



Issue Date:	December 23, 2021	File No.:	2021-5627.000
To:	Rob Atalick, Partner	Previous Issue Date:	n/a
From:	Domenic Di Flavio, C.Tech.	Project No.:	2021-5627
Client:	Meadowvale Developments Ltd.		
Project Name:	Sightline Assessment Study		
Subject:	Sightline Assessment of Proposed Access to 7702 Chippawa Creek Road		

Greetings Rob,

Further to our assessment of sightlines for the new driveways being proposed at 7702 Chippawa Creek Road, we have concluded that the sight distance for vehicles turning northbound left from the westerly access (Access "B") does not meet the technical requirement. As a result, we recommend you take the following action:

- Maintain the existing driveway but restrict left out movements, or;
- Relocate the driveway (sightlines will have to be reassessed), or;
- Remove the existing trees restricting sightlines and provide assurances that the area is kept clear at all times.

1 BACKGROUND

You retained us to conduct a horizontal sight distance assessment of two (2) new access driveways for the development your company is proposing at 7702 Chippawa Creek Road in the City of Niagara Falls. The site is located just south of the built-up area of the City and has significant frontage along Chippawa Creek Road and the Welland River. A key map showing the proposed site is provided in **Figure 1-1**.



Figure 1-1
Key Map



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Existing Site and Land Use

The site is situated on the south side of Chippawa Creek Road, east of Montrose Road and just east of Heartland Forest Road with frontage of just over 900 metres on Chippawa Creek Road. The existing land is currently occupied by a single building that does not appear to be currently operating, with the remainder occupied by various trees and vegetation.

Proposed Driveway(s) Location

The proposed development will consist of various commercial and retail use buildings that will be located close to the east property limit. Access will be provided via two (2) new driveway connections to Chippawa Creek Road. The location of these (2) access driveways will be 150 metres (Access "A") and 295 metres (Access "B") from Heartland Forest Road, measured centreline-to-centreline. A site plan, dated April 2020, showing the location of the (2) access driveways is provided in **Figure 1-2**.



Figure 1-2
Site Plan Sketch

Potential Sightline Issues

There are potential sightline obstructions for turning vehicles at the (2) proposed access driveways east and west of the site along Chippawa Creek Road. West of the site, Chippawa Creek Road curves to the south with restricted visibility due to the existing trees near the north property line; east of the site, there is a vertical curve in the road just east of Heartland Forest Road restricting visibility beyond the top of the curve's crest. Images from Google Streetview on Chippawa Creek Road facing both directions illustrating the sightline issues is provided in **Figures 1-3 and 1-4**.



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Figure 1-3
Looking West along Chippawa Ck. Rd.

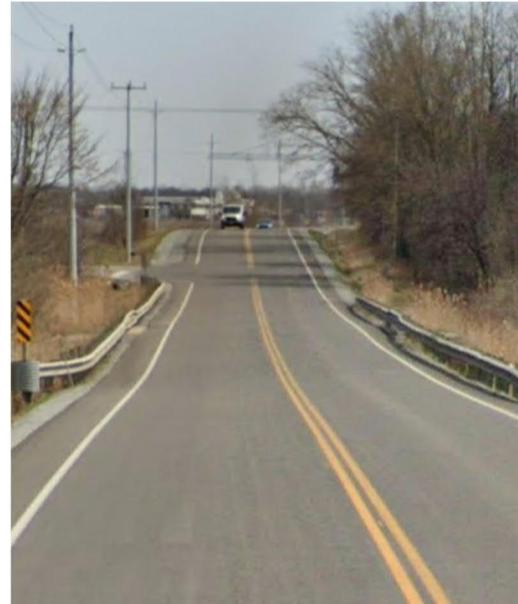


Figure 1-4
Looking East along Chippawa Ck. Rd.

2 METHODOLOGY AND ANALYSIS

Sightlines were assessed based on the technical requirements of the *Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads, 2017*. Specifically, observed sight distances were compared with TAC's minimum intersection sight distance requirements for the following turning movements:

- **Case B1** - vehicles turning left from a minor road at a 2-way stop controlled intersection;
- **Case B2** - vehicles turning right from a minor road at a 2-way stop controlled intersection, and;
- **Case F** - vehicles turning left from the major road at a 2-way stop controlled intersection.

Criteria and Assumptions

Various known criteria were used to calculate the minimum sight distance and to determine the field-observed sight distances; however, in some cases, assumptions were made where data was not readily available. One assumption involved the grade of the proposed driveways – in this case, we assumed the grade would be equal to the shoulder grade. Other criteria and assumptions used for our assessment were as follows:

- Design speed 90 km/h (assumed posted speed + 10 km/h);
- Height of turning driver's eye 1.08 metres above (assumed driveway) grade (as per TAC);
- Height of approaching vehicle (headlight) 0.60 metres above grade (as per TAC);
- Position of turning driver's eye 4.4 metres from the edge of the crossing road (as per TAC);



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- Design vehicle is a passenger car (assumed based on anticipated prevailing vehicle class);

Field Visit – Observed Sight Distance

A field visit was conducted on December 15, 2021 to observe and record the sightlines for turning vehicles at the proposed (2) access driveways (Access "A" and Access "B"). The eye-level position of the 1st observer was consistent with the previously mentioned criteria and represented the driver's eye-level of a turning vehicle (northbound left or right and westbound left).

The position of the 2nd observer represented an approaching vehicle and displayed a target 0.60 metres above the road. The sight distance was recorded the farthest distance that the target was visible. Photographs from the perspective of the driver of a turning vehicle (from the driveways) observing the target at the sight distance are provided in **Figure 2-1 to 2-4**.



Figure 2-1
Looking Left from Access "A"



Figure 2-2
Looking Right from Access "A"



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Figure 2-3
Looking Left from Access "B"



Figure 2-4
Looking Right from Access "B"

Required Sight Distance

The minimum sight distance requirements for Cases B1, B2 and F are from Tables 9.9.4, 9.9.6 and 9.9.12, respectively out of the *Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads, 2017*. These requirements are based on a design speed of 90 km/h as well as the other previously mentioned criteria. The minimum requirements and observed measurements of sight distance are summarized in Tables 2-1 and 2-2.

Table 2-1
Turning Sight Distance for Northbound (NB) Left and Right Turning Vehicles

Case B1 – Left Turn from the Minor Road		Case B2 – Right Turn from the Minor Road	Location	Observed	
Required Looking Left	Required Looking Right	Required Looking Left		Looking (NB) Left	Looking (NB) Right
190 metres	190 metres	165 metres	Access "A"	271.0 metres	283.9 metres
			Access "B"	169.8 metres	424.9 metres



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Table 2-2
Turning Sight Distance for Westbound (WB) Left Turning Vehicles

Case F – Left Turn from the Major Road	Location	Observed
		Required Looking Ahead (WB) Ahead
140 metres	Driveway "A"	284.5 metres
	Driveway "B"	183.3 metres

Summary of Findings

The existing sight distance for vehicles turning from access "A" and "B" exceeds the TAC minimums with the exception of the sight distance for vehicles turning northbound left from access "B" which is only 169.8 metres looking to the left versus the required 190 metres. The existing sight distance for vehicles turning westbound left into access "A" and "B" exceeds the TAC minimum.

3 CONCLUSIONS RECOMMENDATIONS

The following summarizes key findings of our study and corresponding recommendations:

- Sightlines looking to the west along Chippawa Creek Road from either proposed access "A" or "B" are limited by a combination of the horizontal curve and a number of exiting trees situated on the north property line.
- Sightlines looking to the east along Chippawa Creek Road are restricted by the existing vertical curve just east of Heartland Forest Road.
- Existing sight distance for vehicles turning at access "A" and "B" exceeds the TAC minimums with the exception of the sight distance for vehicles turning northbound left from access "B" which is only 169.8 metres versus the required 190 metres.
- As a result of not having sufficient sight distance to turn northbound left at access "B", we recommend restricting lefts out at this location to the satisfaction of the municipality. This can be achieved either through signage (less effective) and/or physical channelization (more effective).
- If restricting lefts out at access "B" is not desirable, we recommend either i) relocating the driveway (sightlines will have to be reassessed) or ii) arranging to remove any trees contributing to restricted sightlines permanently and providing assurances that the area is kept clear at all times.



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TECHNICAL MEMORANDUM

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Prepared by:

A handwritten signature in blue ink that reads "Domenic Di Flavio".

Domenic Di Flavio, C.Tech.
Senior Transportation Planner

DDF

Reviewed by:

A handwritten signature in black ink that reads "Roger De Gannes".

Roger De Gannes, P.Eng.
Senior Transportation Engineer

RDG