

Appendix 5.2

Modern Roundabout Supplement

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The preferred concept for Lighthouse Corners, Columbia (discussed in Section 4.1.6) recommends replacing the existing signalized intersection of Routes 6 and 66 with a two-lane modern roundabout to improve traffic safety and operations while complementing the future village character that is envisioned by the Town for this area. The community response to the notion of a roundabout in this location was mixed, with a number of public meeting attendees and other study stakeholders expressing concerns about the potential function of the roundabout relative to safety, truck operations, and motorist unfamiliarity with roundabout operations.

In response to these concerns, several pieces of information were developed from new and existing sources to better explain the key advantages and characteristics of modern roundabouts (particularly in contrast to more commonly understood traffic circles or rotaries) and to better illustrate the intent of the modern roundabout concept at Lighthouse Corners through regional examples of roundabouts and computer simulation.



This supplement contains the following information:

- *All About Modern Roundabouts* Summary
- A list of Roundabout Resources & References
- Example Multi-lane Roundabouts
- Lighthouse Corners Roundabout: Traffic Analysis

All About Modern Roundabouts

What is a Modern Roundabout?

- A modern roundabout is a compact circular intersection in which traffic flows counter-clockwise around a center island.
- A roundabout can be single lane, or multi-lane with two or more lanes of entering and circulating traffic.
- Entering traffic yields to circulating traffic.
- The relatively small diameter of a roundabout and the curved entry paths promote speeds of 20 mph or less.



What a Roundabout is Not...

A modern roundabout is not a rotary or traffic circle. Modern roundabouts differ from rotaries and traffic circles in several key respects:

- Roundabouts are substantially smaller in diameter than typical traffic circles. The diameter of a typical roundabout can be 3 to 5 times smaller than that of a traffic circle or rotary.
- Because of their small size, roundabouts are designed for low speeds of entering and circulating traffic. Traffic circles and rotaries are much larger and promote high-speed merging and weaving of traffic.
- Roundabouts require yield-at-entry such that entering traffic must yield to circulating traffic. Traffic circles require circulating vehicles to grant the right of way to entering vehicles.



Features of a Modern Roundabout...



1. Pedestrian Refuge
 2. Pedestrian Crossing
 3. Splitter Island
 4. Lane Use Marking
 5. Yield Line
 6. Edge Line
 7. Landscaping Buffer
 8. Circulatory Roadway
 9. Center Island
 10. Truck Apron
- A. Lighting
B. Sidewalk
C. Regulatory Chevron
D. Exit Guide Sign
E. Yield Sign

The features of a modern roundabout communicate to drivers, pedestrians, and bicyclists how the roundabout operates and direct users how to safely navigate through the roundabout.

[Source: *Planning-Level Guidelines for Modern Roundabouts*, Center for Transportation Research and Education, November 2008]

Signs & Pavement Markings are Key...

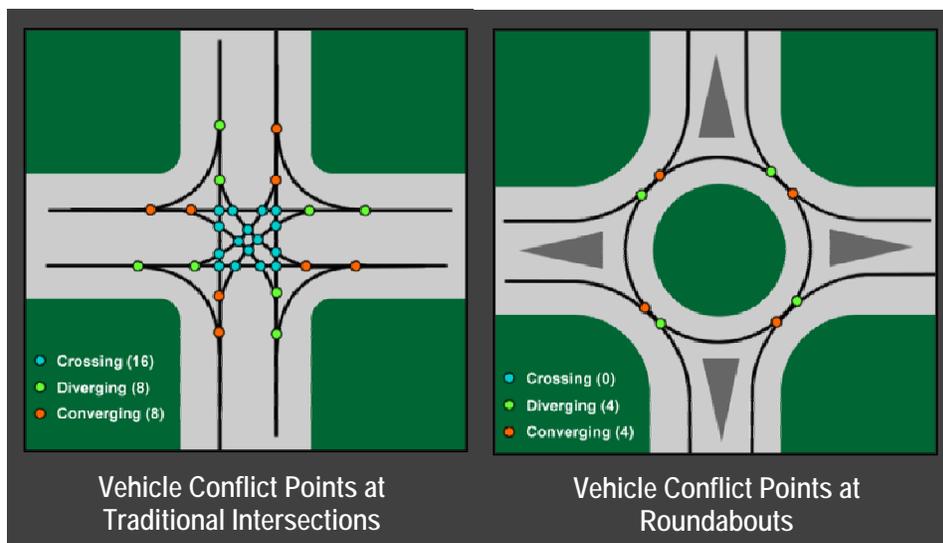
Key features of modern roundabouts are signs and pavement markings, particularly those on the approaches to roundabouts. Clear and effective signing and pavement markings are essential to helping users safely navigate roundabouts.



Safety Benefits of a Roundabout...

Studies have shown that modern roundabouts, when replacing traditional intersections, can reduce all accidents by 48% and fatal accidents by 78%. Also consider:

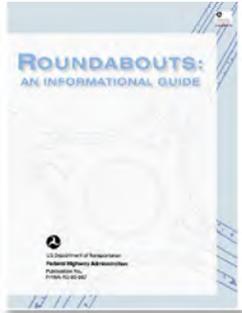
- At traditional intersections, common collision types often include right-angle, left-turn, and head-on collisions. These types of collisions can be severe as they can occur at high speeds.
- With roundabouts, these types of collisions are essentially eliminated. Installing roundabouts in place of traffic signals can also reduce the likelihood of rear-end crashes and their severity by removing the incentive for drivers to speed up as they approach green lights and by reducing abrupt stops at red lights.
- As shown in the graphic below, the vehicle-to-vehicle conflicts that occur at roundabouts generally involve a vehicle merging into the circular roadway, with both vehicles traveling at low speeds — generally less than 20 mph.



[Additional Sources: *What is a Roundabout?*, CTDOT; *Benefits and Operational Information, Five Corners, Ellington*, CTDOT; *Safety Aspects of Roundabouts*, FHWA.

Roundabout Resources and References

Federal Highway Administration (FHWA)

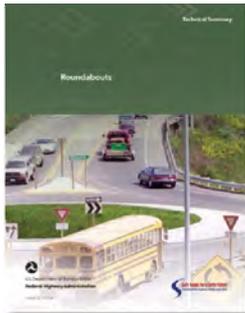


Roundabouts: An Informational Guide

<http://www.fhwa.dot.gov/publications/research/safety/00068/>

Includes chapters on:

- Planning
- Operations
- Safety
- Geometric Design



Technical Summary: Roundabouts

<http://safety.fhwa.dot.gov/intersection/roundabouts/fhwasa10006/>

Includes chapters on:

- Characteristics of Roundabouts
- Benefits of Roundabouts
- User Considerations
- Design Considerations



Roundabouts Webpage

<http://safety.fhwa.dot.gov/intersection/roundabouts/>

Webpage provides links to:

- Video – ***Modern Roundabouts: A Safer Choice***
- Presentations
- Publications
- Related Website Links

Transportation Research Board (TRB)



Roundabouts: An Informational Guide – Second Edition

http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_672.pdf

Includes chapters on:

- Roundabout Considerations
- Planning
- Operational Analysis
- Safety

State Agencies



Connecticut Department of Transportation (CTDOT)

CTDOT Roundabout Information Webpage

<http://www.ct.gov/dot/cwp/view.asp?a=4109&q=467780&PM=1>

Webpage Includes:

- General Information
- Project News
- Roundabout Simulation (under News)



New York State Department of Transportation (NYSDOT)

NYSDOT Roundabout Information Webpage

<https://www.dot.ny.gov/main/roundabouts>

Webpage Includes:

- Guidance for Users (with Animations)
- Video Gallery
- Photo Gallery



Washington State Department of Transportation (WSDOT)

WSDOT Roundabout Information Webpage

<http://www.wsdot.wa.gov/safety/roundabouts/>

Webpage Includes:

- General Information
- Driving Multi-lane Roundabouts Information
- Roundabout Video Series

Other Resources

Roundabouts USA Website

<http://www.roundaboutsusa.com/>

Includes:

- Roundabout Information
- Photo Gallery
- Article Library
- Hot Topics
- Resource Links



Example Multi-lane Roundabouts

Keene, New Hampshire

Routes 10/12/101 and Winchester Street Intersection [Source: Bing Maps]



Keene, New Hampshire

Main Street, Marlborough Street, Winchester Street Intersection [Source: Google Maps]



Lighthouse Corners Roundabout: Traffic Analysis

To better understand the operational feasibility of a two-lane roundabout at the intersection of Route 6 and Route 66 in Columbia (Lighthouse Corners), a VISSIM traffic model was developed as part of this study to simulate the performance of the conceptual roundabout design under future traffic conditions (year 2030). The simulation was developed for the weekday afternoon peak traffic hour, which represents the highest traffic volumes that are experienced at this intersection during a typical weekday. During the afternoon peak hour, the highest volumes are experienced on the eastbound Route 6 approach to the intersection. A large percentage of this traffic then continues “north” on expressway Route 6.



Screenshot image of the VISSIM traffic model that was developed for the preferred roundabout concept at the intersection of Route 6 and Route 66 in Columbia (Lighthouse Corners).

The outputs from the VISSIM model showed that the overall average delay for all vehicles traveling through the roundabout is comparable to a level-of-service (LOS) C for a signalized intersection (that is, approximately 30 sec. of delay per vehicle). The LOS for each approach (using comparable signalized intersection criteria) was shown to be:

Two-lane Roundabout Concept

- Eastbound Route 6: LOS D
- Westbound Route 66: LOS E
- Northbound Route 66: LOS B
- Southbound Route 6: LOS A
- All Approaches (overall): LOS C

By comparison, the afternoon peak hour traffic analysis for the existing signalized intersection at Routes 6 and 66 under future traffic conditions with no improvements to the intersection was shown to be:

Signalized Intersection (with No Improvements)

- Eastbound Route 6: LOS F
- Westbound Route 66: LOS F
- Northbound Route 66: LOS E
- Southbound Route 6: LOS C
- All Approaches (overall): LOS F