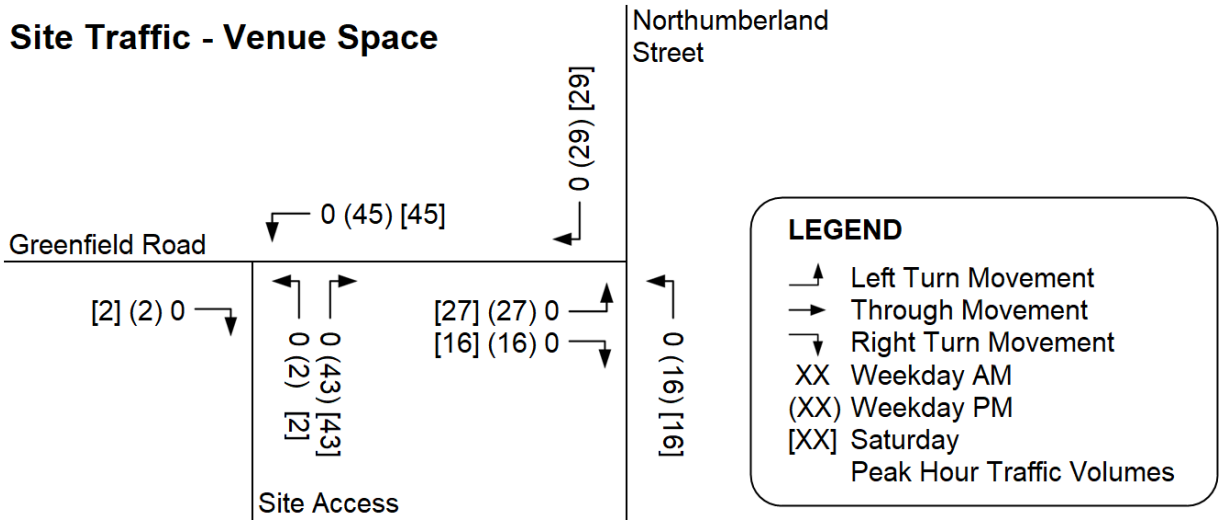
Site Traffic - Wince Cellar



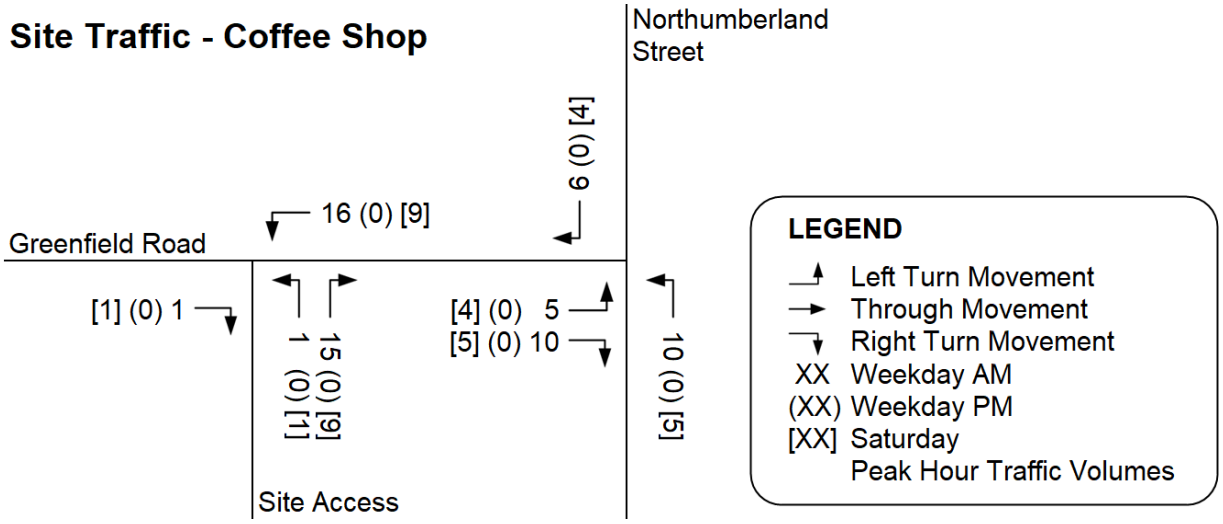
Site Traffic - Restaurant



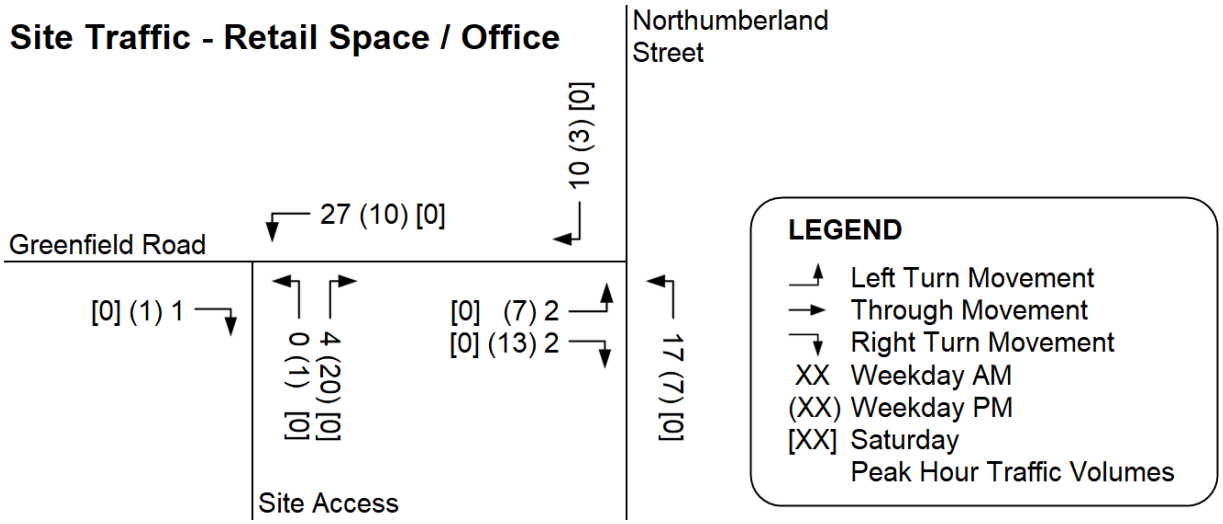
Site Traffic - Venue Space



Site Traffic - Coffee Shop

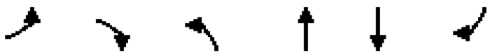


Site Traffic - Retail Space / Office



Appendix H

Future (2031) Total Intersection Operation Calculations (Synchro)



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	52	45	45	623	337	33
Future Volume (Veh/h)	52	45	45	623	337	33
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	52	45	45	623	337	33
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1067	354	370			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1067	354	370			
tC, single (s)	6.4	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	78	93	96			
cM capacity (veh/h)	239	688	1167			

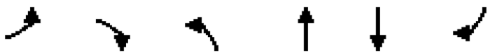
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	97	668	370
Volume Left	52	45	0
Volume Right	45	0	33
cSH	342	1167	1700
Volume to Capacity	0.28	0.04	0.22
Queue Length 95th (m)	8.7	0.9	0.0
Control Delay (s/veh)	19.6	1.0	0.0
Lane LOS	C	A	
Approach Delay (s/veh)	19.6	1.0	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	79.4%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	78	2	43	35	1	19
Future Volume (Veh/h)	78	2	43	35	1	19
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	78	2	43	35	1	19
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			80		200	79
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			80		200	79
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		100	98
cM capacity (veh/h)			1531		771	987

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	80	78	20
Volume Left	0	43	1
Volume Right	2	0	19
cSH	1700	1531	973
Volume to Capacity	0.05	0.03	0.02
Queue Length 95th (m)	0.0	0.7	0.5
Control Delay (s/veh)	0.0	4.2	8.8
Lane LOS		A	A
Approach Delay (s/veh)	0.0	4.2	8.8
Approach LOS			A

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	21.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	68	69	89	439	746	107
Future Volume (Veh/h)	68	69	89	439	746	107
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	68	69	89	439	746	107
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1417	800	853			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1417	800	853			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	50	82	89			
cM capacity (veh/h)	135	388	786			

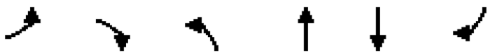
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	137	528	853
Volume Left	68	89	0
Volume Right	69	0	107
cSH	202	786	1700
Volume to Capacity	0.68	0.11	0.50
Queue Length 95th (m)	31.9	2.9	0.0
Control Delay (s/veh)	54.0	3.0	0.0
Lane LOS	F	A	
Approach Delay (s/veh)	54.0	3.0	0.0
Approach LOS	F		

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	103.6%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	58	4	80	116	3	79
Future Volume (Veh/h)	58	4	80	116	3	79
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	58	4	80	116	3	79
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			62		336	60
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			62		336	60
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		100	92
cM capacity (veh/h)			1554		629	1011

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	62	196	82
Volume Left	0	80	3
Volume Right	4	0	79
cSH	1700	1554	989
Volume to Capacity	0.04	0.05	0.08
Queue Length 95th (m)	0.0	1.2	2.1
Control Delay (s/veh)	0.0	3.3	9.0
Lane LOS		A	A
Approach Delay (s/veh)	0.0	3.3	9.0
Approach LOS			A

Intersection Summary			
Average Delay		4.1	
Intersection Capacity Utilization		30.9%	ICU Level of Service
Analysis Period (min)		15	



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	79	93	96	354	374	83
Future Volume (Veh/h)	79	93	96	354	374	83
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	79	93	96	354	374	83
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	962	416	457			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	962	416	457			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	70	85	91			
cM capacity (veh/h)	262	641	1114			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	172	450	457
Volume Left	79	96	0
Volume Right	93	0	83
cSH	385	1114	1700
Volume to Capacity	0.45	0.09	0.27
Queue Length 95th (m)	17.0	2.1	0.0
Control Delay (s/veh)	21.7	2.6	0.0
Lane LOS	C	A	
Approach Delay (s/veh)	21.7	2.6	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	80	5	97	82	6	92
Future Volume (Veh/h)	80	5	97	82	6	92
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	80	5	97	82	6	92
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			85		359	83
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			85		359	83
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			94		99	91
cM capacity (veh/h)			1524		603	983

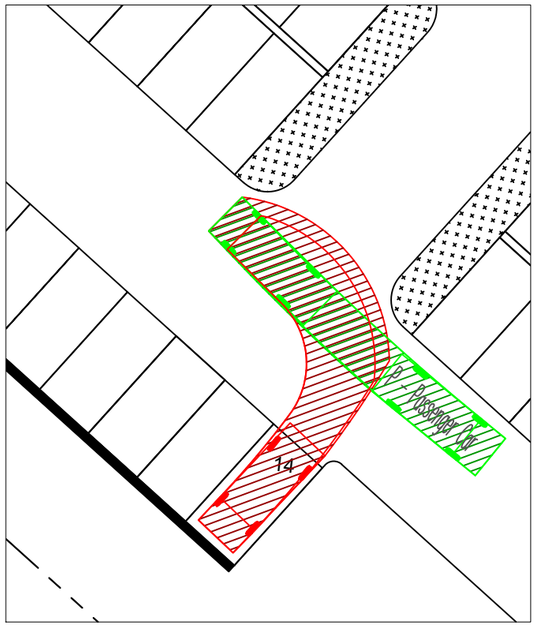
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	85	179	98
Volume Left	0	97	6
Volume Right	5	0	92
cSH	1700	1524	946
Volume to Capacity	0.05	0.06	0.10
Queue Length 95th (m)	0.0	1.5	2.6
Control Delay (s/veh)	0.0	4.3	9.2
Lane LOS		A	A
Approach Delay (s/veh)	0.0	4.3	9.2
Approach LOS			A

Intersection Summary			
Average Delay	4.6		
Intersection Capacity Utilization	31.0%	ICU Level of Service	A
Analysis Period (min)	15		

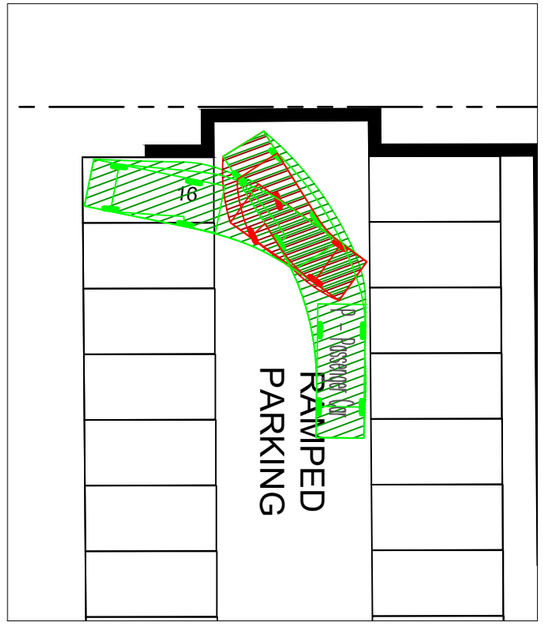
Appendix I

Vehicle Manoeuvring Diagrams

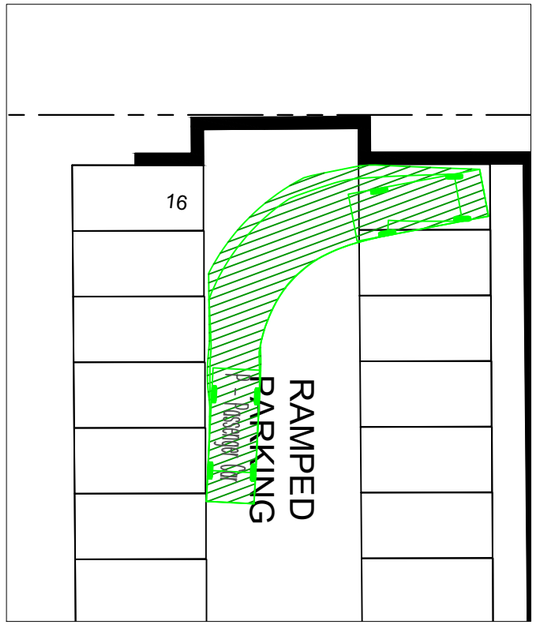
PASSENGER CAR INGRESS - 1



PASSENGER CAR INGRESS - 2



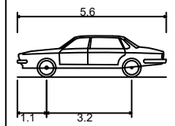
PASSENGER CAR INGRESS - 3



LEGEND:

FORWARD PATH

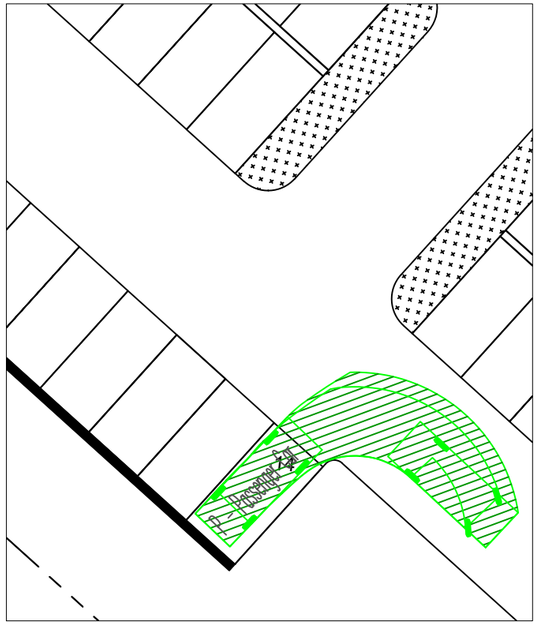
REVERSE PATH



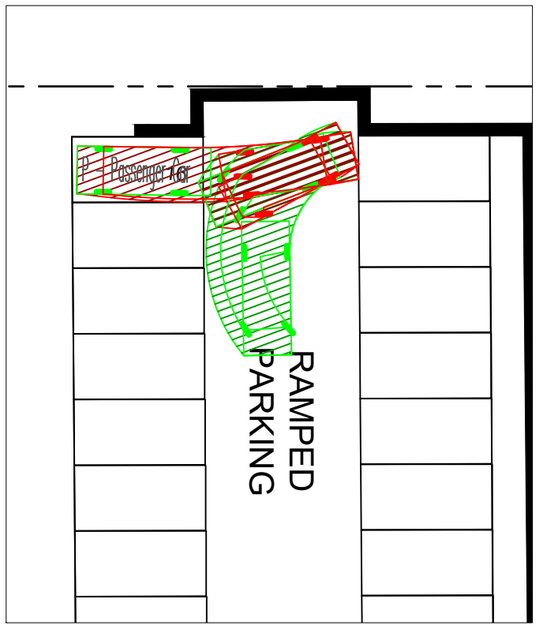
P - Passenger Car

Overall Length	5.600m
Overall Width	2.000m
Overall Body Height	1.555m
Min Body Ground Clearance	0.340m
Track Width	2.000m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.300m

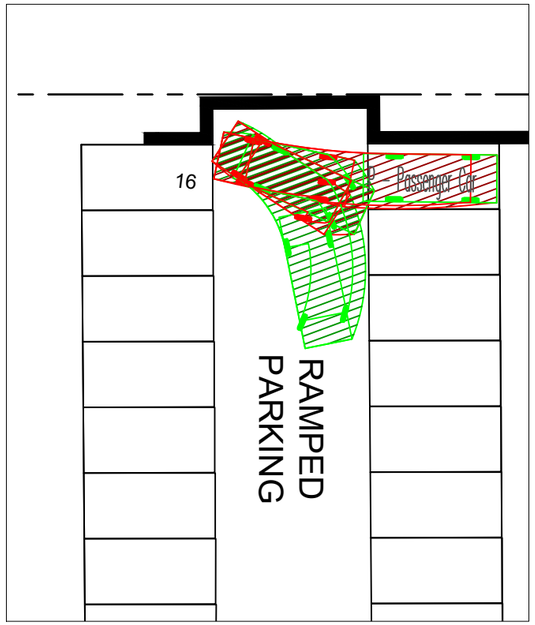
PASSENGER CAR EGRESS - 1



PASSENGER CAR EGRESS - 2

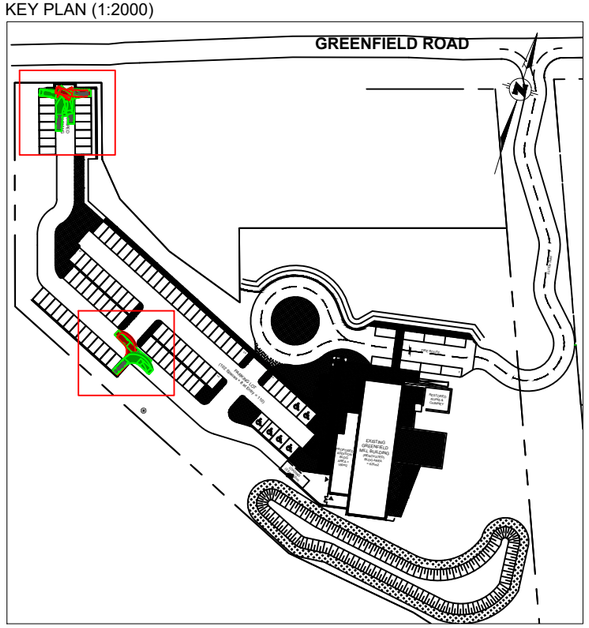


PASSENGER CAR EGRESS - 3



GREENFIELD ROAD

KEY PLAN (1:2000)



REV.	SUBMISSION	DATE	INITIAL
A	FIRST SUBMISSION	16/06/2026	MY

3089 GREENFIELD ROAD
TRAFFIC IMPACT STUDY

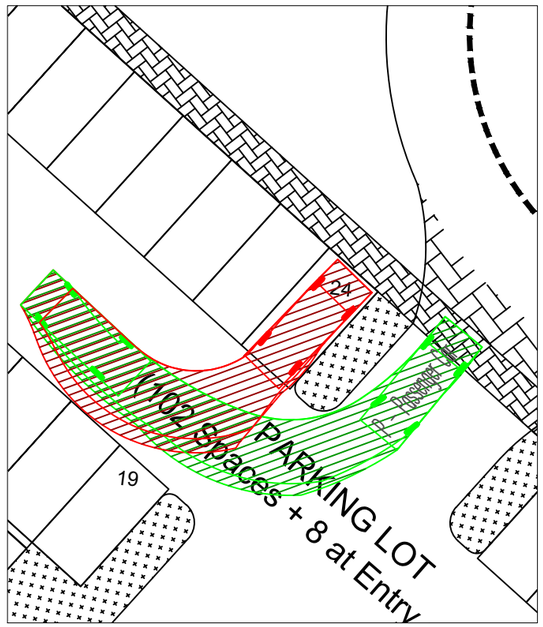
SWEPT PATH ANALYSIS

TRAFFMOBILITY

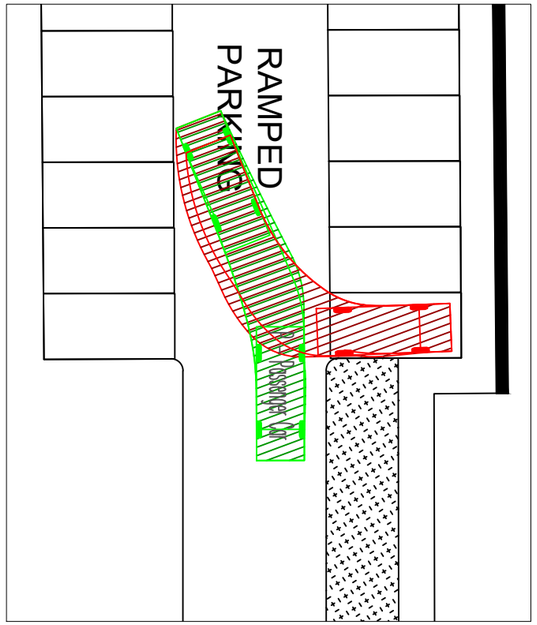
DESIGN	M.Y.	DRAWN	C.W.	CHECKED	M.Y.	CONTRACT No. PTRAN2026008
SCALE:	1:250		DRAWING NUMBER	PASSENGER CAR		
DATE:	JUN 16, 2026					

PASSENGER CAR INGRESS - 4

PASSENGER CAR INGRESS - 5



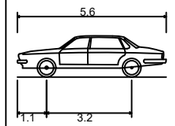
PASSENGER CAR INGRESS - 6



LEGEND:

FORWARD PATH

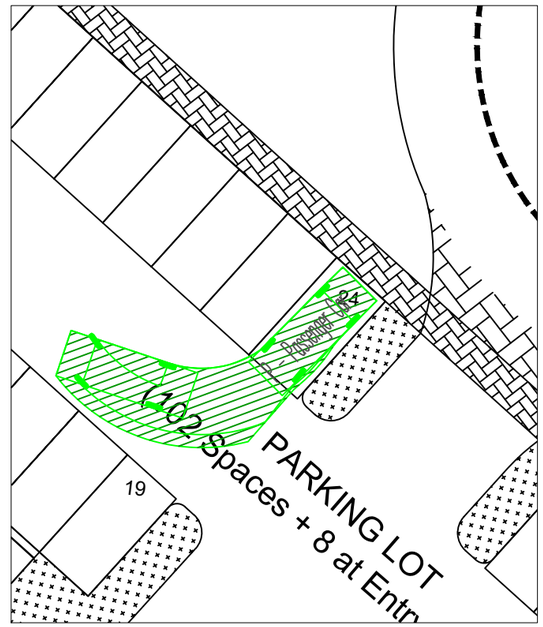
REVERSE PATH



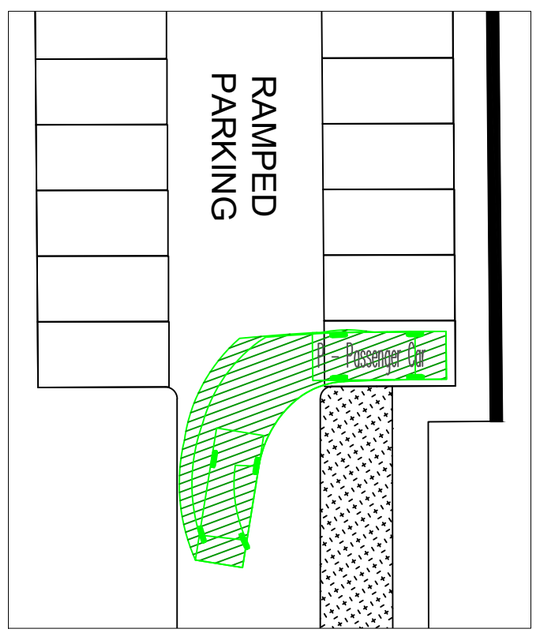
P - Passenger Car	
Overall Length	5.600m
Overall Width	2.000m
Overall Body Height	1.555m
Min Body Ground Clearance	0.340m
Track Width	2.000m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.300m

PASSENGER CAR EGRESS - 4

PASSENGER CAR EGRESS - 5

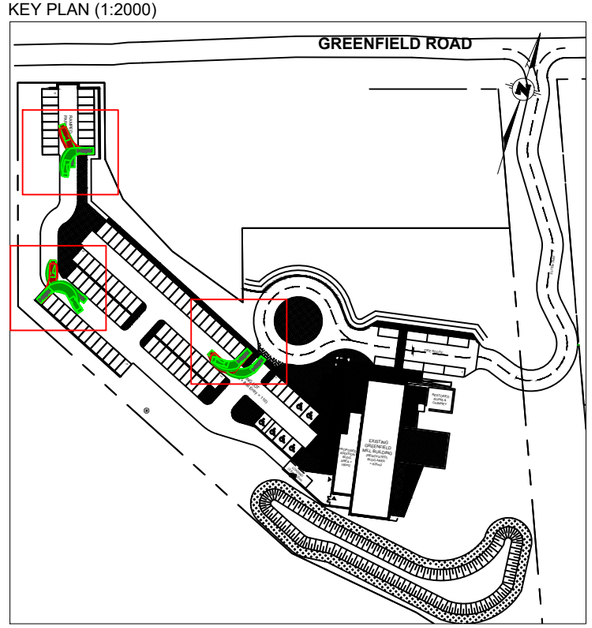


PASSENGER CAR EGRESS - 6



GREENFIELD ROAD

KEY PLAN (1:2000)



REV.	SUBMISSION	DATE	INITIAL
A	FIRST SUBMISSION	16/06/2026	MY

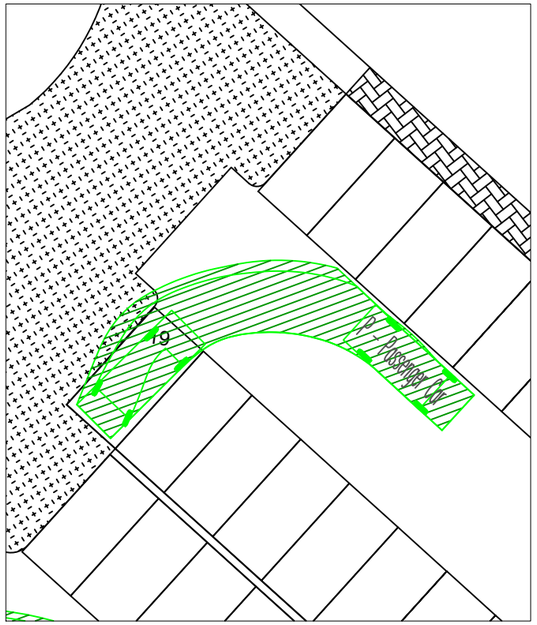
3089 GREENFIELD ROAD
TRAFFIC IMPACT STUDY

SWEPT PATH ANALYSIS

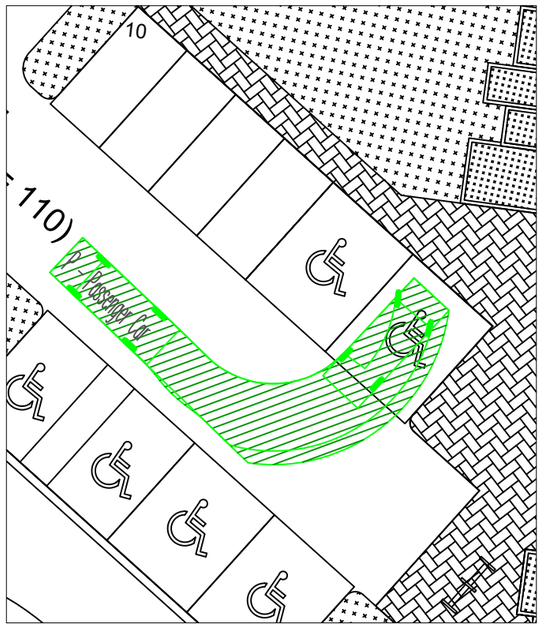
TRAFFMOBILITY

DESIGN	M.Y.	DRAWN	C.W.	CHECKED	M.Y.	CONTRACT No. PTRAN2026008
SCALE:	1:250		DRAWING NUMBER	PASSENGER CAR 2		
DATE:	JUN 16, 2026					

PASSENGER CAR INGRESS - 7



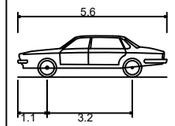
PASSENGER CAR INGRESS - 8



LEGEND:

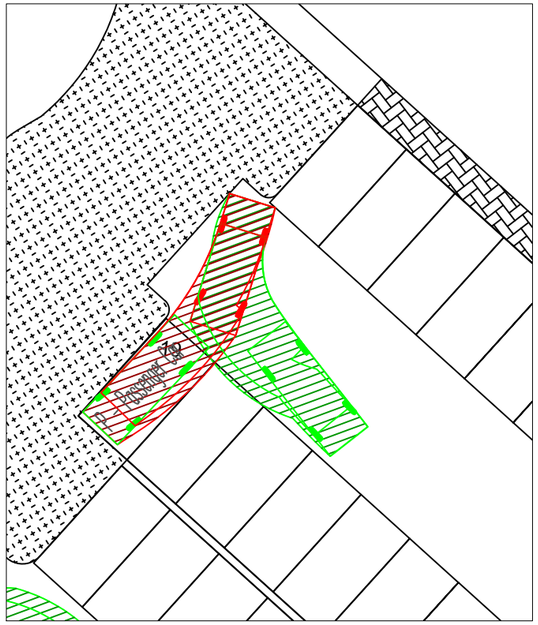
FORWARD PATH

REVERSE PATH

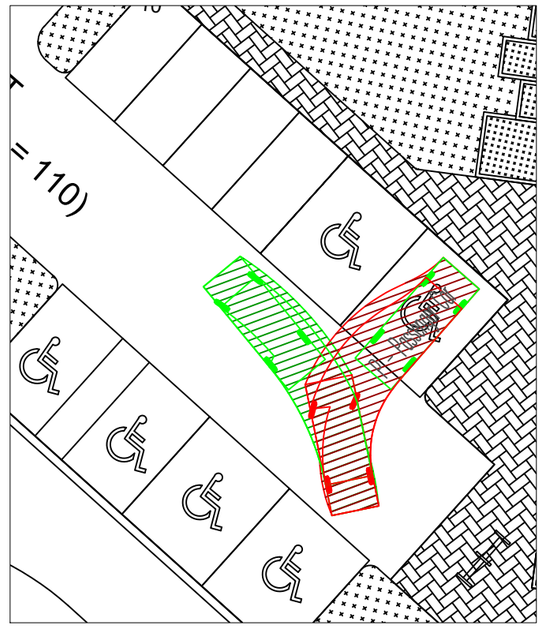


P - Passenger Car	
Overall Length	5.600m
Overall Width	2.000m
Overall Body Height	1.555m
Min Body Ground Clearance	0.340m
Track Width	2.000m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.300m

PASSENGER CAR EGRESS - 7

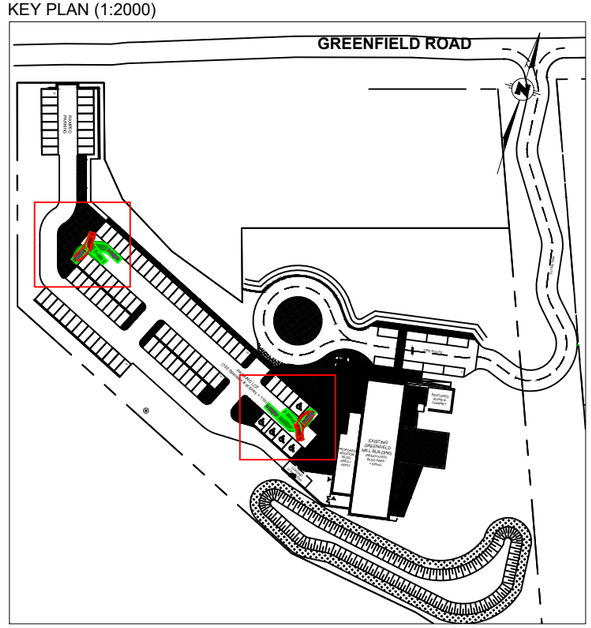


PASSENGER CAR EGRESS - 8



GREENFIELD ROAD

KEY PLAN (1:2000)



REV.	SUBMISSION	DATE	INITIAL
A	FIRST SUBMISSION	16/06/2026	MY

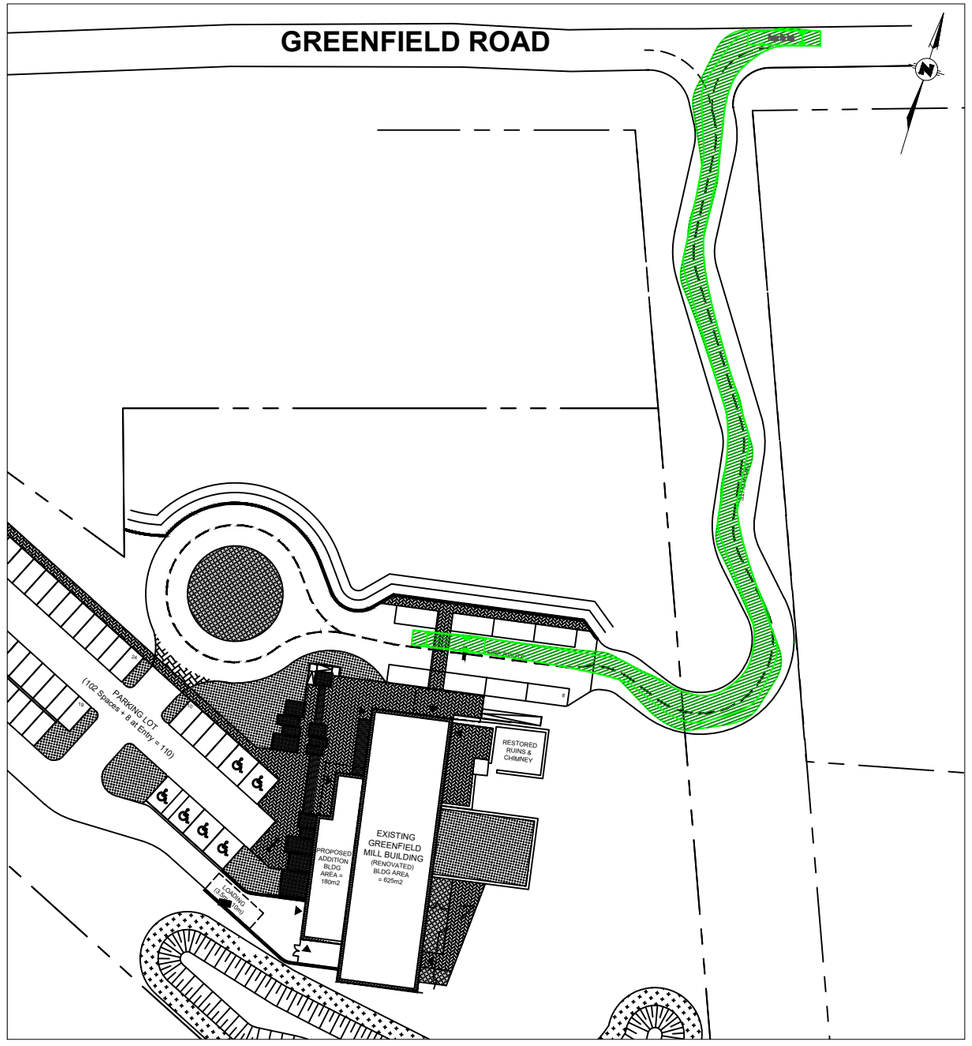
3089 GREENFIELD ROAD
TRAFFIC IMPACT STUDY

SWEPT PATH ANALYSIS

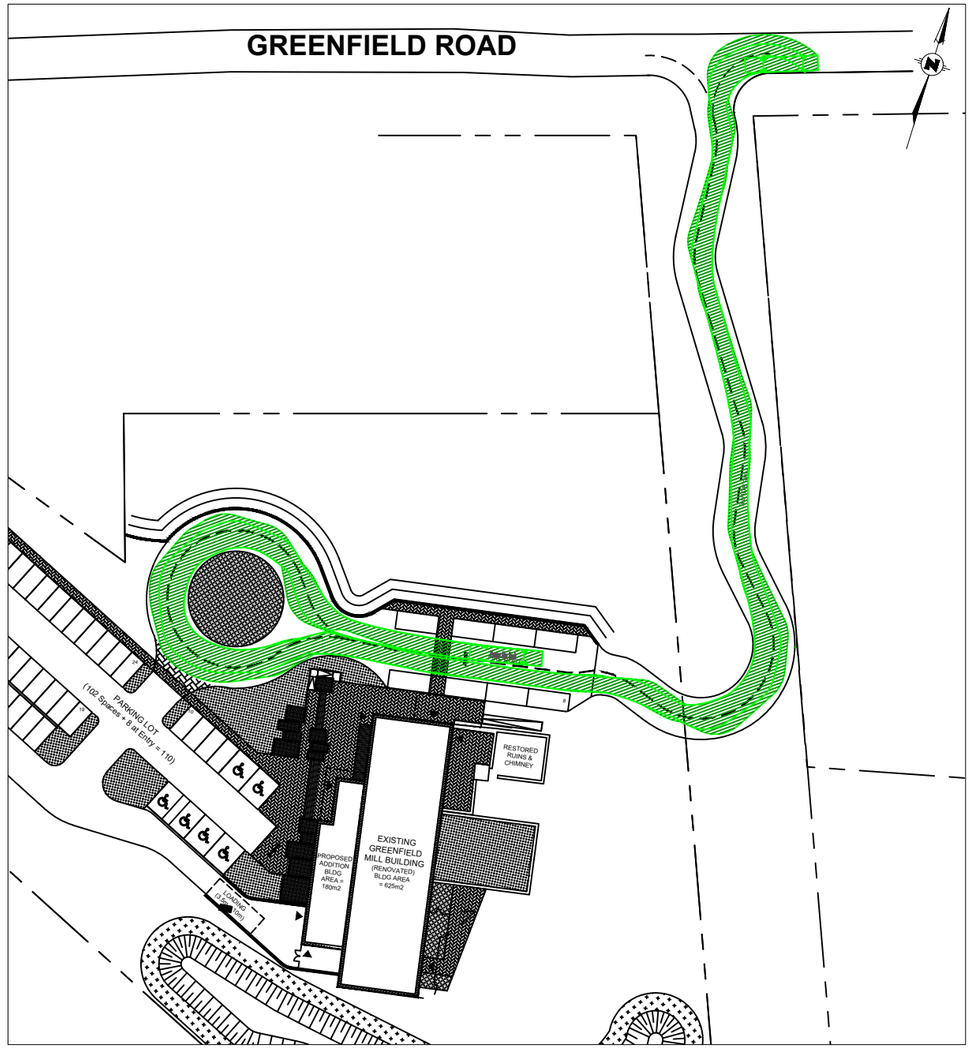
TRAFFMOBILITY

DESIGN	M.Y.	DRAWN	C.W.	CHECKED	M.Y.	CONTRACT No. PTRAN2026008
SCALE:	1:250		DRAWING NUMBER	PASSENGER CAR 3		
DATE:	JUN 16, 2026					

FIRE TRUCK

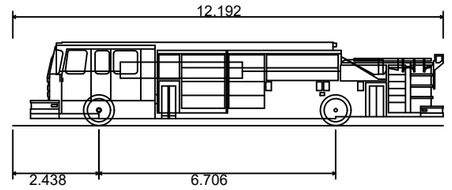


FIRE TRUCK



LEGEND:

- FORWARD PATH
- REVERSE PATH



Pumper Fire Truck	
Overall Length	12.192m
Overall Width	2.489m
Overall Body Height	2.361m
Min Body Ground Clearance	0.200m
Track Width	2.489m
Lock-to-lock time	5.00s
Max Wheel Angle	45.00°

REV.	SUBMISSION	DATE	INITIAL
A	FIRST SUBMISSION	16/06/2026	MY

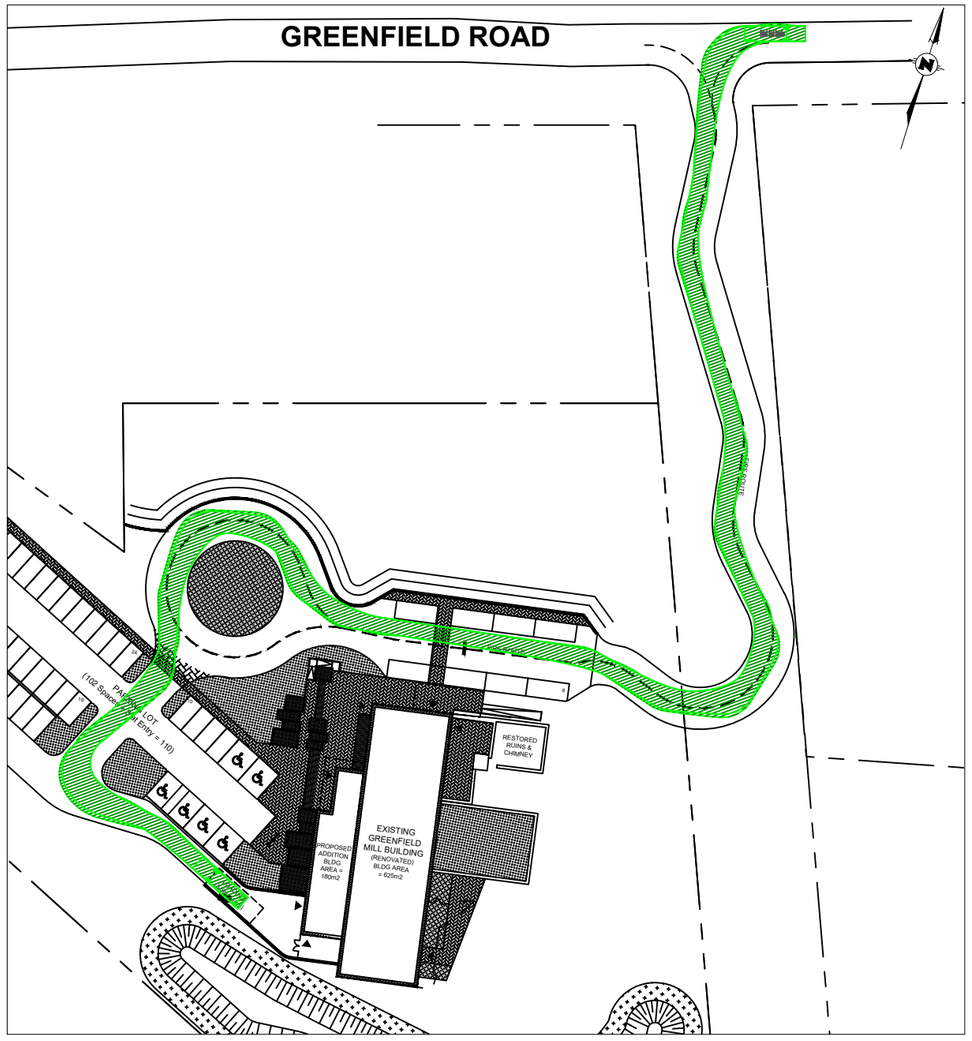
3089 GREENFIELD ROAD
TRAFFIC IMPACT STUDY

SWEPT PATH ANALYSIS

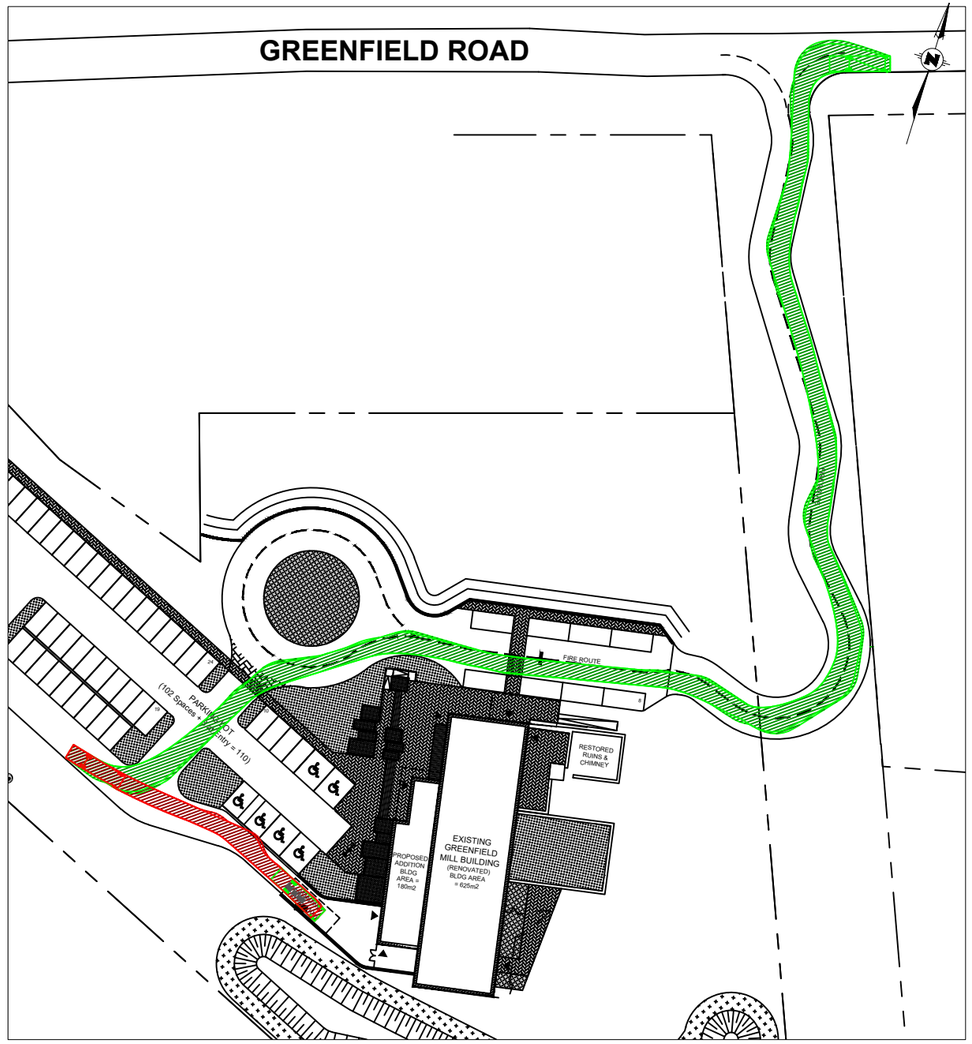
TRAFFMOBILITY

DESIGN	M.Y.	DRAWN	C.W.	CHECKED	M.Y.	CONTRACT No. PTRAN2026008
SCALE:	1:1000		DRAWING NUMBER	FIRE TRUCK		
DATE:	JUN 16, 2026					

GARBAGE TRUCK INGRESS

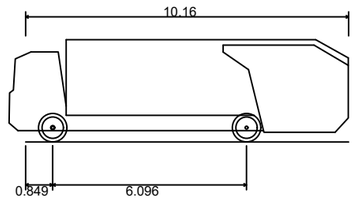


GARBAGE TRUCK EGRESS



LEGEND:

- FORWARD PATH
- REVERSE PATH



Front End Loader	
Overall Length	10.160m
Overall Width	2.553m
Overall Body Height	3.215m
Min Body Ground Clearance	0.305m
Track Width	2.553m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	8.931m

REV.	SUBMISSION	DATE	INITIAL
A	FIRST SUBMISSION	16/06/2026	MY

3089 GREENFIELD ROAD
TRAFFIC IMPACT STUDY

SWEPT PATH ANALYSIS

TRAFFMOBILITY

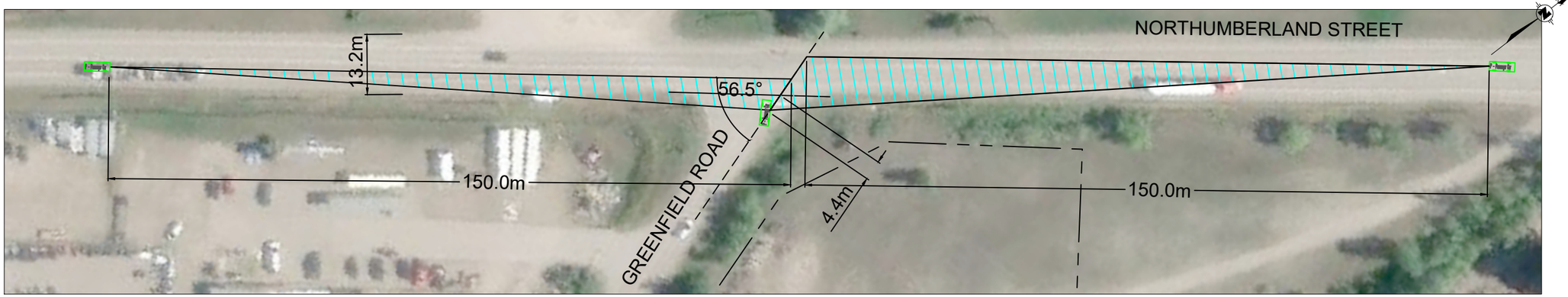
DESIGN	M.Y.	DRAWN	C.W.	CHECKED	M.Y.	CONTRACT No. PTRAN2026008
SCALE:	1:1000		DRAWING NUMBER	GARBAGE TRUCK		
DATE:	JUN 16, 2026					

TRAFFMOBILITY

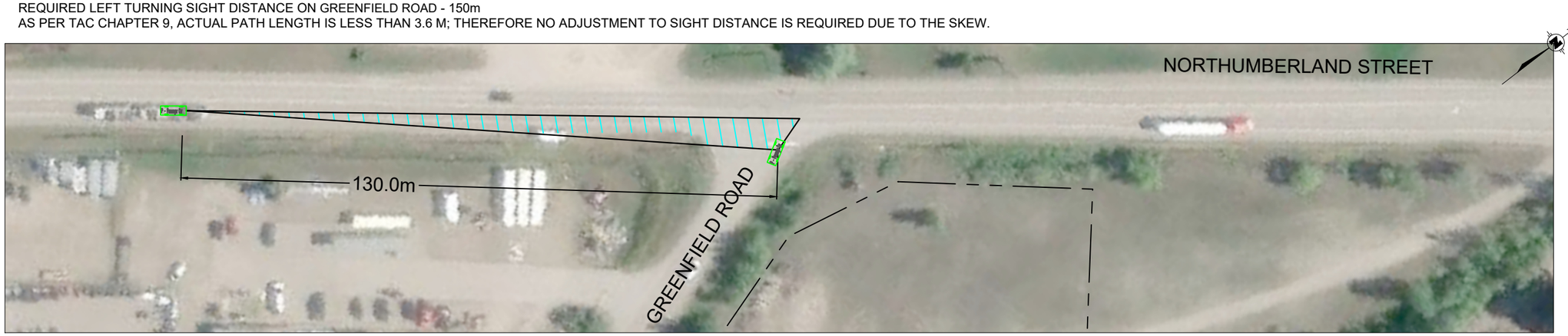
Appendix J

Sightline Review

NOTES:
1. MEASUREMENTS SHOWN ARE IN METRES.
2. AERIAL IMAGE BASE SHOWN AS VISUAL AID, AND IS ONLY SCALED APPROXIMATELY TO MATCH SURVEY.
3. DESIGN SPEED ON GREENFIELD ROAD: 70KM/H (POSTED SPEED: 60KM/H)



REQUIRED LEFT TURNING SIGHT DISTANCE ON GREENFIELD ROAD - 150m
AS PER TAC CHAPTER 9, ACTUAL PATH LENGTH IS LESS THAN 3.6 M; THEREFORE NO ADJUSTMENT TO SIGHT DISTANCE IS REQUIRED DUE TO THE SKEW.



REQUIRED RIGHT TURNING SIGHT DISTANCE ON GREENFIELD ROAD - 130m

REQUIRED STOPPING SIGHT DISTANCE ON GREENFIELD ROAD - 105m

REV.	SUBMISSION	DATE	INITIAL
A	FIRST SUBMISSION	16/06/2026	MY

3089 GREENFIELD ROAD
TRAFFIC IMPACT STUDY

SKEWED INTERSECTIONS SIGHTLINE MEASUREMENT

TRAFFMOBILITY

DESIGN	M.Y.	DRAWN	C.W.	CHECKED	M.Y.	CONTRACT No. PTRAN2026008
SCALE:	1:1000					
DATE:	JUN 16, 2026					

DRAWING NUMBER

SKEWED INTERSECTIONS SIGHTLINE MEASUREMENT

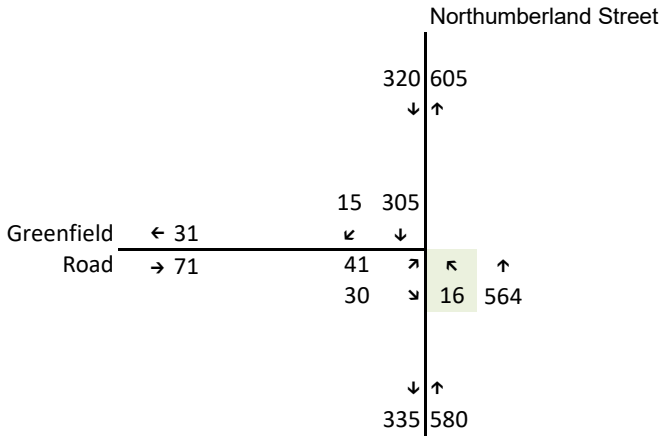
TRAFFMOBILITY

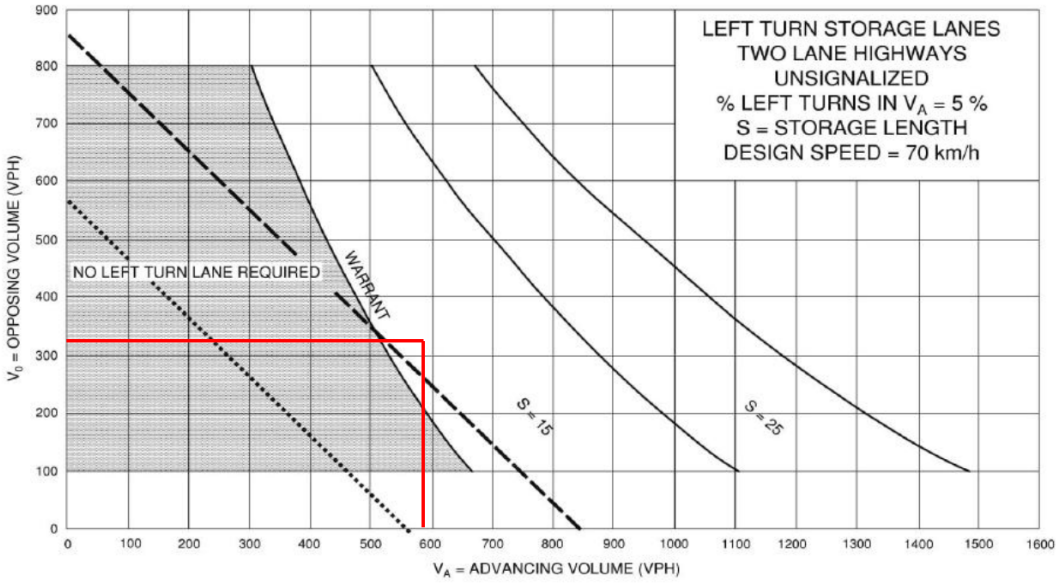
Appendix K

Left Turn Lane Warrant Analysis

Weekday AM Existing Conditions - Left Turn Warrant Analysis at Northumberland Street and Greenfield Road

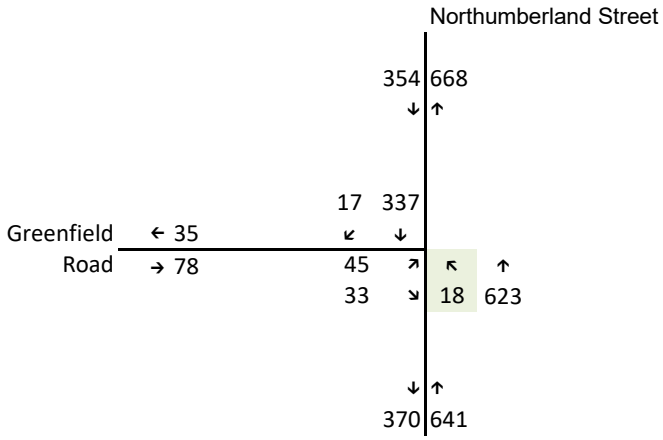
Design Speed =	70 km/h
Advancing Traffic Vol (VA) =	580
Opposing Traffic Vol (VO) =	320
Left Turn Traffic Vol (VL) =	16
Formula =	(LT x 100) / VA
% of Left Turning Veh's =	**2.8**

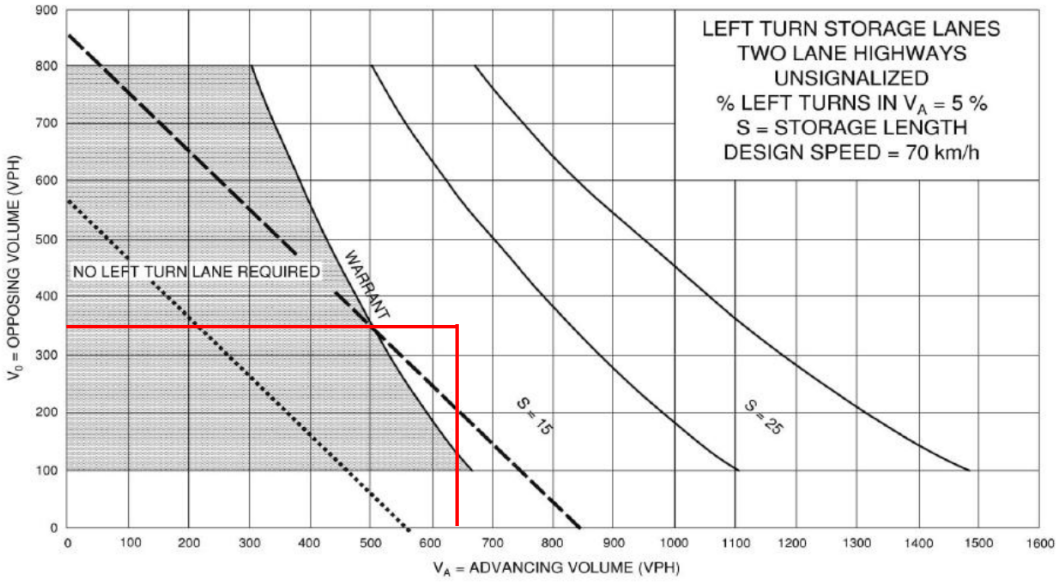




Weekday AM Future (2031) Background Conditions - Left Turn Warrant Analysis at Northumberland Street and Greenfield Road

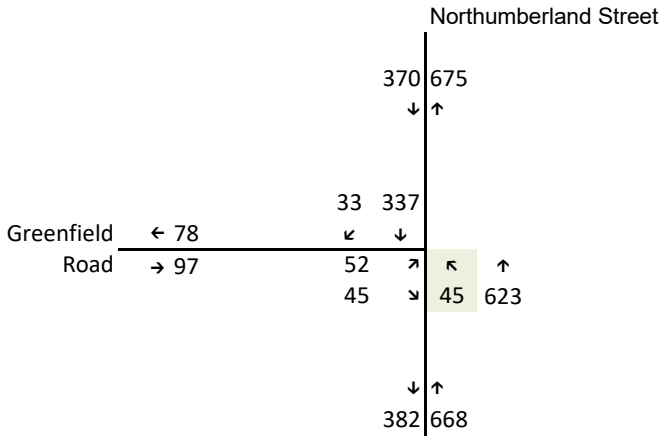
Design Speed =	70 km/h
Advancing Traffic Vol (VA) =	641
Opposing Traffic Vol (VO) =	354
Left Turn Traffic Vol (VL) =	18
Formula =	(LT x 100) / VA
% of Left Turning Veh's =	**2.8**

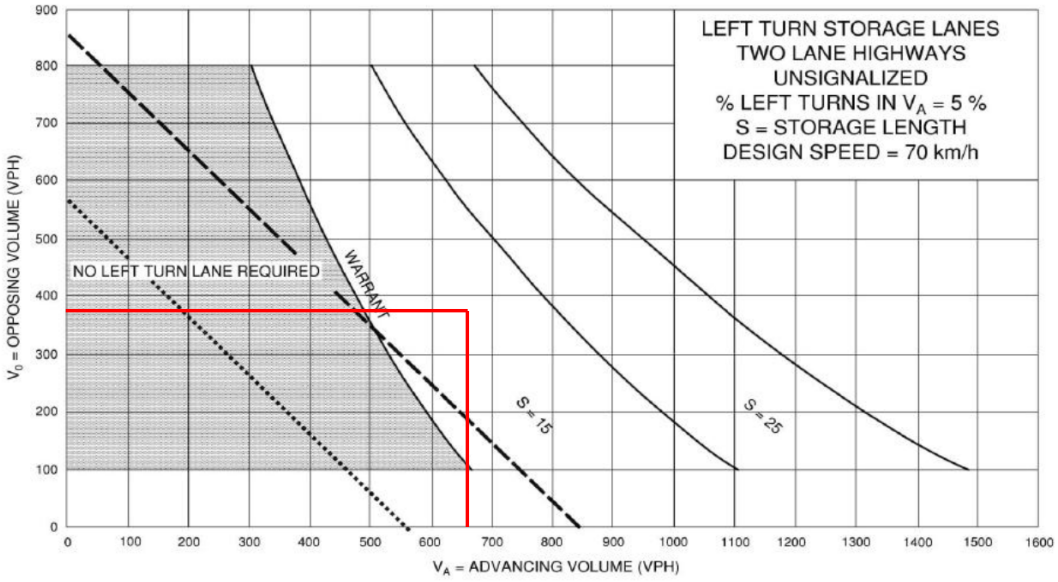




Weekday AM Future (2031) Total Conditions - Left Turn Warrant Analysis at Northumberland Street and Greenfield Road

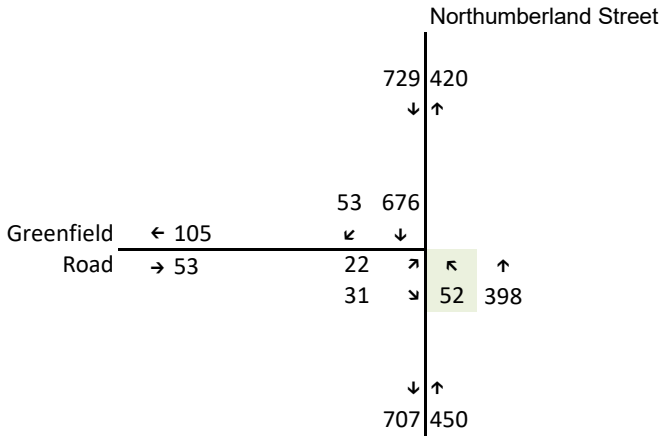
Design Speed =	70 km/h
Advancing Traffic Vol (VA) =	668
Opposing Traffic Vol (VO) =	370
Left Turn Traffic Vol (VL) =	45
Formula =	(LT x 100) / VA
% of Left Turning Veh's =	**6.7**

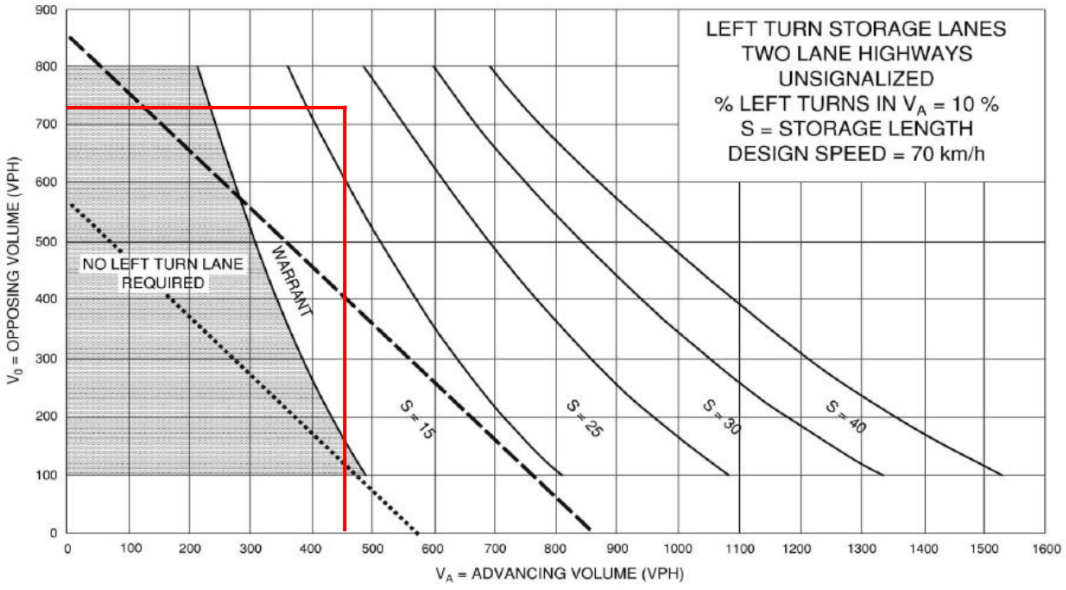




Weekday PM Existing Conditions - Left Turn Warrant Analysis at Northumberland Street and Greenfield Road

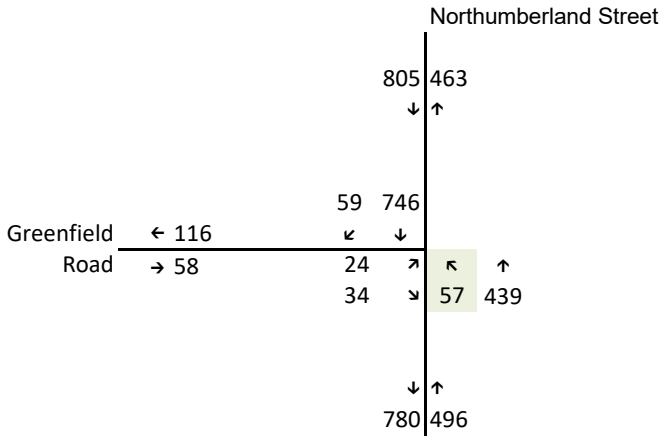
Design Speed =	70 km/h
Advancing Traffic Vol (VA) =	450
Opposing Traffic Vol (VO) =	729
Left Turn Traffic Vol (VL) =	52
Formula =	(LT x 100) / VA
% of Left Turning Veh's =	**11.6**

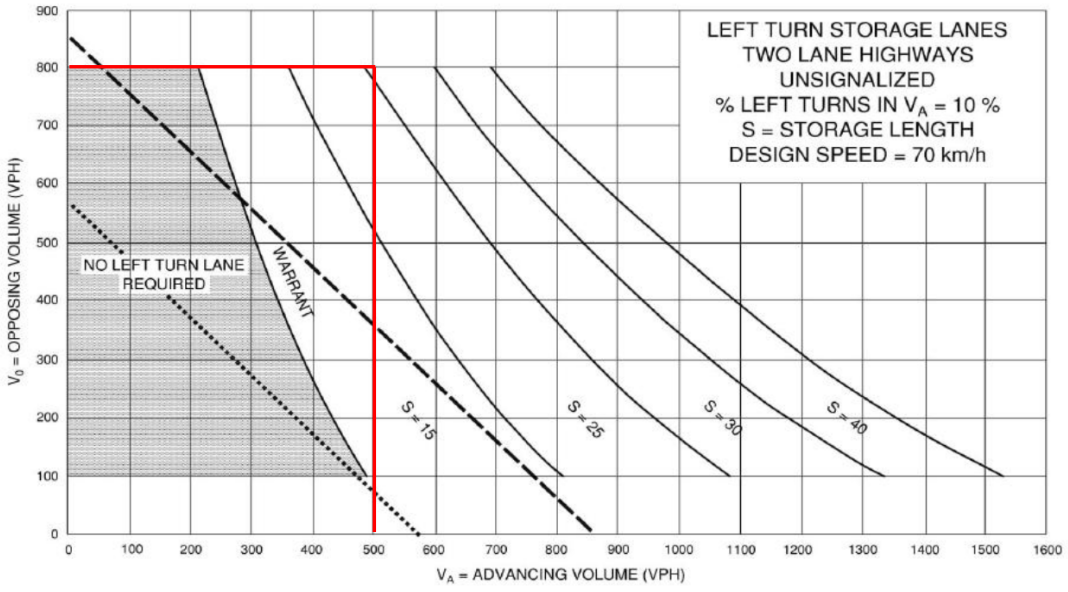




Weekday PM Future (2031) Background Conditions - Left Turn Warrant Analysis at Northumberland Street and Greenfield Road

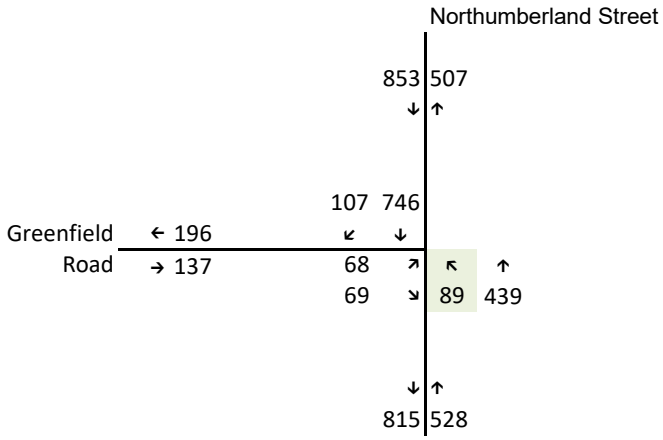
Design Speed =	70 km/h
Advancing Traffic Vol (VA) =	496
Opposing Traffic Vol (VO) =	805
Left Turn Traffic Vol (VL) =	57
Formula =	(LT x 100) / VA
% of Left Turning Veh's =	**11.5**

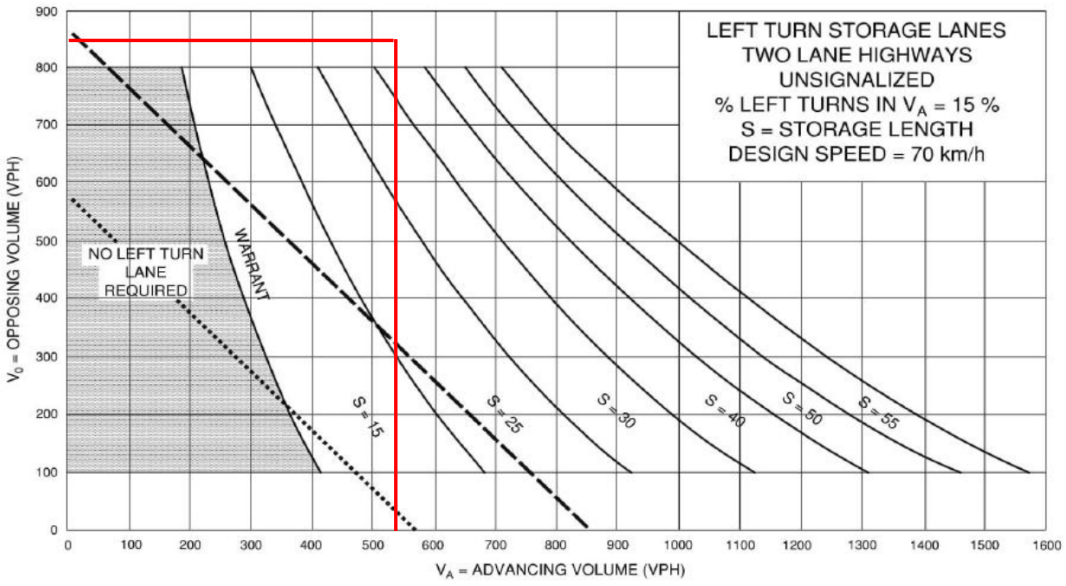




Weekday PM Future (2031) Total Conditions - Left Turn Warrant Analysis at Northumberland Street and Greenfield Road

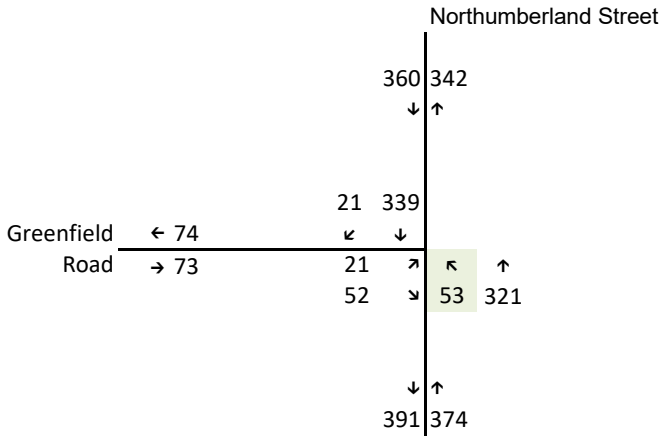
Design Speed =	70 km/h
Advancing Traffic Vol (VA) =	528
Opposing Traffic Vol (VO) =	853
Left Turn Traffic Vol (VL) =	89
Formula =	(LT x 100) / VA
% of Left Turning Veh's =	**16.9**

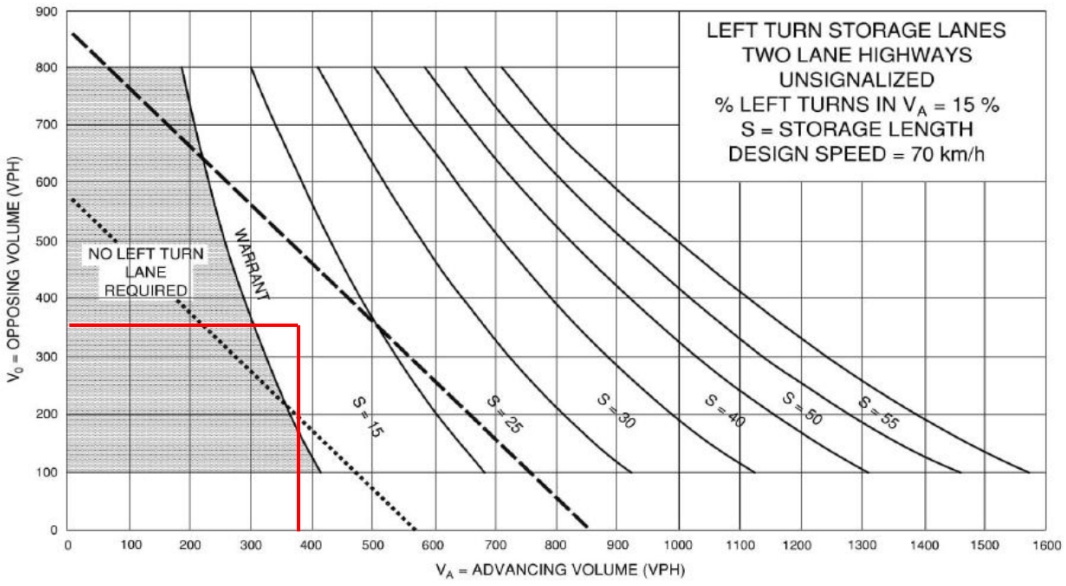




Weekday SAT Existing Conditions - Left Turn Warrant Analysis at Northumberland Street and Greenfield Road

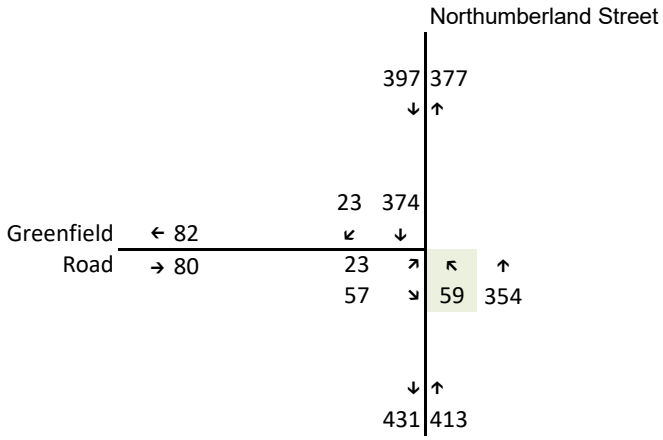
Design Speed =	70 km/h
Advancing Traffic Vol (VA) =	374
Opposing Traffic Vol (VO) =	360
Left Turn Traffic Vol (VL) =	53
Formula =	(LT x 100) / VA
% of Left Turning Veh's =	**14.2**

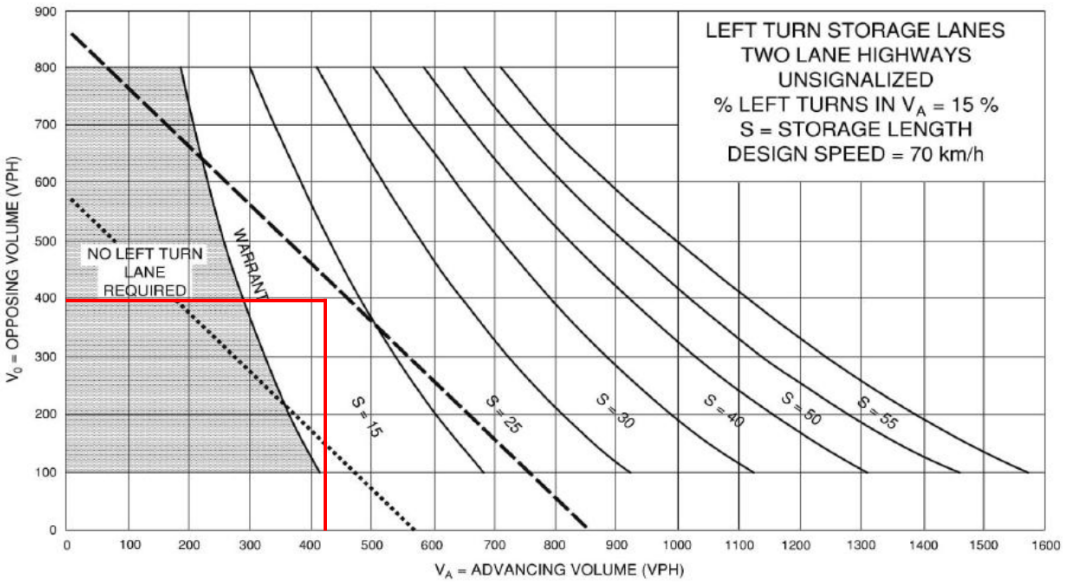




Weekday SAT Future (2031) Background Conditions - Left Turn Warrant Analysis at Northumberland Street and Greenfield Road

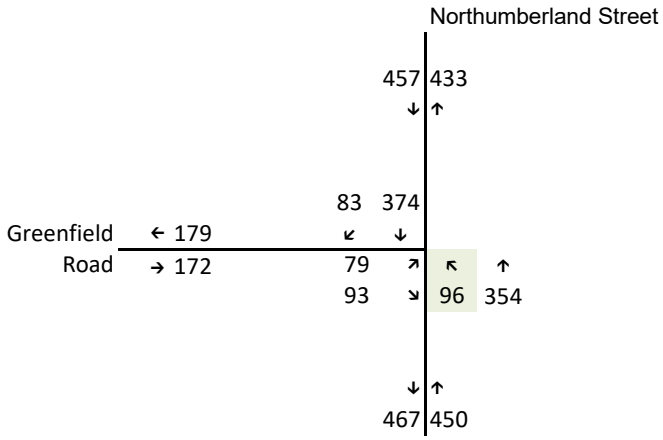
Design Speed =	70 km/h
Advancing Traffic Vol (VA) =	413
Opposing Traffic Vol (VO) =	397
Left Turn Traffic Vol (VL) =	59
Formula =	(LT x 100) / VA
% of Left Turning Veh's =	**14.3**

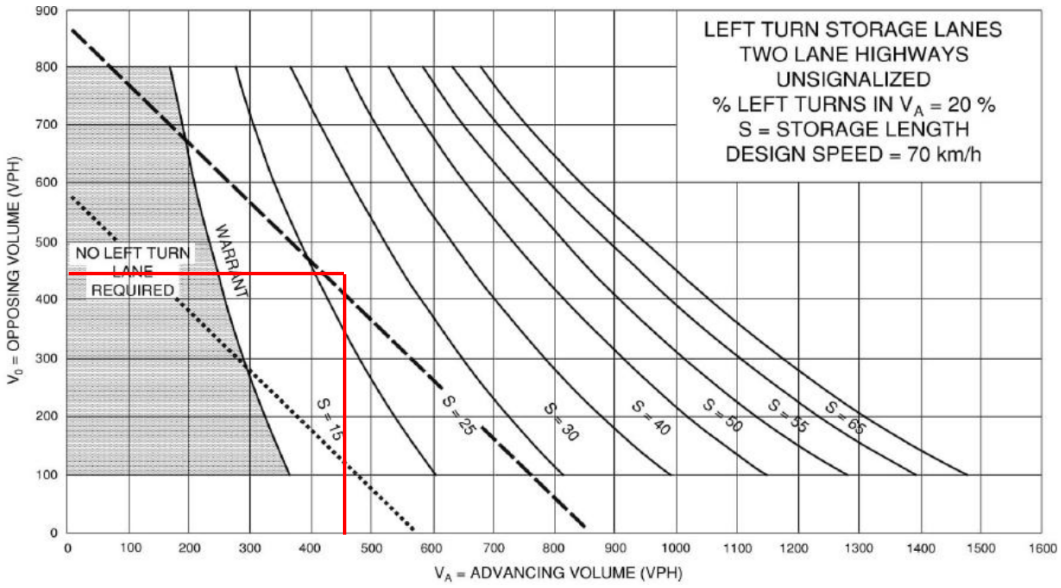




Weekday SAT Future (2031) Total Conditions - Left Turn Warrant Analysis at Northumberland Street and Greenfield Road

Design Speed =	70 km/h
Advancing Traffic Vol (VA) =	450
Opposing Traffic Vol (VO) =	457
Left Turn Traffic Vol (VL) =	96
Formula =	(LT x 100) / VA
% of Left Turning Veh's =	**21.3**





Appendix L

Zoning By-Law Excerpts

section, a building may be erected the front wall of which is in line with the front wall of the existing building closer to the required building line.

6.10.6 On any lot between two existing buildings which are not more than 60 metres apart and both of which are farther from the street line than the building line established by this sub-section, the line of the front wall of the building closer to the street line shall be deemed to be the building line.

6.11 OFF-STREET PARKING AND OFF-STREET LOADING

The entrances, driveways, service areas, off-street parking and off-street loading areas, if not paved, shall be properly levelled, drained and treated to prevent the escape of dust.

6.12 OFF-STREET LOADING REQUIREMENTS

In any zone where off-street loading spaces are required, no commercial, industrial or institutional building to which or from which regular deliveries are made by truck shall be used or erected unless there is provided space off a street or lane for the standing, loading or unloading of trucks in conformity with the following regulations:

6.12.1 Shall be located to the rear of the building line or lines;

6.12.2 Shall be so arranged to avoid interference with the movement of traffic on public streets or lanes;

6.12.3 Each off-street loading space shall have a minimum dimension of 3.5 metres (12 feet) by 10.5 metres (35 feet) and a minimum overhead clearance of 4.5 metres (15 feet);

6.12.4 One off-street loading space shall be provided for each 2,300 square metres (25,000 square feet) or part thereof of building floor area.

6.13 OFF-STREET PARKING REQUIREMENTS

6.13.1 Unless specifically permitted elsewhere in this By-law:

a) all off-street parking areas required by this By-law shall be provided and maintained on the same lot and in the same zone as the one requiring such area;

b) all off-street parking areas shall be situated to the rear of the building line or lines.

6.13.2 Where, in accordance with the requirements of this By-law, any part of a lot is required to be reserved for off-street parking, such space shall continue to be so reserved.

6.13.3 No off-street parking area designed to contain more than four (4) off-street parking spaces shall be located within 1.5 metres (5 feet) of any lot line.

6.13.4 When calculating the number of parking spaces required in accordance with the regulations of this By-law, any fraction or part of a parking space so calculated shall be considered to be a requirement for one additional parking space.

6.13.5 In any zone where off-street parking is required, such off-street parking spaces shall be provided and maintained on the same lot in conformity with the following:

Permitted Use	Required Off-Street Parking Space
Residential Building Single Detached Semi-Detached Duplex	2 spaces per dwelling unit
Townhouse or Stacked Townhouse	2 spaces per dwelling unit
Single Detached, Semi-Detached, Duplex, Stacked Townhouse or Townhouse Dwelling on a private (condominium) road	2 spaces per dwelling unit, and, 1 common (shared) parking stall for every 3 dwelling units
Secondary Dwelling Unit, Coach House or Garden Suite	1 space for the additional dwelling unit
Bed and Breakfast Establishment	1 space per bedroom available
Apartment Row	1½ spaces per dwelling unit
Golf Course 18 hole 9 hole	 125 spaces 75 spaces
Golf Driving Range/ Miniature Golf Course	3 spaces for each 2 tees or holes
Doctor's Office in Private Residence	3 spaces plus 1 space for the Residential Unit
Medical Clinic	6 spaces for each physician or practitioner
Day Nursery	5 spaces
Funeral Home	20 spaces
Church, Auditorium, Community Stadium or any use involving assembly of persons	1 space for every 7 seats or 8 Centre, spaces for each 100 square metres (1075 square feet) of floor area available to the public, whichever is greater
Commercial Floor Area devoted to retail sales or merchandising	1 space for each 18.5 square metres (200 square feet) of such floor area
Commercial Floor Area not devoted to retail sales or	1 space for each 30 square metres (325 square feet) of

merchandising	such floor area
Schools Elementary	1 space for each classroom plus the additional requirement for an auditorium
Secondary and Other	3 spaces for each classroom plus the additional requirement for an auditorium
Hospital, Rest Home, Nursing Home or Convalescent Home	1 space for every 4 beds plus 1 space for every 4 employees
Hotel, Motel, Motor Hotel, Home, Cabins and similar uses providing sleeping accommodation for hire	1 space per rentable bedroom unit Tourist additional requirements for restaurant or place for dispensing refreshment to the public
Restaurant or Place for Dispensing Refreshment to the Public	1 space for each 4.5 square metres (50 square feet) of floor area devoted to public use
Industry	1 parking space for each 2 employees
Warehousing	1 parking space for each 1,500 square metres of the gross floor area
Service Station or Repair Garage	4 spaces for each service bay
Fraternal Organization, Club or similar use	1 space for each 18.5 square metres (200 square feet) of building floor area
Car Washing Establishment	5 spaces per bay but a minimum of 15 spaces per car washing establishment
Drive-In Restaurant	15 spaces per 100 square metres (1075 square feet) of building floor area
Lodging, Rooming or Boarding House	1 space for each dwelling unit plus 1 additional space for each 2 guest
Other Permitted Uses	1 space for each 45 square metres (485 square feet) of floor area

6.13.6 In any Residential Zone where off-street parking is required for a Single Detached, Semi-Detached, Townhouse, Stacked Townhouse, and/or Duplex Dwellings, the following provisions shall apply related to the requirements of a driveway.