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Halifax, Nova Scotia
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Item No. 3
Halifax Regional Council
May 11, 2010
Committee of the Whole

TO: Mayor Kelly and Members of Halifax Regional Council

SUBMITTED BY:

A handwritten signature in dark ink, appearing to read "Dan English".

Dan English, Chief Administrative Officer

A handwritten signature in dark ink, appearing to read "Wayne Anstey".

Wayne Anstey, Deputy Chief Administrative Officer - Operations

DATE: April 26, 2010

SUBJECT: Roundabouts: Applicability to HRM Roads

ORIGIN

This report was prepared by Traffic and Right of Way to promote Modern Roundabouts for use at HRM intersections. This report will clearly indicate the reasons why a roundabout should be considered as a potential solution to intersection analysis and design.

RECOMMENDATION

It is recommended that Halifax Regional Council adopt in principle the use of modern roundabouts on Municipal roads where appropriate design guidelines and standards can be met.

BACKGROUND

On October 1, 2005, the Province of Nova Scotia amended Chapter 293 of the Motor Vehicle Act which decided how a vehicle was to traverse a rotary or roundabout. It stated the following:

- 135(1) The driver of a vehicle entering a roadway in or around a rotary or roundabout shall yield the right of way to traffic already on the roadway in the circle and approaching so closely to the entering highway as to constitute an immediate hazard; and
- (2) The driver of a vehicle passing around a rotary or roundabout shall drive the vehicle in a counter clockwise direction around the island or the center of the circle.

This yield sign replaced such control as traffic signals, stop signs, or the “one on one” approach that rotaries or traffic circles commonly used. This legislation helped to simplify the use of roundabouts in that all vehicles must yield upon entry to a circle.

Roundabouts are widely used in the United Kingdom (since the 1960s, with over 10,000 roundabouts) and Australia (with over 15,000 roundabouts) and are gaining popularity in the United States and Canada with the US having over 2300 roundabouts in 40 different states and Canada having over 150.

Transport Canada has a vision to have the safest roads in the world. The Road Safety Vision that Transport Canada developed for 2010 calls for a 30 percent decrease in road users killed and seriously injured between 1996-2001 and 2008-2010. A subtarget calls for a 20 percent decrease in road users killed or seriously injured in speed or intersection related crashes. During a review, Transport Canada discovered that they are not progressing fast enough to reach those target rates. In all their research they have found that countries showing higher reductions of intersection collisions have been implementing roundabouts. Therefore, Transport Canada is recommending that all Canadian jurisdictions consider converting signalized intersections to roundabouts wherever appropriate.

Every Province has investigated implementing roundabouts and almost all provinces are implementing them. The Province of Nova Scotia’s Transportation and Infrastructure Renewal Department has installed three roundabouts around the Province and have sixteen scheduled for construction in 2010. **Many jurisdictions within Canada have gone to their Regional Council to ask for endorsement to utilize roundabouts as an option to intersection design with great success.**

DISCUSSION

What is a Roundabout?

A roundabout is a circular intersection where traffic goes one way in a counterclockwise direction where vehicles yield upon entry. A roundabout provides another option for a controlled intersection, that is, instead of stop signs or traffic signals.

Traversing a Roundabout

Roundabouts can handle all modes of transportation. Each mode (vehicles, pedestrians, cyclists, large trucks, transit, etc.) has its own way to travel through a roundabout. Vehicles will be encouraged to slow down on approach to the roundabout and are to yield to the vehicles circulating in the roundabout. When a gap becomes available the vehicle may enter the roundabout and travel counterclockwise until they reach their desired exit. Pedestrians should always cross at the crosswalks, crossing one lane at a time and never through the center island. Cyclists can follow the method of a pedestrian or choose to transverse a roundabout as a vehicle would (cyclists can maintain the speed of circulating traffic). Transit vehicles, large trucks, emergency vehicles, and snow plows are all accommodated within a roundabout either by utilizing the lanes or the truck apron. See Appendix A - How to Drive a Roundabout, for further information.

Signs

Most of the signs at a roundabout are familiar to the public. They include a yield sign which is located upon entry into the circle, pedestrian crossing signs, and a roundabout directional sign (similar to a chevron sign) in the center island to ensure motorists circulate counter clockwise. A new sign that the public will encounter is the “roundabout ahead sign”. See picture of a roundabout ahead sign below.



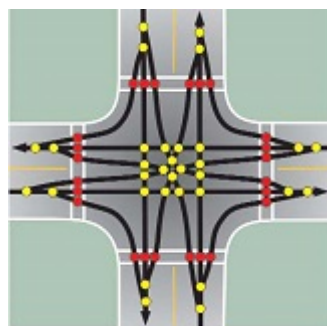
Roundabout Ahead Sign (WA-39)

Why Provide Roundabouts at HRM intersections?

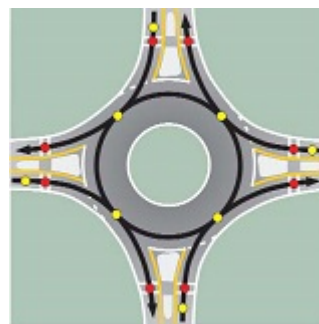
1. Improved Safety

Roundabouts generally provide a greater level of safety than other types of intersections because of the following characteristics:

- a) **Lower speed / Reduced Differential in Speeds**
A Roundabout's geometry is designed specifically to direct traffic around the circle at a much slower speed. Therefore, lower speeds provide more time for all users to detect and correct for their mistakes or, if a collision does occur, it is less severe due to the lower speeds.
- b) **Simplified Decision Making**
It's just Yield Upon Entry. As a vehicle travels towards a roundabout the geometry and signs will prompt a vehicle to slow down. As you approach the crosswalk a motorist can detect whether or not there is a pedestrian present and allow them to cross and then they will proceed to the yield line to wait for a gap in the circulating traffic.
- c) **Reduced Right Angle and Head On Collisions**
The severity of a collision is largely determined by the speed of the impact and the angle of the impact. The higher the speed and/or the higher the angle of impact, the more severe the collision. Roundabouts reduce the severity (Right angle or head on collisions) that are present in traditional intersections.
- d) **Fewer Conflict Points or Potential for Collisions**



Intersection
No. of Conflict Points - 56

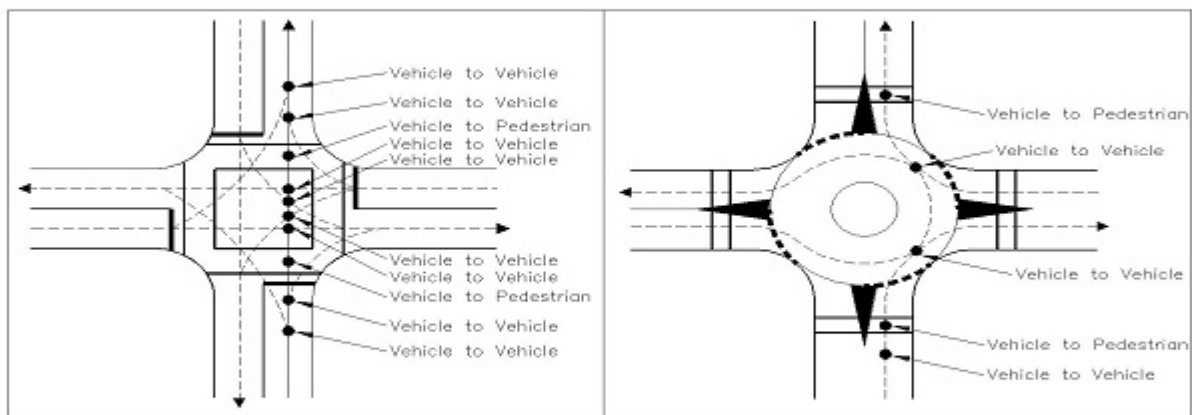


Roundabout
No. of Conflict Points - 16

- Vehicle-to-vehicle conflict point
- Vehicle-to-pedestrian conflict point

As can be seen from these diagrams, a four-way stop or Traffic signal has 32 vehicle to vehicle conflict points and 24 vehicle to pedestrian conflict points for a total of 56, whereas a roundabout has 8 vehicle to vehicle conflict points and 8 vehicle to pedestrian conflict points for a total of 16. A reduction of over 70 percent in the number of potential conflicts can be achieved if a roundabout is implemented.

At roundabouts your exposure to risk is decreased. For instance, if you make a through movement at a signalized intersection you will encounter 10 conflict points. See diagram on the left below. Whereas a through movement at a roundabout yields only 5 conflict points. See diagram on the right below. That is a 50 percent reduction in the possibility of being involved in a collision.



The Transportation Association of Canada (TAC) guideline, the National standard that is following for traffic control devices, states that practitioners should explore alternatives including roundabouts before implementing signals. That the placement of signals at an intersection should be seen as an option to be used after all other safety options are exhausted. In 2003 the Region of Waterloo in Ontario received the endorsement from their Council to include roundabouts in their design toolbox. Recently, they received approval to convert a corridor of 12 traffic signals to roundabouts due to high collisions rates and the widening that is necessary to reduce queuing and delays.

Statistics

Several studies that we found identified that the installation of roundabouts at previous intersections operated by all way stop or traffic signals were improved. As previously stated, Transport Canada is recommending that Canadian jurisdictions consider converting signalized intersections to roundabouts wherever appropriate. Their findings, as well as many others, have concluded that countries showing higher reductions of intersection collisions have been implementing roundabouts. National Collision statistics produced by Transport Canada report 2500 fatal collisions and 145 000 injury collisions each year in Canada. In 2006, about 28 percent of road users killed and 40 percent of those seriously injured was a result of intersection related crashes.

The most recent study completed by the National Cooperative Highway Research Program (NCHRP 572) which identified 26 multi lane intersections that were converted to multi lane roundabouts. This study showed a 67 percent reduction in collisions when a signalized intersection was converted to a roundabout. There have been several studies completed on this topic and the numbers for reduction in collisions are repeated in each study both nationally and internationally.

2. Reduced Delay

Roundabouts improve traffic flow by reducing speeds and reducing needless wait times at red lights when there is no opposing traffic. This continuous flow leads to a reduction in delay.

The “Willow Tree” is considered a location which would potentially make an ideal candidate for a roundabout. In order to check its candidacy we completed preliminary analysis using a computer software program called SIDRA. In both the peak AM and PM the model concluded significant decreases in delay if the intersection was converted to a roundabout. Currently in the peak PM the intersection has a total delay of 290 seconds per vehicle. With the implementation of a roundabout the overall intersection delay decreases to between 10 to 15 seconds per vehicle. That is a time saving of approximately 275 seconds or 4 and a half minutes in the peak PM hour for a vehicle. In a year the average commuter would save approximately 20 hours of travel time in their afternoon commute alone. What would you do with an additional 20 hours, almost a whole day a year? Keep in mind that this calculation only accounts for this intersection.

Given the same traffic volumes a roundabout will typically outperform signalized intersections or all way stops with respect to both delay and shorter queues.

3. Reduced Environmental Impact

Vehicles operating in a roundabout results in lower environmental impacts, by keeping traffic moving at a more consistent lower speed and reducing idling, roundabouts reduce emissions and fuel consumption. HRM has introduced a “Reduced Idling Campaign” whereby Halifax

Regional Council is committed to a healthy, sustainable, vibrant community with clean air, land, water, and energy options. HRM Council is committed to making a difference in climate change and air quality and Roundabouts can help that campaign. The shorter delays and “rolling” approach to roundabouts generally reduce fuel and energy consumption, green house gas emissions, the carbon footprint, as well as a reduction in noise to the surrounding community. The longer delays and the start and stop approach to signalized intersections will generally have a more demanding impact on the environment. As an example, when we completed the preliminary SIDRA analysis for the Willow Tree the carbon dioxide emissions with a signalized intersection was 460 tonnes per year during the peak PM, with the implementation of a roundabout the carbon dioxide emissions was calculated to be 158 tonnes per year in the peak PM. That is a savings of over 300 tonnes per year or a 66 percent reduction during just the peak PM for a year.

To put this into context, HRM is currently in the process of undertaking a program to convert all of its traffic signal heads from incandescent bulbs to LEDs. Approximately 12 tonnes of green house gas emissions are saved per intersection per year with this upgrade. With a network of approximately 270 signalized intersections that is a savings of approximately 3000 tonnes of green house gas emissions per year. With one intersection converted to a roundabout we can save 10 percent of this entire project.

4. Improved Aesthetics

There is typically more green space available at roundabouts than at signalized intersections. The center island at a roundabout can be utilized as gateways to communities. The center island can be landscaped using such treatments as trees, shrubs, flower beds, public art, etc. Landscaped features should not encourage pedestrians to explore the center island as this would create safety and operational issues. Roundabouts can also provide opportunities for traffic calming and speed transition within neighborhoods. See Appendix B - Potential Candidates for a Roundabout, for before and after illustrations to show the increase in green space and the reduction in asphalt and lanes at intersections.

Roundabouts Have Been Shown to Perform Best When

- Traffic flow is fairly even among all legs
- High speed intersections
- Intersections with high collision rates
- Intersections with high delays
- Intersections with high left turn movements
- Intersections with unusual geometry
- Intersections that serve as gateways to communities

Cost

Cost comparison between the implementation of a new signalized intersection and a new roundabout typically yields the same construction costs.

Within HRM, if a roundabout were to be implemented it would generally replace a signalized intersection. A retrofit of a signalized intersection with a roundabout will generally cost more if just the construction costs were compared. Although the bottom line for constructions costs is more for a roundabout it must be remembered that this elevated cost does not factor in the following cost savings:

- Safety - Increased safety means lower emergency response, health care, and other societal costs as collisions are less severe at roundabouts
- Delays to traffic - the cost of commuters time
- Environmental impacts - societal cost of fuel consumption and vehicle emissions are lower at roundabouts
- Maintenance Costs - Significant reduction in ongoing maintenance costs, no signals to maintain.

If costs for safety, delay, environmental impacts, and ongoing maintenance costs were factored in, the cost of a roundabout would be often less expensive than a signalized intersection.

Roundabouts do not require maintenance like traffic signals, and there is no need to be concerned with power outages. The replacement of traffic signals can be significant at the end of their life cycle. The intersections of Devonshire/Novalea/Duffus, North Park/Cogswell/Trollope/Ahern/Rainnie, Cunard/North Park/Agricola, and the Willow Tree are all over 25 years old and are in need of replacement. Therefore, the life cycle cost of a roundabout at any of these locations would be a less expensive option than signals with all things considered.

Things to Consider - Perceived Design Challenges

There are many perceived challenges with roundabouts, many of these factors also create challenges for signalized intersection. Some of these perceived challenges include:

- **Land**
Traffic Signals: In order to accommodate left and right turning vehicles in a high volume intersection lanes must be added thereby increasing the size of the immediate intersection as well as along the corridor to accommodate the storage lengths.
Roundabout: A roundabout requires widening at the immediate intersection to accommodate the circle. Depending on what type of design vehicle is necessary the circle can be of varying sizes.
- **Pedestrians**
Traffic Signals: Although most signalized intersections have pedestrian signal, a

pedestrian still has to be attentive to ensure vehicles are operating correctly (red light running, etc.).

Roundabout: Roundabouts do offer that all pedestrians only cross one direction of traffic at a time with splitter islands between entrance and exit lanes to provide a refuge for pedestrians.

With proper design and alignment of crosswalks and pedestrian ramps roundabouts can work effectively for all pedestrians. Many studies have shown a pedestrian's risk of being involved in a severe collision is lower at roundabouts, due to the slower vehicle speeds. Also, as previously stated, the number of conflict points for a pedestrian is lower at a roundabout than at other intersections, which lowers the frequency of collisions. A Dutch study of 181 intersections converted to roundabouts found a reduction in all pedestrian crashes of 73%.

- **Grades**

Roundabout: It is not ideal to locate a roundabout on a significant grade.

Traffic Signal: There are many signalized intersections within HRM on significant grades and these intersections operate well.

Although not ideal to have either a signalized intersection or a roundabout on a significant grade it is sometimes hard in a Municipality like Halifax to avoid it.

- **Education**

We have educated all modes of transportation on how to drive and walk a signalized intersection including pamphlets, the internet, etc.; it is our intention to do the same education program for the introduction of roundabouts. Roundabouts are fairly new to HRM and we understand that particular attention must be paid to educating the public.

Public Education

Public education is a very important part of the plan to introduce roundabouts. In order to ensure success of the introduction of Roundabouts to HRM intersections, HRM is committed to the following:

- Public Meetings - Held in the community to provide information and to receive feedback.
- Groups/Partnerships - Develop partnerships with advisory boards, committees, and commissions of HRM as applicable such as ecology groups, bikeways advisory, or the vision impaired, driver training, school, and other groups identified by Council and staff.
- Media - Spread information via radio, newspaper, pamphlets, internet, etc.

Typically, where roundabouts were newly introduced into areas in the US, the majority of the general public was opposed to their implementation; however, within 12 months of the implementation, most members of the public were in support of roundabouts. In most cases, motorists learned to traverse a new roundabout and feel comfortable driving it in a relatively short time, usually only after a few trips.

Potential Candidates for a Roundabout

The below locations are potential candidates for roundabouts, due to some or all of the following:

- The complexity of the traffic signal phasing
- The unusual geometry
- High delays
- High speeds

The list below offers potential locations that fit the above characteristics:

- Devonshire Avenue/Novalea Drive/Duffus Street
- North Park/Cogswell Street/Trollope Street/Ahern Avenue/Rainnie Drive
- Cunard Street/North Park/Agricola Street
- The Willow Tree

See Appendix B - Potential Candidates for a Roundabout and for preliminary roundabout layout of these locations. Noticeable in each of the preliminary layouts is the large amount of green space that becomes available with the implementation of a roundabout, the reduced number of lanes into and out of the intersection, as well as the availability of a splitter island that reduces the travel distance for pedestrians as well as allows pedestrians to only deal with traffic in one direction at a time.

In 2010, the Province will be implementing roundabouts within the HRM. This means that HRM residents will be utilizing them. Three roundabouts will be implemented at the Highway 102 interchange at Larry Uteck Boulevard as well as three roundabouts at the Highway 101 interchange with Margeson Drive. HRM will be obtaining ownership of one of the roundabouts at both interchanges. So roundabouts make up intersection layout in HRM already. Developers are sending designs for future subdivisions to Community Development which include roundabouts. Developers see the benefits of roundabouts as gateways to their communities.

Conclusions and Recommendations

Diligent design and review must be undertaken for all intersection analysis to determine the best solution for each location. Roundabouts give HRM another method to ensure the highest level of safety for motorists, pedestrians, and cyclists. Roundabouts are a proven tool both nationally and internationally to provide safer intersections.

Given the considerable benefits of roundabouts in certain situations we are recommending that Halifax Regional Council adopt in principle the use of modern roundabouts on Municipal roads where appropriate design guidelines and standards can be met.

BUDGET IMPLICATIONS

There are no budget implications associated with this report. The merits, financial, environmental and social, will be assessed as part of the overall planning, design and construction process for specific projects as they are identified and brought forward through the Capital Plan.

FINANCIAL MANAGEMENT POLICIES/BUSINESS PLAN

This report complies with the Municipality's Multi-Year Financial Strategy, the approved Operating, Capital and Reserve budgets, policies and procedures regarding withdrawals from the utilization of Capital and Operating reserves, as well as any relevant legislation.

ALTERNATIVES

There are no other alternatives associated with this report.

ATTACHMENTS

Appendix A - How to Drive a Roundabout
Appendix B - Potential Candidates for a Roundabout
Appendix C - Frequently Asked Questions

A copy of this report can be obtained online at <http://www.halifax.ca/council/agendasc/agenda.html> then choose the appropriate meeting date, or by contacting the Office of the Municipal Clerk at 490-4210, or Fax 490-4208.

Report Prepared by: Tanya Davis, P.Eng, Traffic Services Supervisor, 490-8425

Report Approved by:



Taso Koutroulakis, P.Eng, Acting Manager, 490-4816

Financial Approval by:

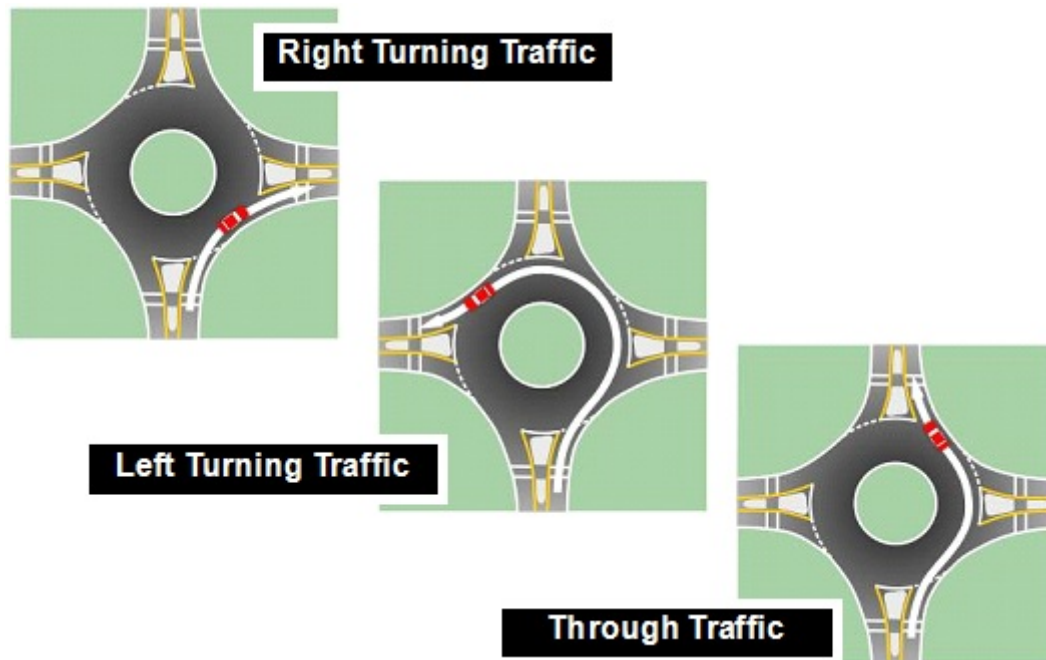


Cathie O'Toole, CGA, Director of Finance, 490-6308

Report Approved by:

Peter Stickings, Acting Director, Transportation and Public Works, 490-7129

Appendix A How to Drive a Roundabout



Some basic steps in approaching, entering, circulating and leaving a roundabout are listed.

Approaching:

- reduce speed (forced by geometry)
- on a multi lane entry, decide which exit you will be taking and get into correct lane (overhead or ground mounted signs will help identify this)
- left turns (going more than halfway around the roundabout) are made from the left most lane
- right turns from the right most lane stay to the right of the splitter island yield to pedestrians at the crosswalk when an emergency vehicle is approaching pull over to the right and stop

Entering:

- at the yield line, yield to circulating traffic approaching from the left and enter when there is a sufficient gap
- do not enter beside a vehicle already circulating within the roundabout even if there is enough room beside the vehicle, as this vehicle may be exiting at the next exit.

Circulating:

- do not stop except to avoid a collision
- keep to the right of the central island and travel in a counter clock wise direction
- do not overtake adjacent vehicles as they may be exiting at the next exit
- when an emergency vehicle is approaching, Exit the roundabout at your desired exit and pull over to the right and stop once you are past the splitter island

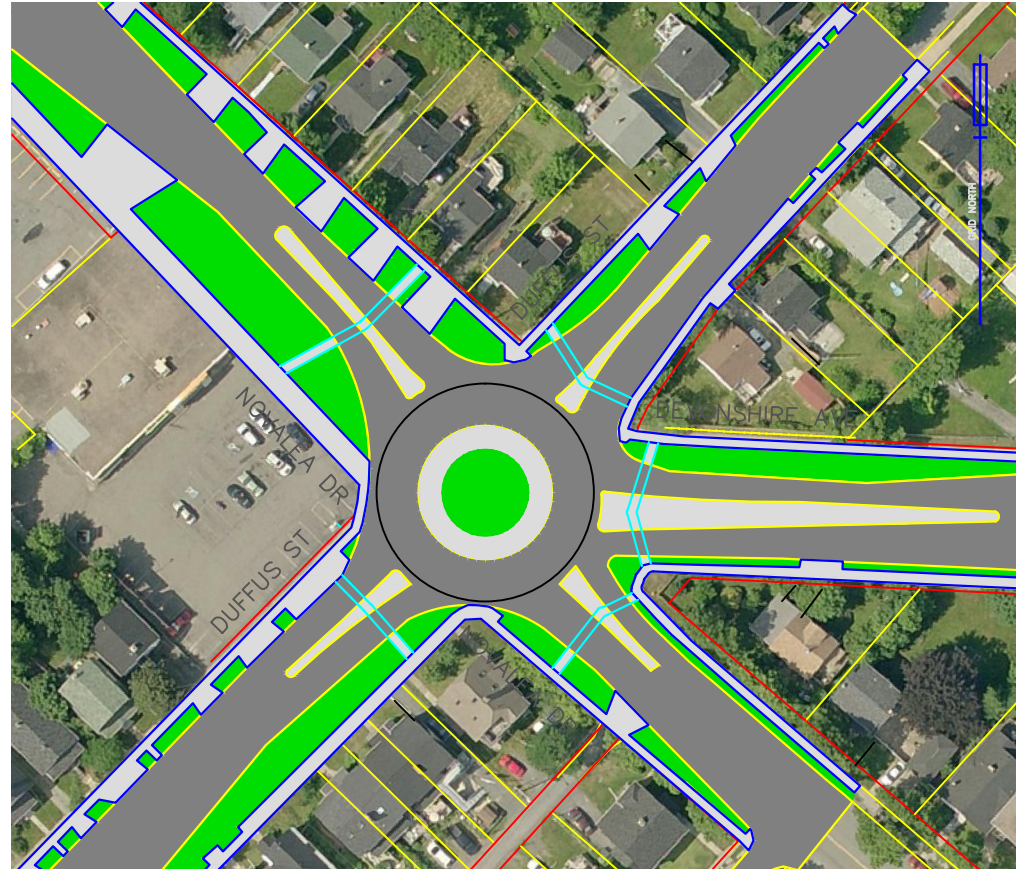
Exiting:

- indicate your desire to exit using your right turn signal
- yield to pedestrians crossing the exit leg

APPENDIX B
POTENTIAL CANDIDATES FOR A ROUNDABOUT
DEVONSHIRE AVE. AT DUFFUS ST. AT NOVALEA DR.



DEVONSHIRE AVE. AT DUFFUS ST. AT NOVALEA DR.
EXISTING TRAFFIC SIGNAL CONFIGURATION

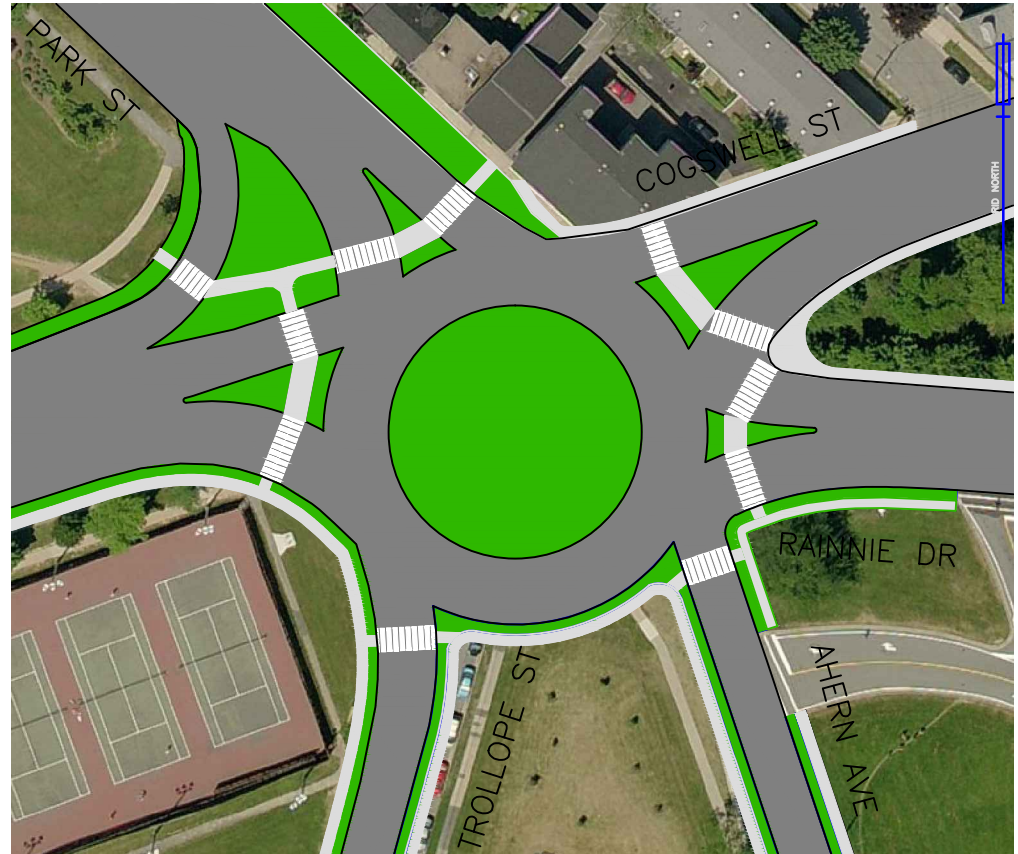


DEVONSHIRE AVE. AT DUFFUS ST. AT NOVALEA DR.
PROPOSED ROUNDABOUT

APPENDIX B
POTENTIAL CANDIDATES FOR A ROUNDABOUT
NORTH PARK ST. AT COGSWELL ST. AT TROLLOPE ST. AT AHERN AVE. AT RAINNIE DR.



NORTH PARK ST. AT COGSWELL ST. AT TROLLOPE ST.
AT AHERN AVE. AT RAINNIE DR.
EXISTING TRAFFIC SIGNAL CONFIGURATION

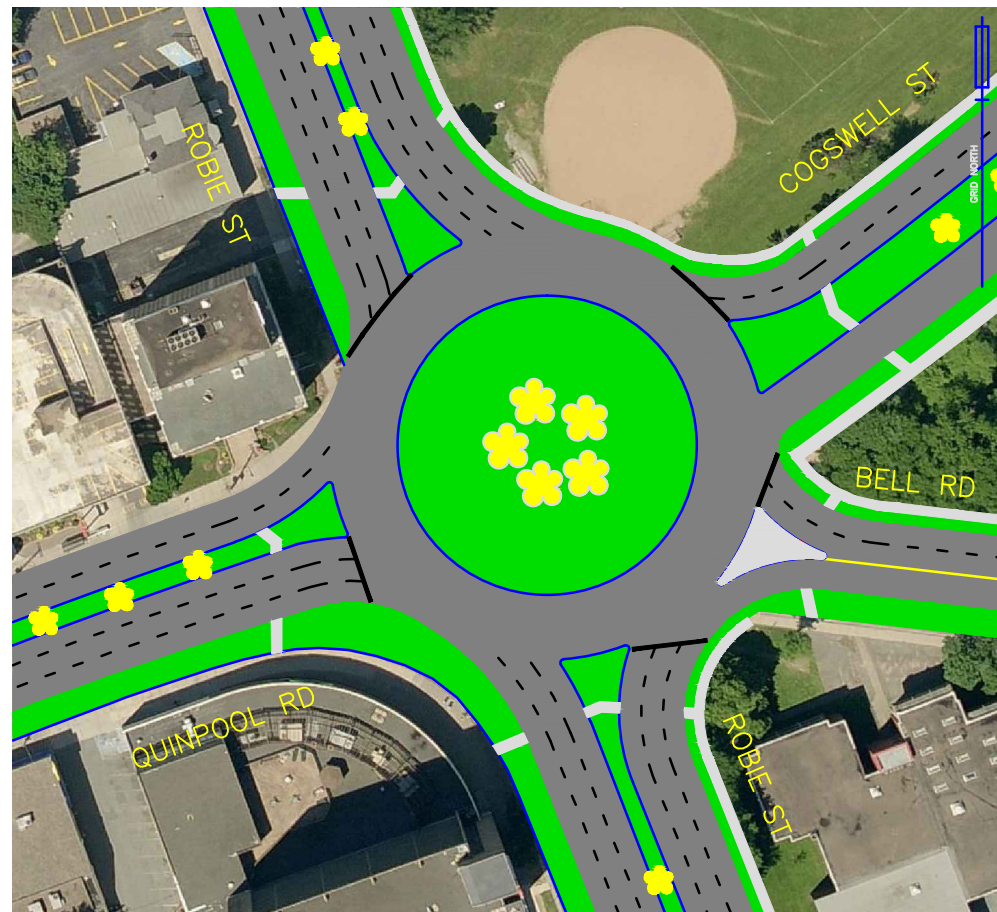


NORTH PARK ST. AT COGSWELL ST. AT TROLLOPE ST.
AT AHERN AVE. AT RAINNIE DR.
PROPOSED ROUNDABOUT

APPENDIX B
POTENTIAL CANDIDATES FOR A ROUNDABOUT
 ROBIE ST. AT COGSWELL ST. AT BELL RD AT QUINPOOL RD



ROBIE ST. AT COGSWELL ST. AT BELL RD AT QUINPOOL RD
 EXISTING TRAFFIC SIGNAL CONFIGURATION

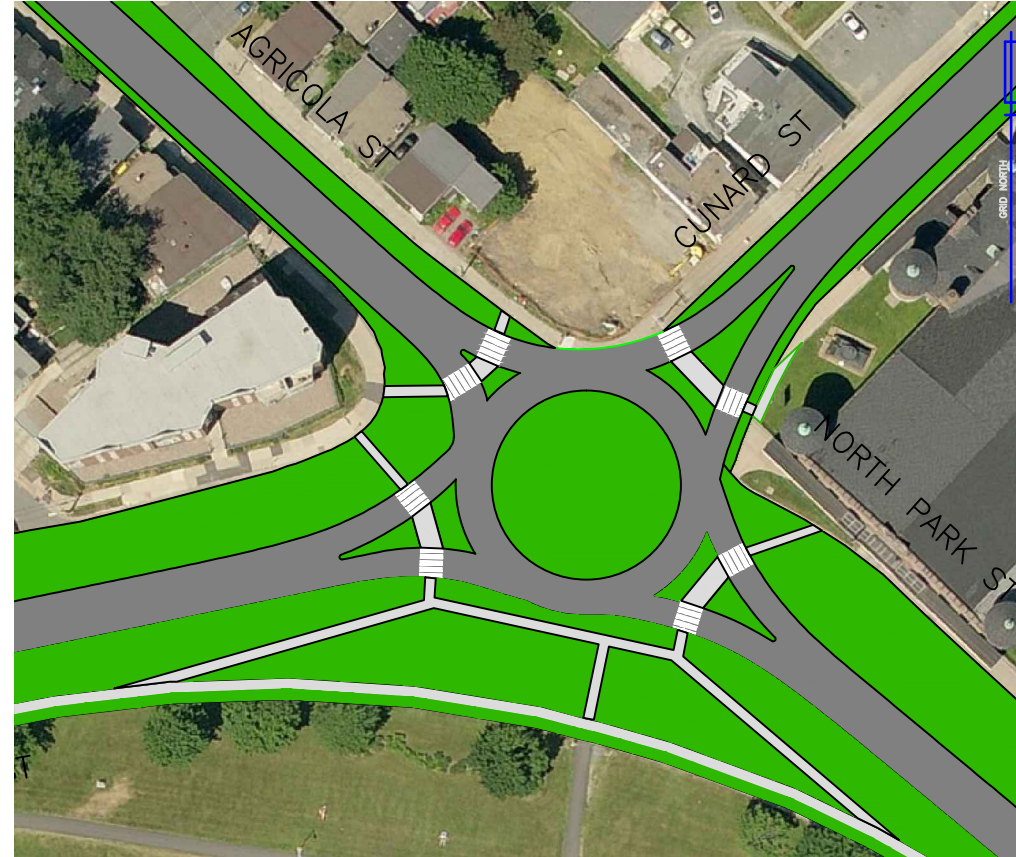


ROBIE ST. AT COGSWELL ST. AT BELL RD AT QUINPOOL RD
 PROPOSED ROUNDABOUT

APPENDIX B
POTENTIAL CANDIDATES FOR A ROUNDABOUT
CUNARD ST. AT NORTH PARK ST. AT AGRICOLA ST.



CUNARD ST. AT NORTH PARK ST. AT AGRICOLA ST.
EXISTING TRAFFIC SIGNAL CONFIGURATION



CUNARD ST. AT NORTH PARK ST. AT AGRICOLA ST.
PROPOSED ROUNDABOUT

Appendix C

Frequently Asked Questions

What is a roundabout?

A roundabout is a circular intersection where traffic goes one way in a counterclockwise direction where vehicles yield upon entry. A roundabout provides another option for a controlled intersection, that is, instead of stop signs or traffic signals. Roundabouts are widely used in the United Kingdom (since the 1960s, with over 10 000 roundabouts) and Australia (with over 15 000 roundabouts) and are gaining popularity in the United States and Canada with the US having over 2300 roundabouts in 40 different states and Canada having over 150.

What is the difference between a Roundabout and Rotary?

Roundabouts are different from Rotaries and traffic circles for two main reasons, a roundabout is always a yield upon entry and the geometry is designed specifically to direct traffic around the circle at much slower speeds. Rotaries and traffic circles were often very large circles and some had traffic signals and even stop signs to control traffic coming into and circulating in the intersection. A modern roundabout simplifies this to yield at entry.

How do roundabouts affect safety?

Roundabouts generally provide a greater level of safety than other types of intersections because of the following characteristics:

Lower speed / Reduced Differential in Speeds

A roundabouts geometry is designed specifically to direct traffic around the circle at a much slower speed. Therefore, lower speeds provide more time for all users to detect and correct for their mistakes or if a collision does occur it is less severe due to the lower speeds.

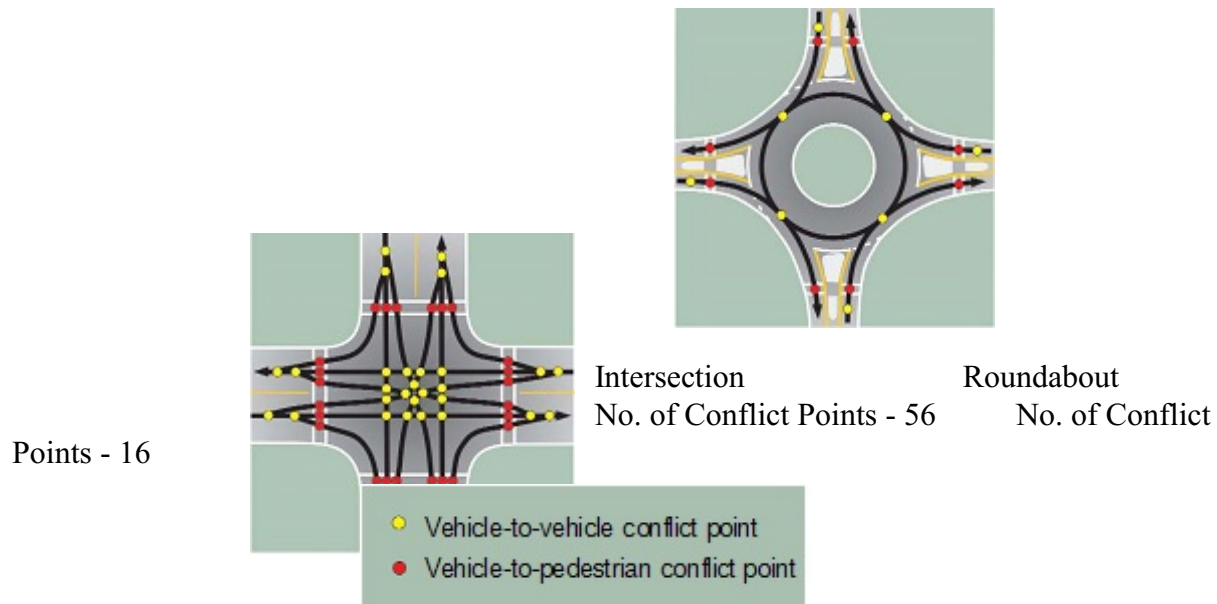
Simplified Decision Making

It's just Yield Upon Entry. As a vehicle travels towards a roundabout the geometry and signs will prompt a vehicle to slow down. As you approach the crosswalk a motorist can detect whether or not to allow for a pedestrian to cross and then they will proceed to the yield line to wait for a gap in the circulating traffic.

Reduced Right Angle and Head On Collisions

The severity of a collision is largely determined by the speed of the impact and the angle of the impact. The higher the speed, the more severe the collision. The higher the angle of impact, the more severe the collision. Roundabouts reduce the severity (Right angle or head on collisions) that are present in traditional intersections.

Fewer Conflict Points or Potential for Collisions



As can be seen from these diagrams a four-way stop or traffic signal has 32 vehicle to vehicle conflict points and 24 vehicle to pedestrian conflict points for a total of 56, whereas a roundabout has 8 vehicle to vehicle conflict points and 8 vehicle to pedestrian conflict points for a total of 16. A reduction of over 70% in the number of potential conflicts if a roundabout is implemented.

Who says that Roundabouts are safer?

Several studies that we found identified that the installation of roundabouts at previous intersections operated by all way stop or traffic signals were improved. Transport Canada is recommending that Canadian jurisdictions consider converting signalized intersections to roundabouts wherever appropriate. Their findings as well as many others have concluded that countries showing higher reductions of intersection collisions have been implementing roundabouts. National Collision statistics produced by Transport Canada report 2500 fatal collisions and 145 000 injury collisions each year in Canada. In 2006, about 28% of road users killed and 40% of those seriously injured was a result of intersection related crashes.

The most recent study completed by the National Cooperative Highway Research Program (NCHRP Report 572), which identified 26 multi-lane intersections that were converted to multi lane roundabouts. The study showed a 67% overall reduction in collisions when a signalized intersection was converted to a roundabout.

Are roundabouts safe for pedestrians?

Pedestrians in roundabouts only need to cross one direction of traffic at a time; this minimizes the number of things to look for (right turning on red, left turns, drivers running a light). For a

single lane roundabout, pedestrians only need to cross one lane of traffic at once instead of multiple.

Can older drivers adjust to roundabouts?

Although Roundabouts are often a new type of intersection to older drivers, fewer decisions are necessary, they must yield to the pedestrian in the crosswalk and wait for an appropriate gap. Roundabouts don't have left turns or require drivers to cross busy thoroughfares from cross streets.

Why are roundabouts considered more aesthetically pleasing?

There is typically more green space available at roundabouts than at signalized intersections. The center island at a roundabout can be utilized as gateways to communities. The center island can be landscaped using such treatments as trees, shrubs, flower beds, public art, etc. As pedestrians are not encouraged to utilize the center island for an activity the landscaped features should not encourage pedestrians to explore the center island. Roundabouts can also provide opportunities for traffic calming and speed transition within neighborhoods.

What are appropriate locations for roundabouts?

Roundabouts are appropriate at many intersections including the following:

- Traffic flow is fairly even among all legs
- High speed intersections
- Intersections with high collision rates
- Intersections with high delays
- Intersections with high left turn movements
- Intersections with unusual geometry
- Intersections that serve as gateways to communities

Do roundabouts require more space than traditional intersections?

Roundabouts do not necessarily require more space than traditional intersections. Geometric design details vary from site to site and must take into account traffic volumes, land use, topography, and other factors. Because they can process traffic more efficiently than traffic signals and stop signs, roundabouts typically require fewer traffic lanes to accommodate the same amount of traffic. In some cases, roundabouts can require more space than stop signs or traffic signals at the actual intersection to accommodate the central island and circulating lanes, but approaches to roundabouts typically require fewer traffic lanes and less right of way than those at traditional intersections.

Are roundabouts better for the environment?

Vehicles operating in a roundabout result in lower environmental impacts, by keeping traffic

moving at a more consistent lower speed and reducing idling, roundabouts reduce emissions and fuel consumption. HRM has introduced a “Reduced Idling Campaign” whereby Halifax Regional Council is committed to a healthy, sustainable, vibrant community with clean air, land, water, and energy options. HRM Council is committed to making a difference in climate change and air quality. Roundabouts can help that campaign. The shorter delays and “rolling” approach to roundabouts generally reduce fuel and energy consumption, green house gas emissions, the carbon footprint, as well as a reduction in noise to the surrounding community. The longer delays and the start and stop approach to signalized intersections will generally have a more demanding impact on the environment.

What do the signs at a roundabout mean?

Roundabout Ahead Sign. Time to slow down.

Keep to the Right

Yield to all traffic in the roundabout including pedestrians at the crosswalk. Remember that “yield” means you may have to stop. Traffic in the roundabout always has the right of way.

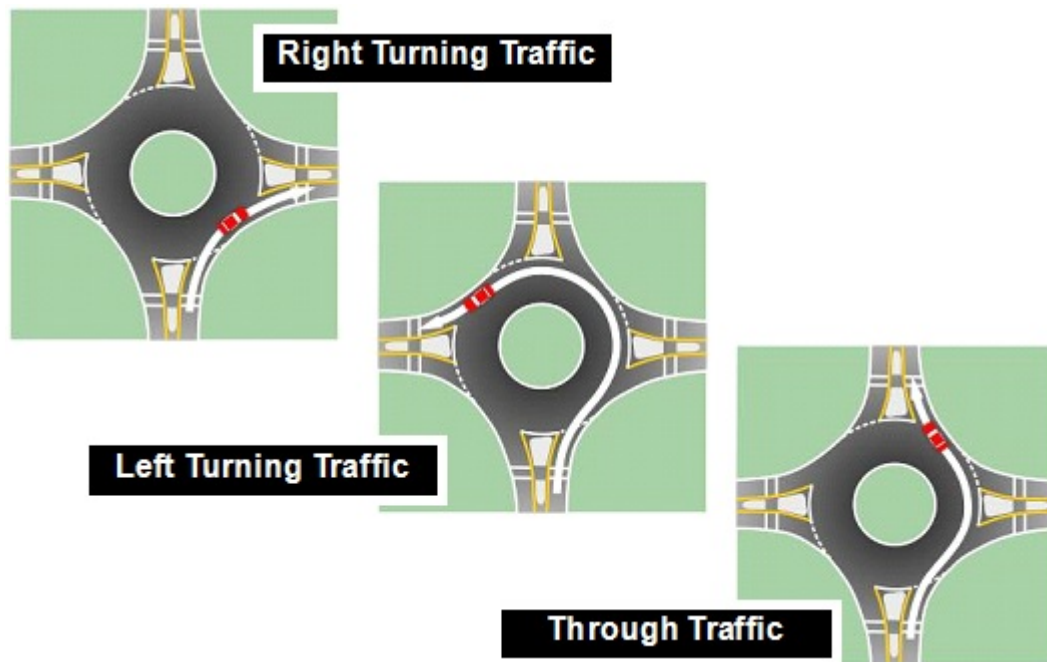
This sign is located on the center island reminding the driver to travel the roundabout in a one way counter clockwise direction



Pedestrian Crossing



How do I drive a Roundabout?



Some basic steps in approaching, entering, circulating and leaving a roundabout are listed.

Approaching:

- reduce speed (forced by geometry)
- on a multi lane entry, decide which exit you will be taking and get into correct lane (overhead or ground mounted signs will help identify this)
- left turns (going more than halfway around the roundabout) are made from the left most lane
- right turns from the right most lane stay to the right of the splitter island yield to pedestrians at the crosswalk when an emergency vehicle is approaching pull over to the right and stop

Entering:

- at the yield line, yield to circulating traffic approaching from the left and enter when there is a sufficient gap
- do not enter beside a vehicle already circulating within the roundabout even if there is enough room beside the vehicle, as this vehicle may be exiting at the next exit.

Circulating:

- do not stop except to avoid a collision
- keep to the right of the central island and travel in a counter clock wise direction
- do not overtake adjacent vehicles as they may be exiting at the next exit
- when an emergency vehicle is approaching, Exit the roundabout at your desired exit and pull over to the right and stop once you are past the splitter island

Exiting:

- indicate your desire to exit using your right turn signal
- yield to pedestrians crossing the exit leg

As a cyclist: Experienced cyclists and vehicles travel the roundabout at the same speed; this allows cyclists to travel in the middle of the lane. Less experienced cyclists might be more comfortable dismounting before entering the roundabout and using the sidewalks and crosswalks.

As a large vehicle: Roundabouts are designed to handle large vehicles, particularly when they are on truck routes or arterial roadways. As in many turning situations, the truck needs more room, stay to the middle of the lane as you approach and enter and use the truck apron if available and needed.

As a snowplow: There are roundabouts in many places that have snow, Ontario, Quebec, Colorado, etc. There will likely be an adjustment period needed, and depending on the width of the center lane, not unlike another larger intersection, it will take a few passes to clear all legs.

For emergency vehicles: If you have not yet entered the roundabout, pull over to the side to allow the emergency vehicle to pass. If you are in the roundabout continue to your exit and pull over where there is room for the emergency vehicle to pass.

Can I get more information?

A brochure is available for download at:

<http://www.tc.gc.ca/media/documents/roadsafety/tp14787e.pdf>

Other useful links:

Province of Nova Scotia www.gov.ns.ca/tran/roundabout

Region of Waterloo, Ontario www.goroundabout.ca

City of Hamilton Ontario

<http://www.hamilton.ca/CityDepartments/PublicWorks/TrafficEngineeringAndOperations/RoadsTrafficModernRoundabout.htm>

For more information call 490-4000

For more information e-mail traffcom@halifax.ca