



Date: March 30, 2020 File: 2020-5465
 To: Scott Peterson, P.Geo. Page: Page 1 of 9
 From: Domenic Di Flavio, C.Tech.
 Project: Temporary Worker Camp Site
 Subject: Traffic Impact Brief

Attention Scott:

The purpose of this memorandum is to document the findings of our review of traffic conditions associated with the proposed construction of a temporary worker camp that will have direct access to Picnic Lake Beach Road near Highway 631 in White River, Ontario. This is further to the Ontario Ministry of Transportation's (MTO) Northeastern Region requirement that the property owner / representative (Valard Construction) submit a traffic impact brief that will examine the adequacy of the site to accommodate traffic, review visibility and sightlines, traffic movement into and out of the property and the potential for conflicts, and traffic generated by the development.

In preparing this traffic brief, Associated Engineering (AE) reviewed the location:

- By assessing existing traffic on Picnic Lake Road, Highway 631 and Highway 17 using historical AADT data and growth available from the MTO;
- By reviewing the site's traffic generation provided by the owner and evaluating impacts that this will have to the surrounding road network;
- By reviewing the adequacy of the proposed driveway access in terms of location and permitted turning movements (for conformance to applicable engineering standards);
- By assessing sightlines (from the perspective of drivers entering and exiting the property) for conformance to applicable engineering standards and;
- Assessing the need for auxiliary lanes to maintain safety and facilitate turning movements specifically at the intersections of Highway 631 / Picnic Lake Beach Road and Highway 17 / Highway 631.

1 PROPOSED WORK CAMP AND LOCATION DESCRIPTION

Valard Construction proposes to construct a temporary work camp on a vacant property located just north of the White River, Ontario urban centre within the southwest quadrant of Highway 631 and Picnic Lake Beach Road. The Town of White River, whose population is estimated to be 800¹, consists of few residential and commercial uses and cottage homes farther away from the town centre, but the surrounding area is mainly vacant forested land. A key map of the site location is provided in Figure 1-1.

¹ www.whiteriver.ca

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Figure 1-1
Key Map

The work camp will be constructed in Spring 2020 and will begin operation in June for a duration of 8 to 12 months. The site will consist of four (4) dormitories containing 44 beds each, a recreation centre, an office and a kitchen as well as on-site utility installations to provide occupants with heating, electricity and water services. The site will provide 124 marked parking spaces for worker vehicles. A single driveway connection is being proposed to access the site which will be located on Picnic Lake Beach Road, approximately 200 metres west of Highway 631. At the end of the 8- to 12-month period, operation at the site will cease and the camp shall be removed. A drawing illustrating general site details including the proposed driveway connection to Picnic Lake Beach Road is provided in Figure 1-2.

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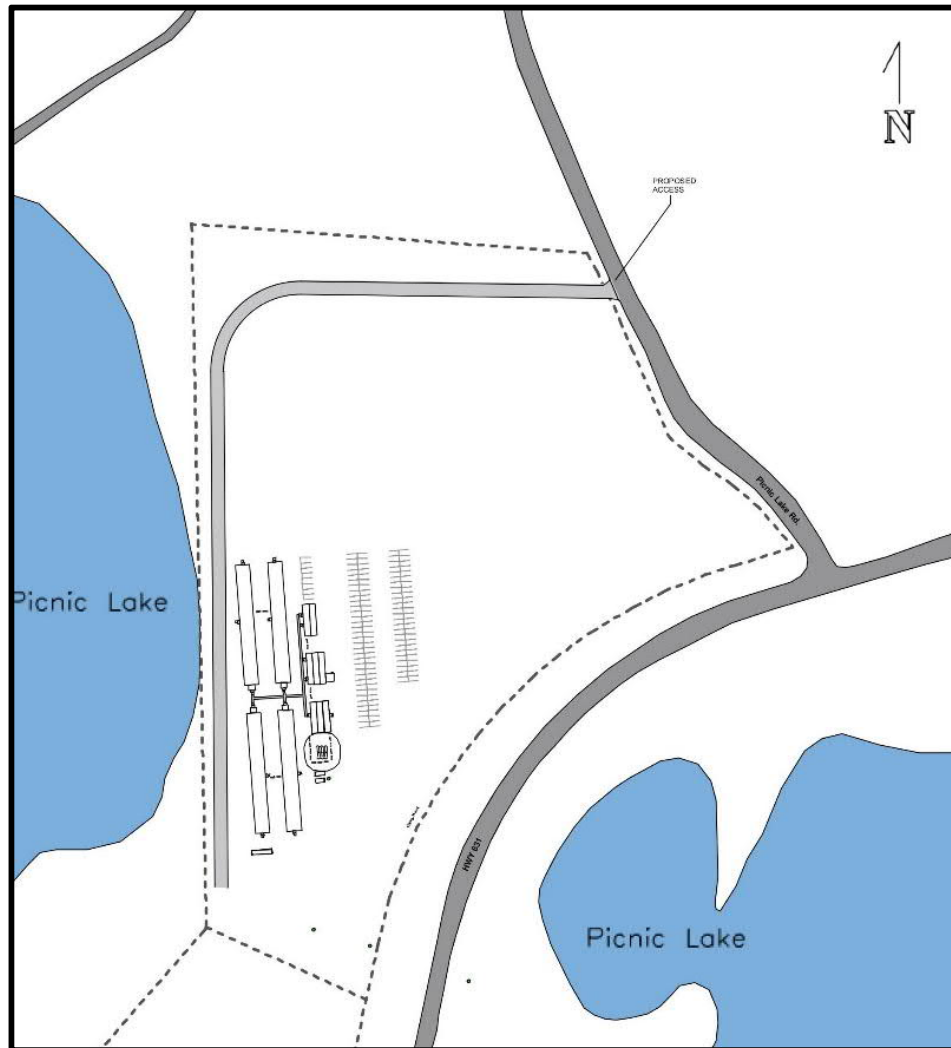


Figure 1-2
Proposed Work Camp Site Plan

2 SURROUNDING ROAD NETWORK

Picnic Lake Beach Road is a two-lane local road that extends from Highway 631 northwest a distance of 450 metres to its terminus at the intersection of Beach Road North and Beach Road South. The road currently provides access to several single dwelling residential properties (lakefront cottage homes) via Beach Road North and Beach Road South. Traffic data is limited for this road but is not anticipated to be significant. The statutory speed is assumed to be 50 km/h given the characteristics and local function of the road. Picnic Lake Beach Road is controlled by a stop sign at the approach to Highway 631.

Highway 631 is an MTO Secondary Highway operating as a two-lane road that extends from Highway 17 in White River north a distance of 167.2 kilometres to Highway 11. The intersection of Highway 631 and Picnic Lake Beach Road is 1,390

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metres north of Highway 17. The posted speed limit is 80 km/h north of Picnic Lake Beach Road and 60 km/h south thereof to Highway 17. Highway 631 is designated as a Local road under MTO's functional classification system.² Highway 631 is controlled by a stop sign at the approach to Highway 17.

Highway 17 is an MTO King's Highway that operates as a two-lane road and functions as the main arterial road through the Town of White River, Ontario. It is designated as a level 2A Arterial road under MTO's access management classification system.³ The posted speed limit in this area is 60 km/h.

3 TRAFFIC GENERATION AND DISTRIBUTION

Valard Construction has provided estimates of the anticipated traffic that would be generated by the work camp and is based on recent previous experience constructing 50 to 60 similar facilities of comparable size. The peak period traffic generated by the site is provided in Table 3-1.

Table 3-1
Work Camp Traffic Generation

Period	In (vehicles/hour)	Out (vehicles/hour)	Total (vehicles/hour)	Proportion of Heavy Trucks	Time Range of Peak Hour of Generator
Weekday AM Peak Hour (of Generator)	3	44	47	8.5%	05:00 to 07:00
Weekday PM Peak Hour (of Generator)	44	3	47	8.5%	17:00 to 19:00

In addition to the weekday peak traffic, the site will generate 6 to 8 vehicles per hour from 07:00 to 12:00, 10 to 15 vehicles per hour from 12:00 to 14:00 and 6 to 8 vehicles per hour from 14:00 to 17:00. Furthermore, the site will generate 2 to 3 heavy trucks per hour all day from 07:00 to 17:00. The in / out split from 07:00 to 17:00 is estimated to be 50% / 50%.

3.1 Traffic Distribution

All traffic exiting the site will proceed eastbound on Picnic Lake Beach Road and then southbound on Highway 631 towards Highway 17. From there, they will travel to multiple sites which are assumed to be equally located east and west along Highway 17; this being the case, a 50% east / 50% west distribution is assumed at the intersection of Highway 17 and Highway 631. The opposite applies for traffic entering the site.

² Ontario Ministry of Transportation Highway Access Management Guideline, December 2013

³ Ontario Ministry of Transportation Highway Access Management Guideline, December 2013

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4 PROPOSED ACCESS

A single driveway connection is being proposed to access the site which will be located on Picnic Lake Beach Road, approximately 200 metres west of Highway 631. This distance away from Highway 631 exceeds the minimum 85.0 metre offset for a low-volume access specified in the Highway Access Management Guideline.⁴ The access will permit all inbound and outbound movements and shall be designed to accommodate AASHTO⁵ WB-20 design vehicles and to the specifications of the MTO for rural commercial access. The access will be both staffed and controlled by a mechanical gate in the evening only for security purposes.

The driveway leading to the site will be over 200 metres in length and will be wide enough to accommodate two-way traffic. The driveway distance (from Picnic Lake Beach Road to the first turn-off in the site) will exceed the minimum driveway depths specified in Highway Access Management Guideline.⁶ Queuing back on the driveway to Picnic Lake Beach Road is not anticipated to occur due the sufficient driveway depth.

4.1 Sightlines

Since all traffic exiting the site will proceed eastbound on Picnic Lake Beach Road, sightlines were only reviewed for right turns out of the property from the proposed single access. For drivers turning (northbound) right at the proposed access and looking to their left (looking west), the measured sight distance is 220 metres. In the vicinity of the proposed access, the road has no change in grade, therefore as per Figure 9.9.5: Design Intersection Sight Distance – Right Turn from Stop⁷, the measured distance of 220 metres is sufficient for a right-turning WB-20 design vehicle to enter a road with a design speed of 70 km/h. Vehicles on Picnic Lake Beach Road are not expected to exceed that speed. Photographs of the perspective of a driver at the proposed access looking both ways along Picnic Lake Beach Road are provided in Figure 4-1 and Figure 4-2.

⁴ Ontario Ministry of Transportation Highway Access Management Guideline, December 2013 Figure 12

⁵ American Association of State Highway and Transportation Officials

⁶ Ontario Ministry of Transportation Highway Access Management Guideline, December 2013 Table 12

⁷ Transportation Association of Canada Geometric Design Guide for Canadian Roads Chapter 9

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Figure 4-1
Proposed Driveway Location
Looking Left (Looking West)



Figure 4-2
Proposed Driveway Location
Looking Right (Looking East)

5 ADJACENT ROAD NETWORK TRAFFIC

Vehicular volumes on Highway 631 and Highway 17 were obtained from MTO's iCorridor website. No information was available for Picnic Lake Beach Road, however existing vehicular volumes are anticipated to be very low. Detailed information regarding AADT, hour-by-hour volumes, heavy vehicle percentage, directional split and growth were available for the 2008 year only. The growth rates (simple) for Highway 17 and Highway 631 are 1.67% per year and -4.17% per year, respectively. A tabulated summary of the adjacent road volume data for 2008 and forecast for the 2020 build-out year is provided in Table 5-1.

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Table 5-1
Adjacent Road Network Traffic Volumes

Road	2008 Two-Way AADT (%Trucks)	2008 AM Peak Hour Two-Way Volumes (Peak Hour of Generator)	2008 PM Peak Hour Two-Way Volumes (Peak Hour of Generator)	Directional Split	Projected 2020 AM Peak Hour Two-Way Volumes (Peak Hour of Generator)	Projected 2020 PM Peak Hour Two-Way Volumes (Peak Hour of Generator)
Highway 17	1,974 (42.2%)	32	141	0.50	38	169
Highway 631	265 (29.8%)	5	20	0.50	2	10
Picnic Lake Beach Road	n/a	n/a	n/a	n/a	n/a	n/a

Existing hourly volumes corresponded to the highest peak hour of the generator which was between 05:00 and 07:00 in the AM and 17:00 to 19:00 in the PM. The proposed site will add 47 vehicles to Highway 631 and Highway 17 in both the AM and PM peak hour of the generator and is not expected to impact existing operations along these roads.

6 NEED FOR AUXILLARY LANES

The need for separate left turn lanes was assessed at the intersections of Highway 631 and Picnic Lake Beach Road for the northbound movement and Highway 17 and Highway 631 for the eastbound movement as per the applicable MTO guidelines (Left Turn Lane Warrant).⁸ The design hour used for the analysis was the PM peak hour of the generator as it corresponded to the highest left turning volumes; 22 eastbound left turns per hour at Highway 17 and Highway 631 and 44 northbound left turns per hour at Highway 631 and Picnic Lake Beach Road. For the analysis, the design speed assumed for Highway 17 was 80 km/h (60 km/h posted speed limit + 20 km/h) and for Highway 631 was 90 km/h (80 km/h posted speed limit + 10 km/h) representing conservative rates of speed.

Analysis shows that left turn lanes are not justified at either of the assessed intersections as the advancing and opposing volumes are too low. A copy of the Left Turn Lane Warrant nomograph analysis is provided in Appendix A. Note that site-generated westbound right turn volumes (22 vehicles) was not added to the opposing volume in the Highway 17 and Highway 631 analysis as there is an existing separate right-turn lane at the intersection.

7 CONCLUSIONS AND RECOMMENDATIONS

Based on the above, the following conclusions are noted:

⁸ Transportation Association of Canada Geometric Design Guide for Canadian Roads: MTO Design Supplement, 2017

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- During the AM and PM peak hours of the generator, 47 trips will be added to the surrounding road network; in the AM, 44 trips will be outbound; in the PM, 44 trips will be inbound; trips will be distributed 50% east and 50% west along Highway 17;
- The proposed access location relative to Highway 631 exceeds MTO's minimum 85.0 metre offset for a low-volume access; the proposed driveway depth will not result in queues that extend back to the public road from inside the site;
- The proposed access will permit all inbound and outbound movements and shall be designed to accommodate WB-20 design vehicles and to the specifications of the MTO for rural commercial access;
- The 220 metre sightline at the proposed access is sufficient for an outbound right-turning WB-20 design vehicle to enter Picnic Lake Beach Road safely;
- The addition of 47 vehicles, generated by the site, to Picnic Lake Beach Road, Highway 631 and Highway 17 in both the AM and PM peak hour of the generator is not expected to significantly impact existing operations on these roads;
- Separate left turn lanes are not justified on either Highway 631 or Highway 17 as the advancing and opposing total volumes are too low.

No recommendations are therefore identified from a traffic perspective with respect to the proposed site.

Prepared by:

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APPENDIX A – LEFT TURN LANE WARRANT ANALYSIS

Use of Graphs

Select proper graph by percentage of left turns in Advance Volume, VA, and design speed in kilometres per hour.

If the intersection of lines projected from Advancing Volume, VA, and Opposing Volume, VO, fall to the left of the warrant line, a left turn lane is not required.

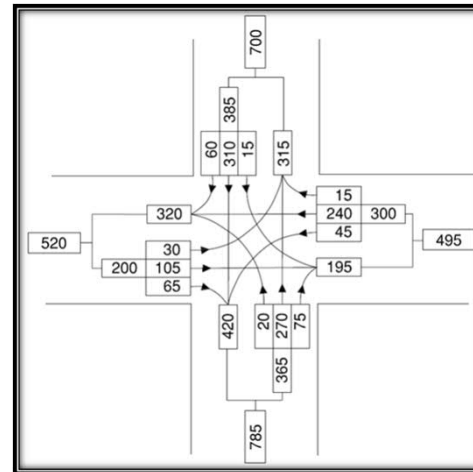
Right of the warrant line, 'S', indicates the length of the storage lane in metres. If the percentage of trucks in the left turning traffic is more than 10% see Exhibit 9-F of Appendix 9 and add the table value to storage lane length.

The charts also indicate conditions where the combination of advancing and opposing traffic may warrant traffic signals. A warrant for traffic signals may occur when no warrant for left turn storage lanes exist due to the requirements of the side road traffic.

On approaches where a separate turning lane is provided for right-turning traffic, the right turns are not included in the determination of VA or VO as the case may be. For right turning lane, refer to Section 9.14 – Tapers and Auxiliary Lanes of Chapter 9- Intersections.

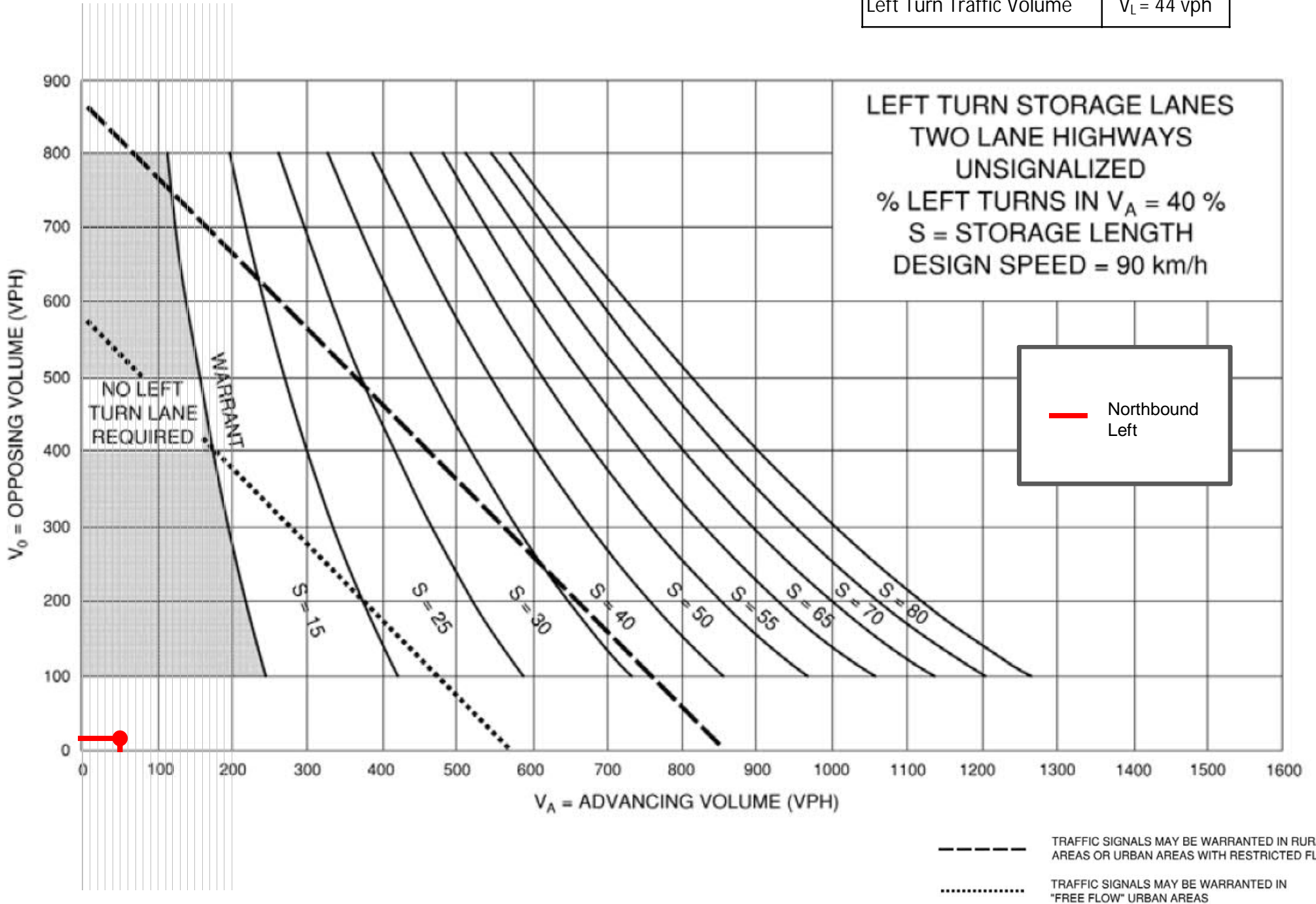
Example:

Design Speed	DS = 50 km/h
Advancing Traffic Volume	VA = 300 vph
Opposing Traffic Volume	VO = 200 vph
Left Turn Traffic Volume	VL = 45 vph



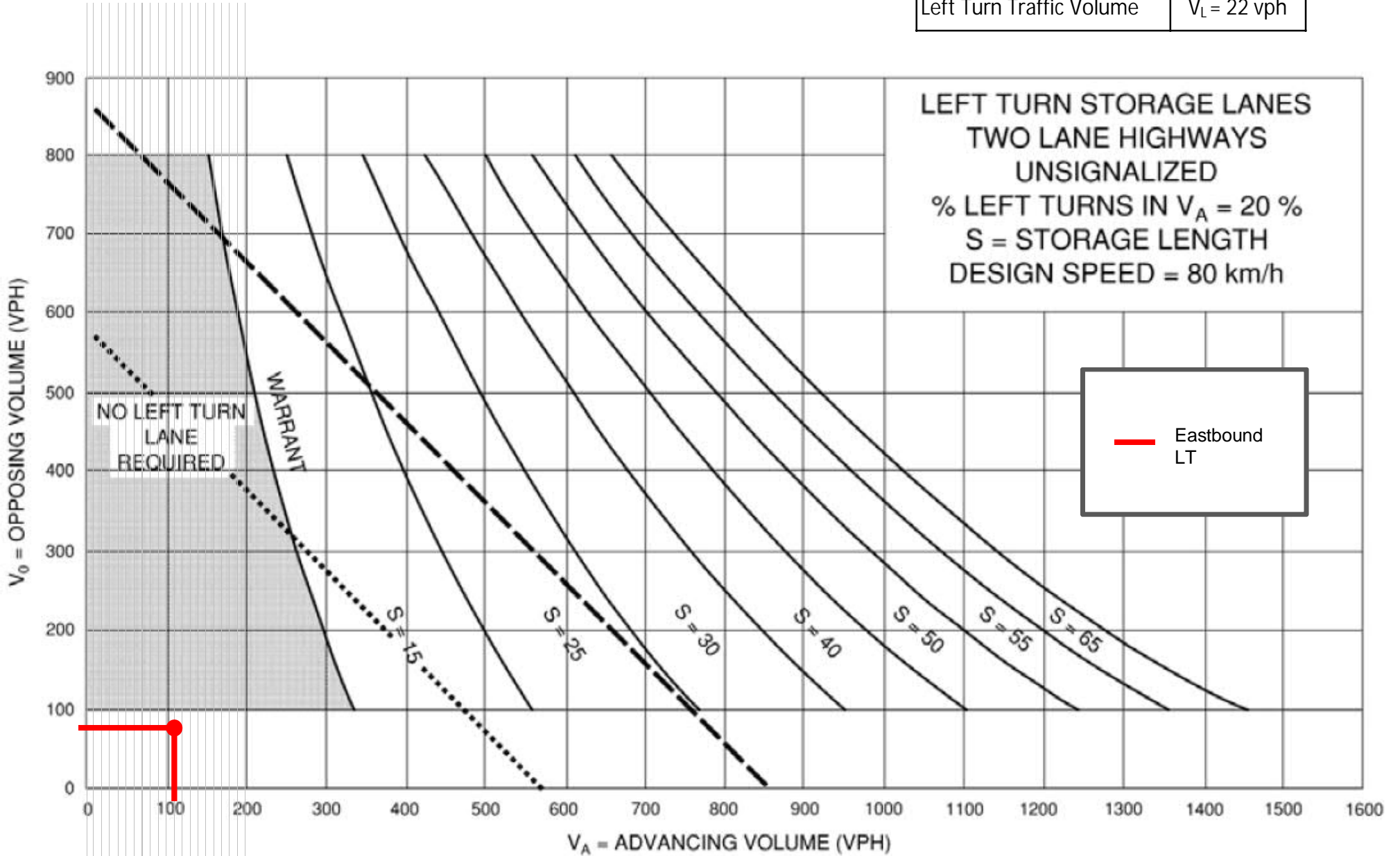
Highway 631 at Picnic Lake Beach Road (2020)

Advancing Traffic Volume	$V_A = 49$ vph
Opposing Traffic Volume	$V_O = 5$ vph
Left Turn Traffic Volume	$V_L = 44$ vph



Highway 17 at Highway 631 (2020)

Advancing Traffic Volume	$V_A = 107$ vph
Opposing Traffic Volume	$V_O = 85$ vph
Left Turn Traffic Volume	$V_L = 22$ vph



----- TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

..... TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS