

Region of Waterloo- TAC –Canadian Roundabouts Design Guide

Design Exceptions



Implementation

This document is effective as of February 1, 2019. Revisions will be revisited and updated on an annual basis or as required.

Background

The Region of Waterloo (Region) has been implementing Roundabouts since 2003. The Region has also established a Roundabout Coordination Committee (RCC) whose mandate is to review all proposed roundabout locations and recommend what intersection type is most appropriate for the location. The RCC meets multiple times per year and is made up of staff from various departments at the Region of Waterloo, (Design & Construction, Transportation, Operations, Corridor Management and Planning) staff from the Cities of Cambridge, Kitchener, Waterloo, and the Townships. The decisions the RCC makes are based on Life Cycle Cost Analysis (LCCA), but will also consider other factors such as: gateway features; speed reduction; and roundabouts in corridors before providing a recommendation. A roundabout will be considered even if the LCCA of the roundabout exceeds the cost of traffic signals by up to 50%.

Policy

Effective immediately for the planning and design of roundabouts on Region of Waterloo roads, use TAC's CRDG- January 2017 along with the following Region Design Exceptions listed below. Please note the Region reserves the right for final decision on all design, signage, pavement markings and implementation of roundabouts on all Regional roads.

Notification

Please notify Mr. Marcos Kroker, P. Eng. Head, Transportation Expansion Program, mkroker@regionofwaterloo.ca or 519-575-4750 of any comments, noted omissions or errors in these documents.



Chapter 1 – Introduction

1.4.3.1 - Turbo roundabouts are not considered appropriate for use in the Region of Waterloo due to the inclusion of mountable lane dividers which place undue risk to motorcycles and motorized scooters. There are also safety concerns with winter maintenance.

Chapter 2 – Considerations in Roundabout Application

2.3.5 - Transit Vehicles 3rd Paragraph – The Region of Waterloo does not encourage use of bus bays in their roadways.

Bus stop locations – It is the Region's preference to locate GRT bus stops at the far side of intersections. Left turning routes need special consideration to allow buses room to manoeuvre and change lanes.

2.2.2 Care should be taken in situations where there are known visually impaired users.

Chapter 3

Fig. 3.1 Stage 1 Screening Phase- The Region has our own Screening Tool and Traffic Flow Worksheet (both available on our website) to help determine feasibility of a roundabout.

3.3.2.2 – The Region's evaluation method for financial analysis for roundabouts is Life Cycle Cost Analysis (LCCA).

3.4 Stakeholder Involvement

The Region typically has a Public Consultation Centre to show the public what the design for the roundabout is and the impacts of the design. If in a rural setting or if the intersection is located in a minimally developed area, then the Project Manager can send letters and meet with individuals directly impacted (this needs to be confirmed with the Director of Design and Construction and the Commissioner of TES). All roundabout projects need to be presented to the Region's Planning and Works Committee and Regional Council for approval.

Chapter 4- Traffic Operational Analysis

General Notes:

For modelling purposes the designer must use edge of pavement, not face of curb.



Design Exceptions

Figure 4.2: Regional staff generally do not increase traffic volumes by PCEs for heavy vehicle percentages, and also usually assume PHFs of 1.0, resulting in no change for observed or modelled traffic.

Section 4.3.1: The Simplified Methods cited are not in use at the Region.

4.3.2 Detailed Methods. The Region will not permit the gap acceptance method (Sidra).

Chapter 5 – Safety

Region will not permit use of prediction models summarized in Table 5.5 as they are not representative of Regional data.

Region will not permit use of CMFs summarized in Table 5.6 as they are not representative of Regional data.

Chapter 6 – Geometric Design

See Region of Waterloo Std Dwg 221 for some specific requirements.

Design vehicle is WB -17 & 20, however transit buses, school buses or snow ploughs may dictate geometric requirements.

All single lane roundabouts require a truck apron, min of 3.0m wide and must accommodate off tracking of the design vehicle.

Multi-lanes

In general the Region's preference is to implement Case 1 roundabouts, however consideration of Case 2 and 3 should be reviewed for routes with high truck percentages.

6.2.5 pg 84 first line replace *“Overall entry width (curb face-to-curb face) should be governed by:”* with *“Overall entry width (edge of pavement to edge of pavement) should be governed by:”*

6.2. 8 Exit Curves – In general the Region's preference is to flatten exit curves to improve drivability, particularly for buses and trucks and open exit sight lines.

6.2.9 –Crosswalk Location and Alignment

2nd bullet, 2nd sentence should be replaced with the following:

Region of Waterloo- TAC –Canadian Roundabouts Design Guide

Design Exceptions



A minimum crosswalk setback of 12-13 m between the crosswalk and yield bar allows for vehicle stacking and implementation of Level 2 Crosswalks as per OTM Book 15.

Region's preference is for Perpendicular crosswalks as per Figure 6.8 with parallel bars and ladder stripes.

6.4 Right Turn By-passes

Region's preference is for Right turn by-passes with yield at exit leg as per Figure 6.26 .

2 Lane Roundabout Exiting to single lane receiving road.

As per observations at previous Region of Waterloo installations, short merging lanes on exits have resulted in under usage and imbalance on lane use. The outside or curb lane has shown significant under usage unless the curb lane exit merge is extended. Designers should implement a minimum of 90 m parallel lane with a min 70m taper.

6.6.2 –Approach Treatments (high speed rural)

Figure 6.35 – Set splitter island length to 60m from the yield bar and extend the outside curb and gutter an additional 30-60 m beyond the splitter island.

6.8 Grading and Drainage

For multilane roundabouts the Region's preference is to have the circulatory roadway crowned 2/3 from the outside curb to the central island. Catchbasins should be placed in a wide concrete curb and gutter (OPSD 600.020) and not have the frame and grate protrude into the asphalt roadway.

6.10 Turbo Roundabouts

Turbo roundabouts are not considered appropriate for use in the Region of Waterloo due to the inclusion of mountable lane dividers which place undue risk to motorcycles and motorized scooters.

Chapter 7 – Traffic Control Devices

7.3 Pavement Markings.

The Region of Waterloo defaults to a Level 2 Type C for crosswalk markings in roundabouts. Elephant feet markings cannot be utilized as we are regulated by Level 2 Crosswalk markings.

Region of Waterloo- TAC –Canadian Roundabouts Design Guide

Design Exceptions



7.3.4 Delineation is optional but not desired on Regional roundabouts to minimize maintenance.

7.4 Signalization

If signals are to be implemented, it should follow OTM standards rather than MUTCD and TAC Pedestrian Control Guide.

Using an upstream signal is not recommended as an alternative to metering a roundabout.

7.4.2.1 At this time, the Region provides pedestrian control through Level 2 Pedestrian Crossovers. Presently the Region considers Level 2 Crossover Type C only. Other options including but not limited to Level 2 Crossover Type A and B and traffic signals must go through a proper engineering evaluation to assess potential road user impacts and impacts on other crosswalks at the roundabout being considered as well as other remaining roundabouts in the Region.

Chapter 8 - Illumination

Perimeter lighting is required at all Region of Waterloo roundabouts and lighting levels need to meet or exceed the Region's Illumination Policy.

Chapter 9 – Landscaping

Landscaping at Region of Waterloo roundabouts are to provide a conspicuous central island with minimal maintenance in mind. Minimum requirements for the central island will include the following for 2 lane roundabouts, 4m maintenance strip made of reinforced 200mm thick coloured impressed concrete followed by a 3m wide grassed strip immediately behind the maintenance strip. Beyond the grassed strip material the central island should be mounded 1.0 m high and is to be planted with low maintenance shrubs and trees. Single lane roundabouts will have a truck apron (3 m wide minimum) made up of reinforced (200mm thick coloured impressed concrete) followed by a 3m wide grassed strip immediately behind the truck apron. Beyond the grassed strip material is to be completed with low maintenance shrubs and trees. A typical layout should follow RMW Standard Drawing 221.