



MALEY DRIVE EXTENSION AND WIDENING PROJECT Roundabout Overview

September 27, 2011

AECOM

MALEY DRIVE EXTENSION AND WIDENING PROJECT

AGENDA:

- Project Overview
- Modern Roundabouts
- Roundabout Features
- Comparative Analysis
- Design Geometrics
- Roundabout Locations
- Driving Modern Roundabouts
- Truck Movements
- Travel Times through Corridor
- Roundabout Simulation
- Open Discussion

PROJECT OVERVIEW



Modern Roundabouts

Modern roundabouts are a type of circular intersection that requires drivers to yield to traffic in the circle when entering, and allow for continuous traffic flow through the intersection at low speed¹.

¹ ITE Journal, September 2002

Modern Roundabouts



Modern Roundabouts

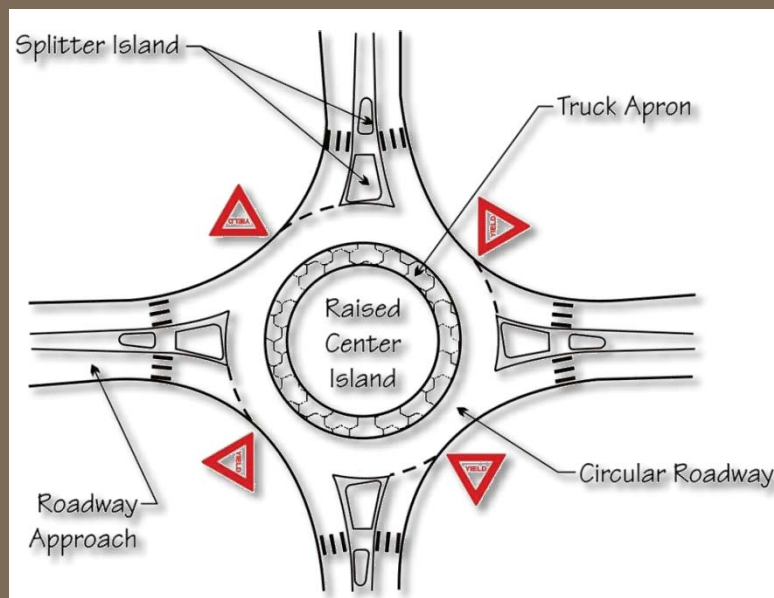
- Purpose is to provide intersection control
- Differs from a traffic circle that is intended to “calm” local traffic (i.e. Southview Drive traffic circle)
- Priority is given to traffic in the roundabout
- Entering vehicles must YIELD to traffic in the roundabout
- Approaches are designed to encourage reduced speeds
- Pedestrian crossings occur at the approaches

Roundabout Features

Benefits:

- Higher capacity than traditional signalized intersections
- Reduces delay – no stop condition – vehicles continually moving
- Channelization provides positive guidance to motorists
- Ability to introduce landscaping/public art to entries and center island
- Maintenance costs are less than traffic signals
- Bicyclist may either mix with vehicles within roundabout or use pedestrian pathways
- Truck apron and roundabout design accommodates large design vehicles

Roundabout Features



- Desirable entry speed less than 48 km/h for passenger vehicles
- Entry vehicles yield to traffic in roundabout
- Splitter islands to accommodate pedestrian activity and slow entering vehicle speeds
- Pedestrian crosswalks approximately one car-length from yield line
- Truck apron to accommodate trailer drag

WB-19 Truck Turning Movement



Roundabout Features

Limitations:

- May require more land to implement
- Requires additional approach signing
- Pedestrians do not have signal phase, but they cross only one direction of travel at a time
- Driver familiarity may be limited in Sudbury at this time

Roundabout Features

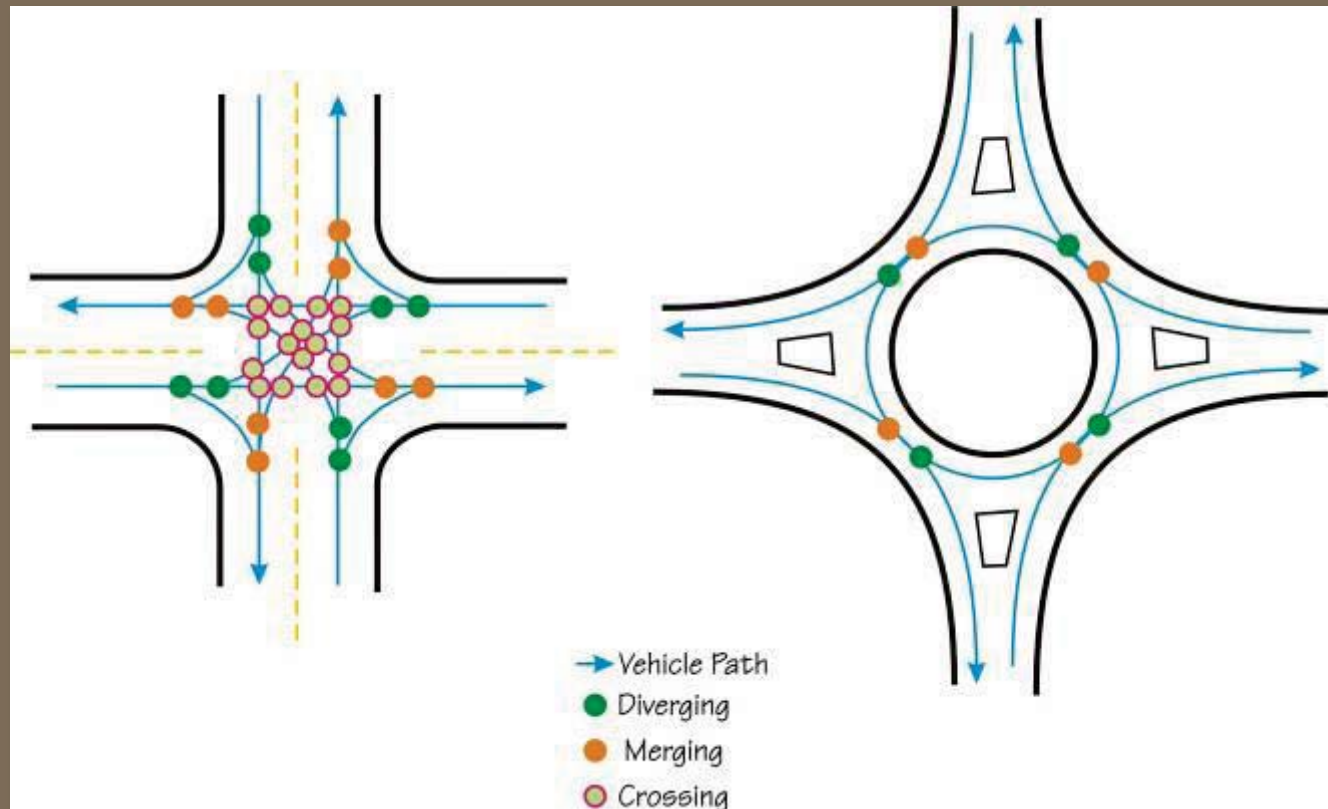
Safety Benefits:

- Reduces intersection conflict points from 32 to 8
- Typical entry and circulatory speeds of 35-50 km/h
- Shown to have less collisions than traffic signal
- 48%¹ reduction in collisions
- Reduces the severity of collisions due to lower speeds and flat angle of impact
- 78%¹ reduction in collisions involving personal injuries
- Facilitates more flexibility in turning movements (U-turns)
- 40-60% reduction in pedestrian collisions²

¹ FHWA Roundabouts: An Informational Guide, 2010

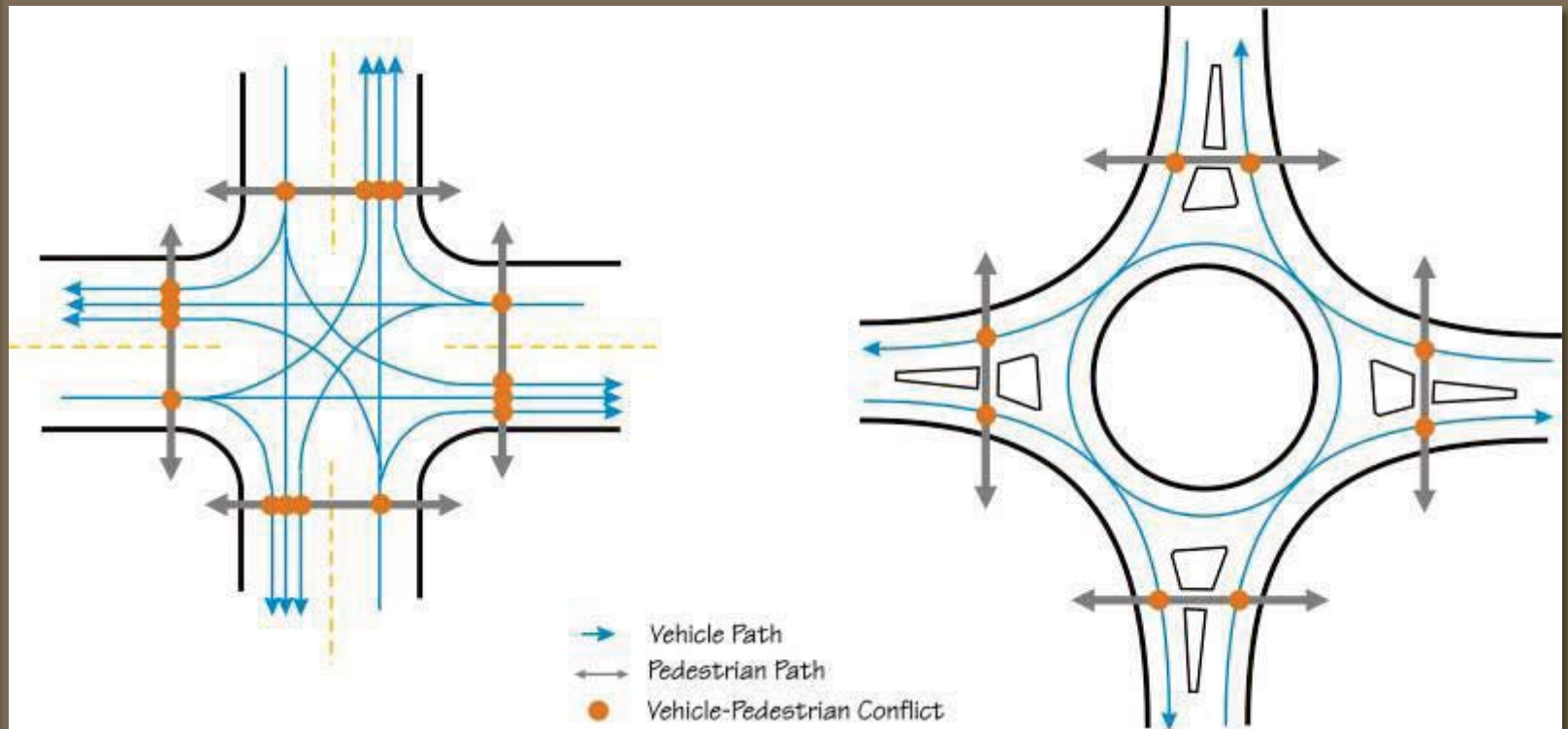
² Region of Waterloo, 2010

Vehicle-Vehicle Conflicts



Roundabout has 75% fewer vehicle conflict points

Pedestrian Movements



Roundabout has 50% fewer pedestrian conflict points

Comparative Analysis

Frood Road

	Roundabout Control	Signalized Control
Pedestrian Safety	+	-
Driver Familiarity	-	+
Vehicular Safety	+	-
Access Management	+	-
Snow and Ice Management	=	=
Right-of-Way/Parcel Impacts	-	+
Maintenance Costs	=	=
Construction Costs	+	-
Utilities	=	=
Underground Infrastructure	N/A	N/A
Corridor Travel Time	+	-
Environmental – Noise Impacts	+	-
Environmental – Air Quality	+	-
Heavy Vehicle Accommodation	=	=

Comparative Ratings: + (Advantage) - (Disadvantage) = (equal or no significant difference)

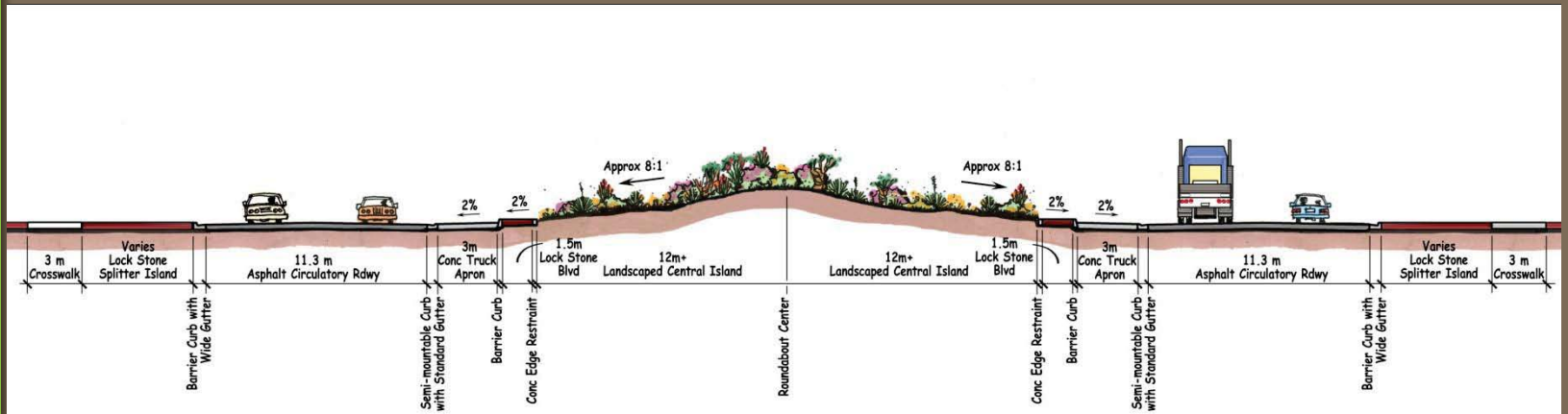
Design Geometrics



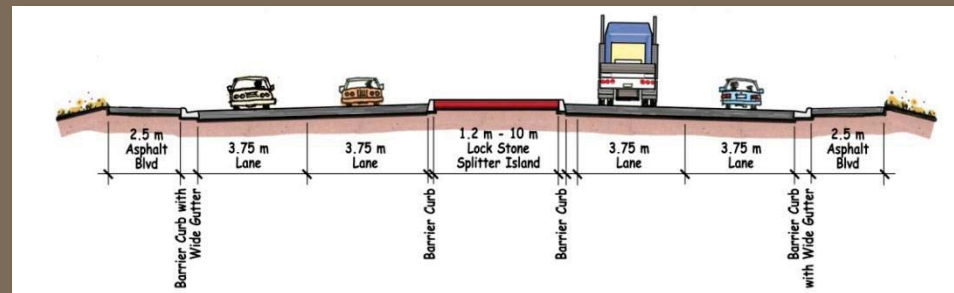
Proposed Roundabouts

- Inscribed Circle Diameter = 58 m
- Circulatory Roadway Width = 11.3 m
- East/west two-lane entry approaches and circulatory roadway
- North/south one-lane entry approaches and circulatory roadway
- Accommodates side by side WB-20 trucks through the roundabout
- Truck apron on central island
- Raised medians on all approaches to guide vehicles

Proposed Typical Sections



Roundabout Section



Roadway Section

Roundabout at Frood Road



Roundabout at College Boreal



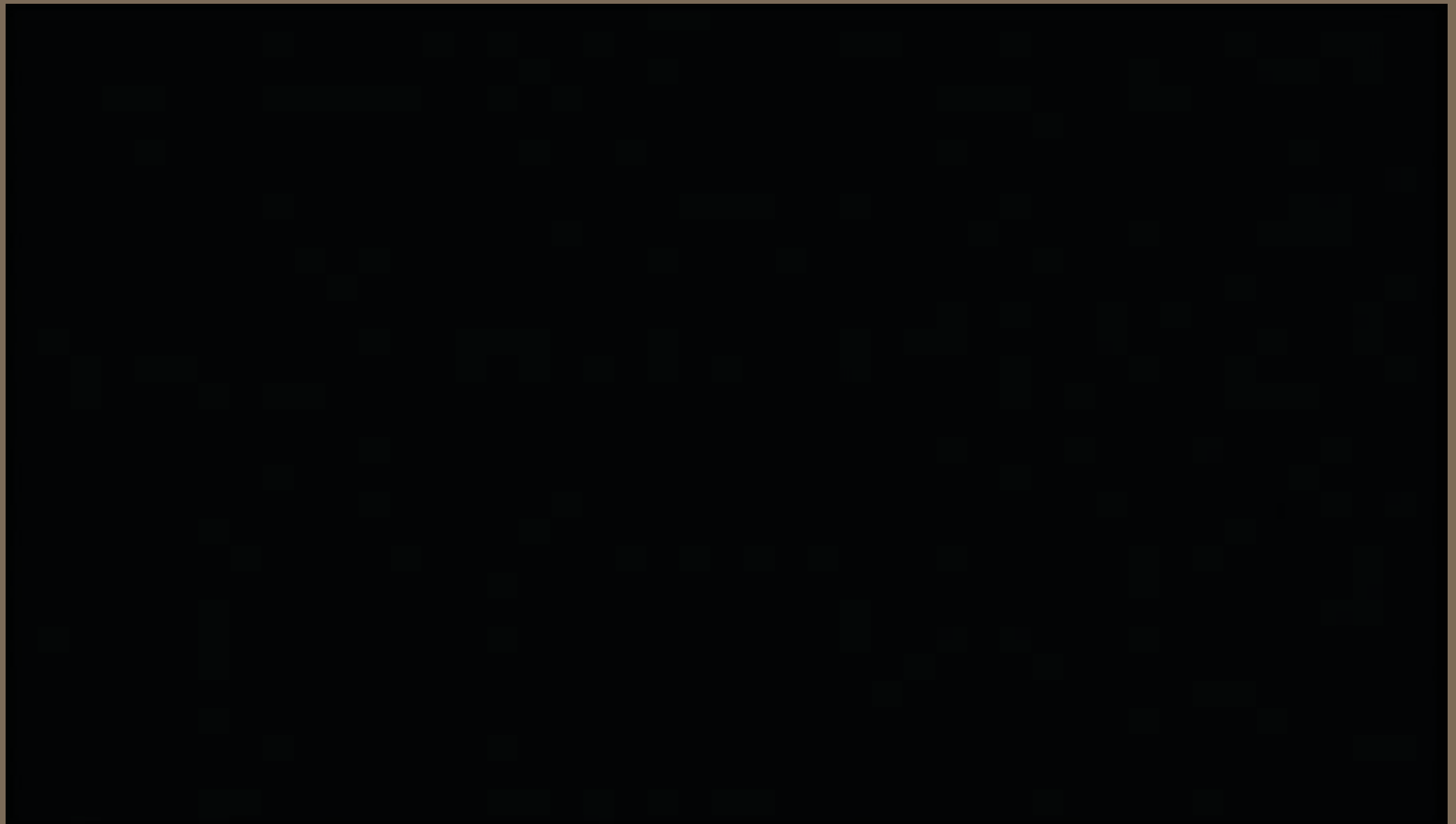
Roundabout at Barry Downe Road



Roundabout at Lansing Avenue



“Driving Modern Roundabouts” by Washington State DOT



Technical drawing of a truck chassis with two 15.436 cu meters containers. The drawing shows the side profile of the truck with dimensions in inches and millimeters. Key dimensions include:

- Overall length: 760 (19.30m)
- Container length: 432 (10.97m)
- Container width: 140 (3.55m)
- Container height: 115 (2.93m)
- Container volume: 15.436 CU METERS
- Chassis length: 604 (15.34m)
- Chassis width: 804 (20.36m)
- Chassis height: 126 (3.20m)
- Chassis wheelbase: 621 (15.77m)
- Chassis wheel offset: 26 (0.66m)
- Chassis wheel offset: 219 (5.56m)
- Chassis wheel offset: 30 (0.76m)
- Chassis wheel offset: 49 (1.25m)
- Chassis wheel offset: 60 (1.52m)
- Chassis wheel offset: 60 (1.52m)
- Chassis wheel offset: 26 (0.66m)
- Chassis wheel offset: 219 (5.56m)
- Chassis wheel offset: 30 (0.76m)
- Chassis wheel offset: 49 (1.25m)

Technical drawing of a truck chassis showing dimensions in feet and inches. The drawing includes a side view of the truck with a cab and a chassis with two sets of axles. Dimensions are provided for the overall length, wheelbase, and axle spacing.

Measurement	Value (Feet)	Value (Inches)
Overall Length	11.05	435"
Wheelbase (Front to Rear)	8.48	334"
Front Overhang	1.17	46"
Front Axle to First Rear Axle	4.70	185"
Distance Between Rear Axles	7.72	304"
Height (Front)	0.38	15"
Height (Rear)	0.38	15"
Overall Length (Including Front Overhang)	9.37	369"



Greater Grand Sudbury

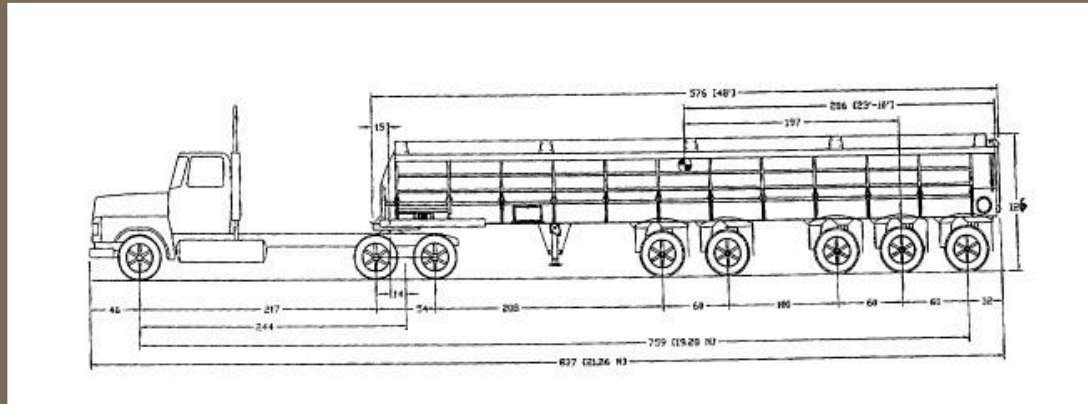


Truck Movements – Steel Hopper

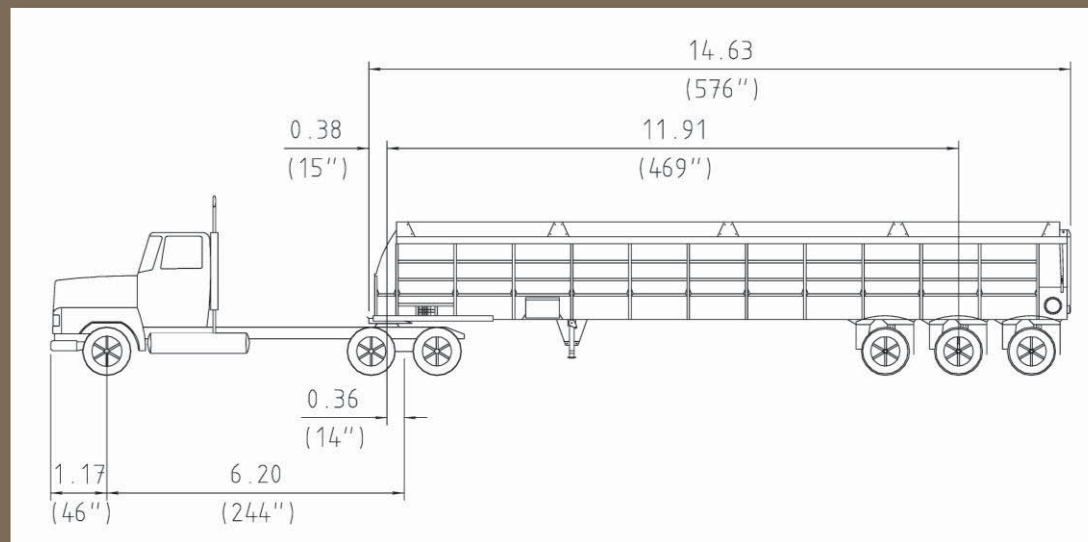


Side by side truck movement

Truck Movements – Steel Live Bottom



Truck dimensions received from manufacturer



Truck created in CADD for design purposes

Truck Movements – Steel Live Bottom



Side by side truck movement

Travel Time through Corridor

	Roundabout Control	Signalized Control
<i>Eastbound Direction of Travel</i>		
Average Travel Time	6.0 min*	6.5 min
Average Travel Speed	71 km/h	65 km/h
<i>Westbound Direction of Travel</i>		
Average Travel Time	5.9 min**	6.1 min
Average Travel Speed	72 km/h	70 km/h

* Roundabout travel time savings of 8% over signals

**Roundabout travel time savings of 3% over signals

(Travel time is from the CPR Overhead to Falconbridge Highway)

Maley Drive at Barry Downe Road Roundabout Simulation

