



Town of Emerald Isle – February 9, 2016

## *Roundabouts*

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# *Circular Intersections*

- 3 Types of Circular Intersections
  - Traffic Circle



Columbus Circle – New York City



Market Square - Fayetteville

# *Circular Intersections*

- 3 Types of Circular Intersections
  - Traffic Circle
  - Traffic Calming Intersection



# *Circular Intersections*

- 3 Types of Circular Intersections
  - Traffic Circle
  - Traffic Calming Intersection
  - Modern Roundabout



Clemmons, Forsyth Co.



NC State, Raleigh

# *Roundabout vs. Traffic Circle - Size*

- Traffic Circle - 800' Diameter
- Roundabout - 180' Diameter

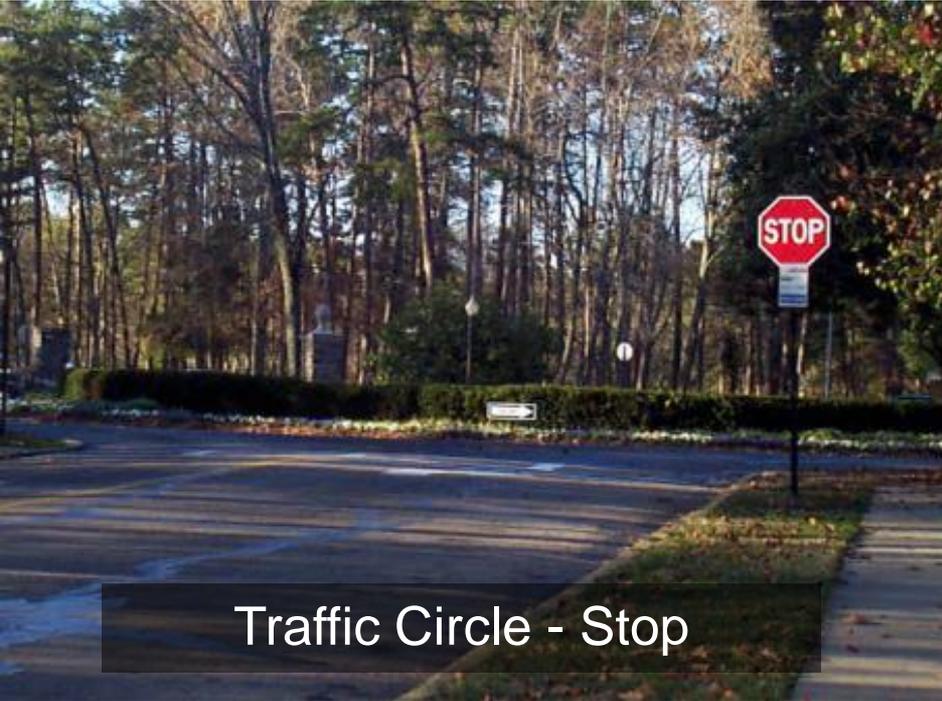


Kingston, NY

# *Roundabout vs. Traffic Circle - Deflection*



# *Roundabout vs. Traffic Circle* *- Entry Traffic Control*



Traffic Circle - Stop



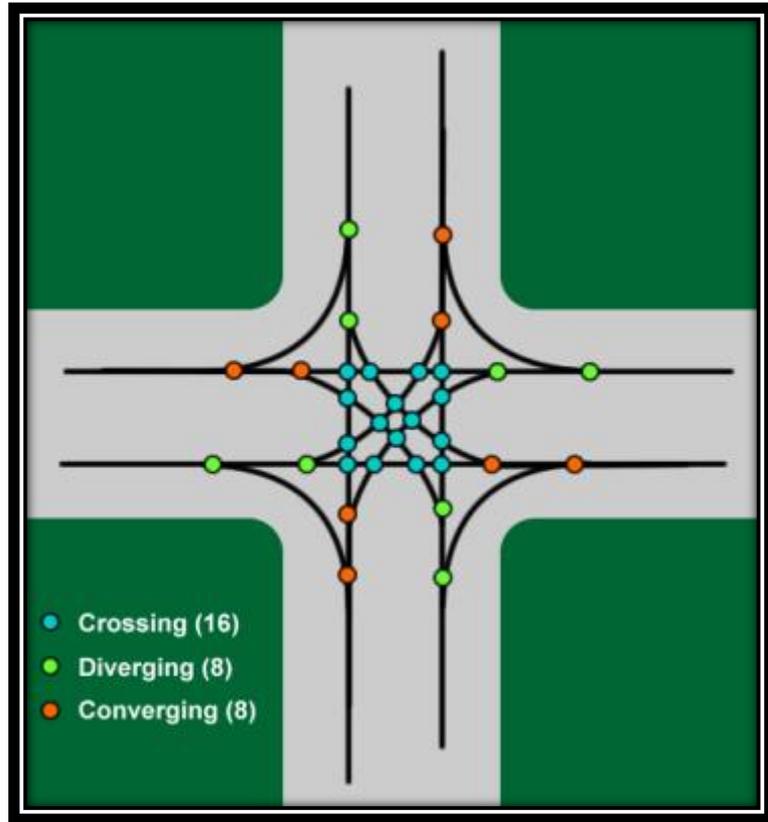
Roundabout - Yield

# *Why Roundabouts?*

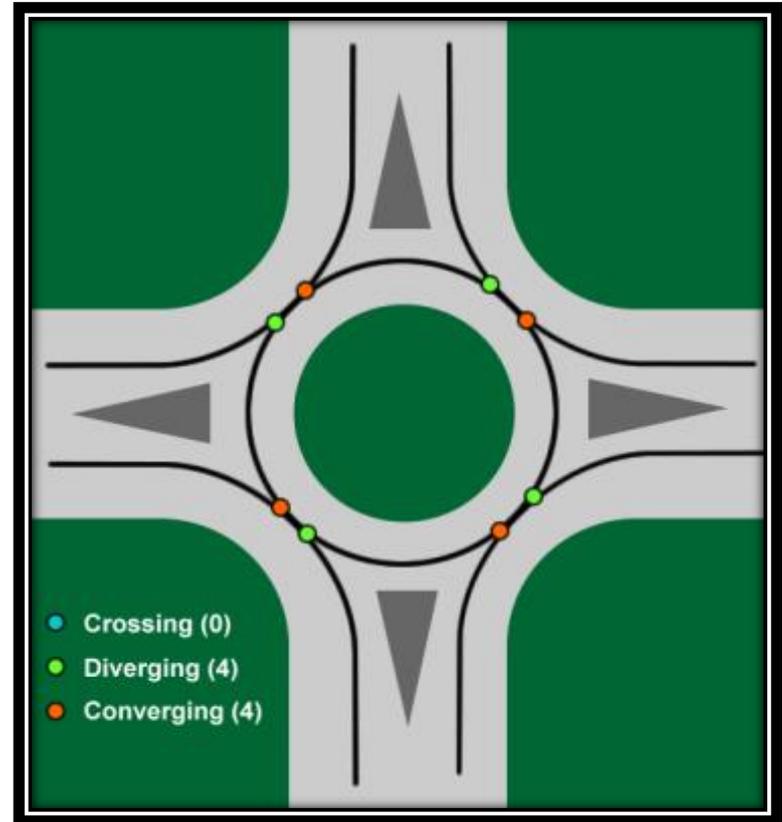
- Safest Intersection
- High Capacity / Low Delay
- Good for All Modes of Traffic
- Geometric Flexibility
- Aesthetics



# Roundabouts - Safety



There are 32 conflict points at a conventional intersection.



There are only 8 conflict points at a modern roundabout

# *Roundabouts - Safety Crash Reductions Following Installation of Roundabouts*

## **In the United States – 2007**

- Total Crashes 48%
- Fatal/Injury Crashes in Rural Areas 78%
- Fatal/Injury Crashes in Urban Areas 60%

## **In North Carolina from 1999-2006**

- Conversion From Stop Sign Control 41%
- Conversion From Signal Control 74%

### Sources:

Insurance Institute For Highway Safety

NCHRP Report 572

NCDOT Safety Evaluation Group

[www.highwaysafety.org](http://www.highwaysafety.org)

[onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_572.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_572.pdf)

[www.ncdot.org/doh/preconstruct/traffic/safety/Reports/completed.html](http://www.ncdot.org/doh/preconstruct/traffic/safety/Reports/completed.html)

# *Roundabouts – Capacity and Operation*

- Peak Hour Traffic – Usually at least as efficient (same overall delay to drivers) as traffic signals or all-way stops
- Off Peak Traffic – Usually much more efficient than traffic signals.
- Multi-lane roundabouts can handle as much traffic as a busy signalized intersection

# *Roundabouts – Multi-Modal*

- Roundabouts provide a safer crossing for pedestrians



# *Roundabouts – Multi-Modal*

- Roundabouts provide safer travel for cyclists



# *Common Concerns*

When a roundabout is recommended for an intersection there typically is some public resistance. Some of the specific complaints and questions we received from Emerald Isle residents dealt with:

- Safety
- Previous Traffic Circle History
- Trucks and Boat Trailers
- Emergency Vehicle Access
- Side Street Delays

# *Safety and Older Drivers*

“I find them a real problem that does not aid with traffic flow but are great for automobile body shops that will be busy fixing fender benders”

“We have a gradually aging population which means reflexes are not as great as they were. They slow traffic down and cause fender benders at the very least. Emerald Isle traffic works smoothly even in the summer until there is an accident. Then traffic backs up way past MP 16 and beyond. The fender benders on round-a-bouts would have traffic snarled for long periods of time.”

“As it is, it is extremely difficult to get out onto Route 58 during the busy season (except near town where you have the left turn lane and can use the lane to come out of the side street and wait for an opening from the other direction).”

# Safety

## North Carolina Crash Analysis Results

Percent Crash Reductions at NC Roundabouts  
(Naïve Before & After with Linear Traffic Factor)

	All 30 Sites
<b>Total Crashes</b>	<b>46.2% (5.2)</b>
<b>Injury Crashes - All Types</b>	<b>75.3% (4.9)</b>
<b>Injury Crashes - KAB</b>	<b>85.0% (6.5)</b>
<b>Frontal Impact Crashes*</b>	<b>75.6% (3.9)</b>
<b>Rear End Crashes*</b>	<b>29.9% (13.2)</b>
<b>Sideswipe Crashes*</b>	<b>20.1% (28.9)</b>
<b>Day</b>	<b>56.0% (5.0)</b>
<b>Night</b>	<b>2.8% (18.2)</b>

\* As crash classified in DMV 349

( ) = standard deviation of an estimated value

NCDOT Transportation Mobility & Safety Division

# Older Drivers

## AARP Roundabout Facts Sheet

### Modern Roundabouts | A LIVABILITY FACT SHEET

Every day in the U.S. more than 20 people are killed at traffic intersections, and many more are seriously injured.<sup>1</sup>

Roundabouts — circular intersections that move traffic counterclockwise around a central island — can help reduce these deaths and injuries. Modern roundabouts are calmer and safer than conventional intersections and have been deemed a “proven safety counter-measure” by the U.S. Department of Transportation.<sup>2</sup>

Roughly the size of a baseball field, modern roundabouts differ from rotaries or traffic circles, which can be as big as the stadium itself. Roundabouts feature lower, safer vehicle speeds. They can be 80 feet across with single lanes carrying 25,000 vehicles a day or larger at 200 feet, with double lanes and 45,000 vehicles a day.<sup>3</sup>

Personal injuries and fatalities plummet as much as 90 percent in modern roundabouts when compared to conventional intersections.<sup>4</sup> Roundabouts cause drivers to slow down, ideally to less than 20 mph, which reduces the risks to both pedestrians and drivers.

Because roundabouts can handle 30 to 50 percent more traffic than conventional intersections, they reduce travel delays.<sup>5</sup> Since roundabouts can be designed to be aesthetically pleasing, they help create a sense of place.

By January 2014, roundabouts graced more than 2,000 intersections in the U.S., with more planned.<sup>6</sup> Given their safety and placemaking benefits, roundabouts should be considered for many more of the three million intersections in the U.S.

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Vehicle speeds on Grandview Drive in University Place, Wash., often reached or exceeded 50 mph. After the installation of modern roundabouts, vehicle crashes dropped from one every nine months to zero in 14 years.



### Myth-Busting!

**“Roundabouts aren’t good for older adults.”**

By 2025, about 25 percent of all drivers in the United States will be over the age of 65. Forty percent of all car crashes that involve drivers over the age of 65 occur at intersections.

As we age, we lose our ability as drivers to judge left turn gaps. Roundabouts don’t require those decisions, and they eliminate head-on and right-angle crashes. When collisions do occur, they are generally at lower speeds and less harmful.

<http://www.aarp.org/content/dam/aarp/livable-communities/documents-2014/Livability%20Fact%20Sheets/Modern-Roundabouts-Fact-Sheet.pdf>

# *New Jersey – Conversion of old style circles*

“Having been born and raised in NJ I feel I have some experience. They were gradually phased out while I lived there because they are confusing and dangerous.”

“Prior to moving to the island 5 years ago, we lived in South Jersey. We had what we called "circles" there. I know, at least in So. Jersey, they have been doing away with them because of the accident rate. They are replacing the circles with traffic lights.”

## **NJ’s hated traffic circles are on the way out**

**They’re supposed to help keep traffic moving, but many Garden State motorists don’t like or trust them. Traffic circles have been around for decades in New Jersey, but they are slowly being phased out in favor of what are called roundabouts.**

- Kevin Israel, spokesman for the [New Jersey Department of Transportation](#), said there is no formal policy in place to get rid of every traffic circle in the state.
- Israel said the roundabout offers several advantages.
- “A traffic circle is typically larger, so it affects the circulation speed of the circle inside, while the roundabout is designed to be smaller,” he said. “There’s a rigorous set of standards used to ensure that the speed in the roundabout is maintained to a safe level.”
- He said that makes it easier to get in and out of the roundabout.
- The roundabout, as Israel pointed out, is used around the country, and is now one option NJDOT looks at when reconfiguring a traffic circle.

<http://nj1015.com/njs-hated-traffic-circles-are-on-the-way-out/>

# *New Jersey – Conversion of old style circle*



# *New Jersey – Conversion of old style circle*



# *Roundabouts – Large Trucks/Boat Trailers*

“Roundabouts are cute on design paper but in reality they are not wise for hauling boat trailers in and thru.”



# *Roundabouts – Emergency Vehicles*



# *Side Street Traffic*

“Since the majority of traffic flow is along Route 58, those vehicles trying to enter from the side streets would get really backed up. As frustration grows, you will have people trying to jump into the roundabout with a very small window, potentially causing accidents from cars that are already in the roundabout.”

“If traffic is heavy, people will find it hard to enter the circle and if they should be trapped on the inside, they will find it hard to exit.”

“In bad traffic I can enter the turning lane and sit until someone lets me in going east. How will the round-about effect me getting in the turning lane to get to the roundabout since there will no longer be a turning lane?”

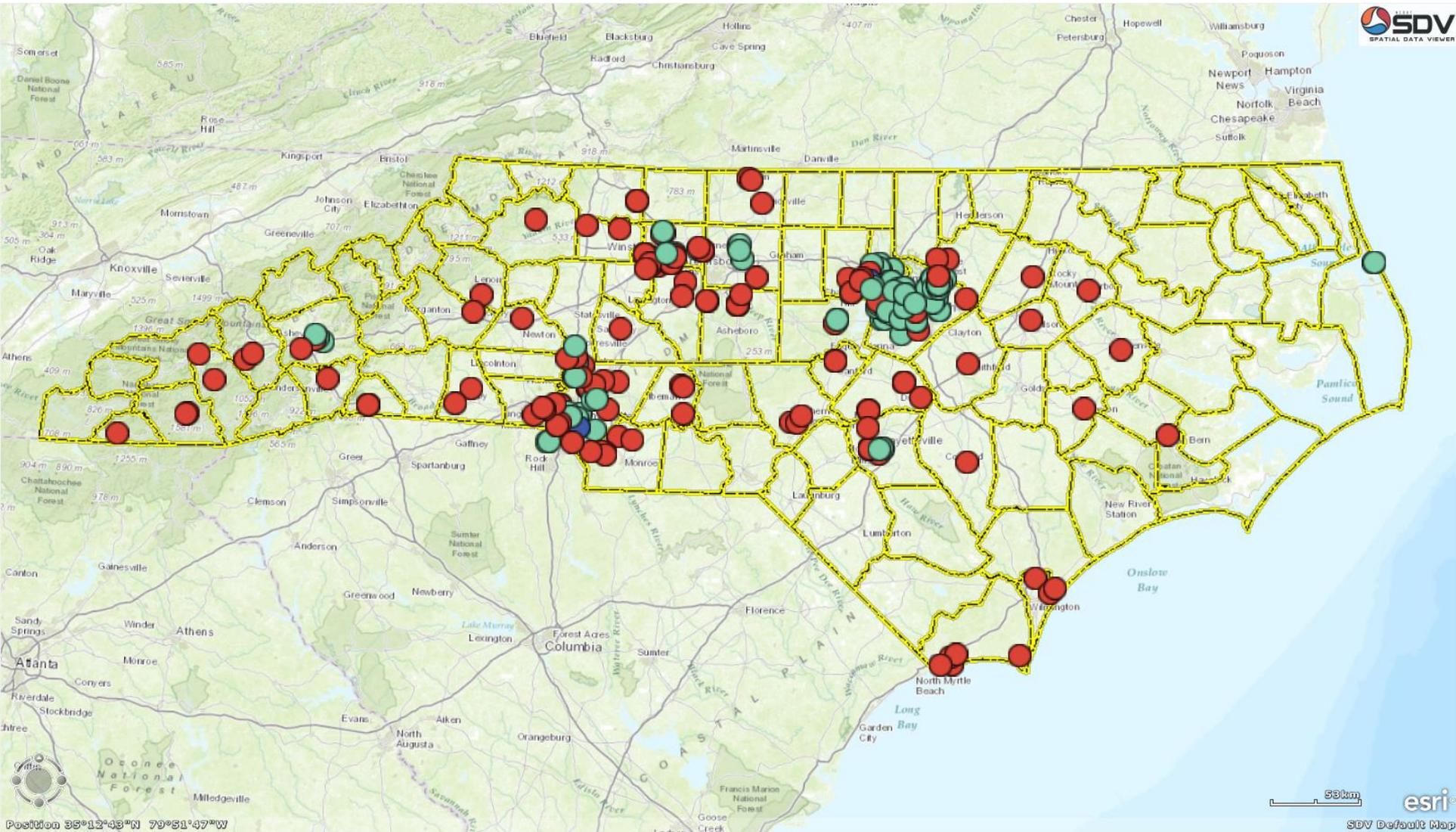
# *Roundabouts – Capacity and Operation*

## **FHWA Roundabouts Technical Summary**

**Operational Performance** – When operating within their capacity, roundabouts typically have lower overall delay than signalized and all-way stop-controlled intersections. The delay reduction is often most significant during non-peak traffic periods. These performance benefits can often result in reduced lane requirements between intersections. When used at the terminals of freeway interchanges, roundabouts can often reduce lane requirements for bridges over or under the freeway, thus substantially reducing construction costs. However, as yield-controlled intersections, roundabouts do not provide priority to specific users such as trains, transit, or emergency vehicles.

**Access Management** – Because roundabouts can facilitate U-turns, they can be a key element of a comprehensive access management strategy to reduce or eliminate left-turn movements at driveways between major intersections.

# Roundabouts in North Carolina



# *Roundabout Network*



I-485 at Prosperity Church Road in Charlotte

*Questions?*

