City of Franklin

109 3rd Ave S
Franklin, TN 37064
(615)791-3217

Meeting Agenda

Work Session

Wednesday, December 4, 2019 | **6:00 PM** | **Board Room**

Call to Order

WORKSESSION DISCUSSION ITEMS

1. 19-1237 Discussion Regarding Use of Roundabouts in Transportation Networks

Sponsors: Paul Holzen

Attachments: 20191202_RAB Presentation D3.pdf

Other Business

Adjournment

Anyone requesting accommodations due to disabilities should contact ADA coordinator at 791-3277.

Exploring the Benefits of Modern Roundabouts

Wednesday, December 4, 2019

City of Franklin, TN

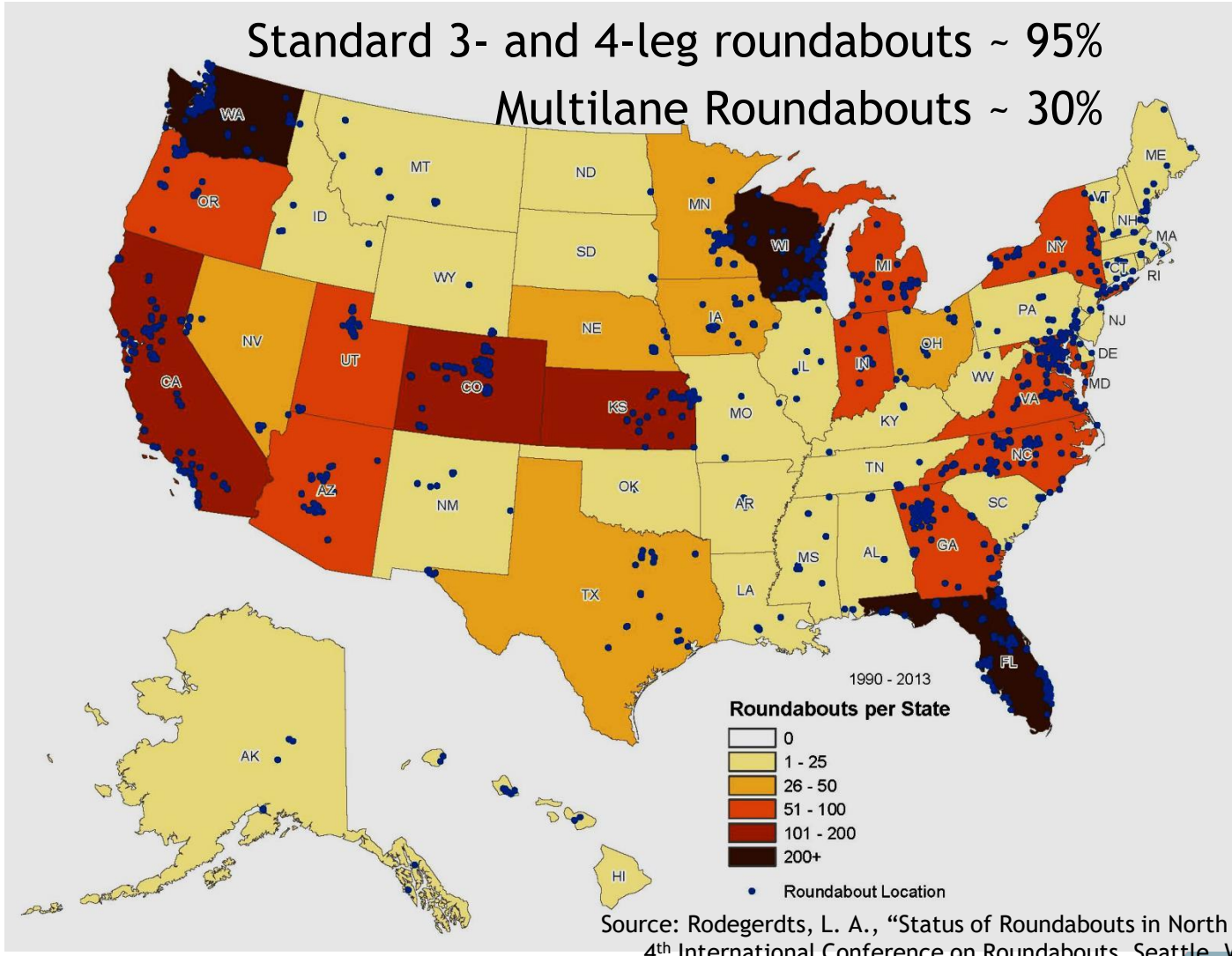
Kimley»Horn

VOLKERT

Why have roundabouts become an attractive choice for intersections?

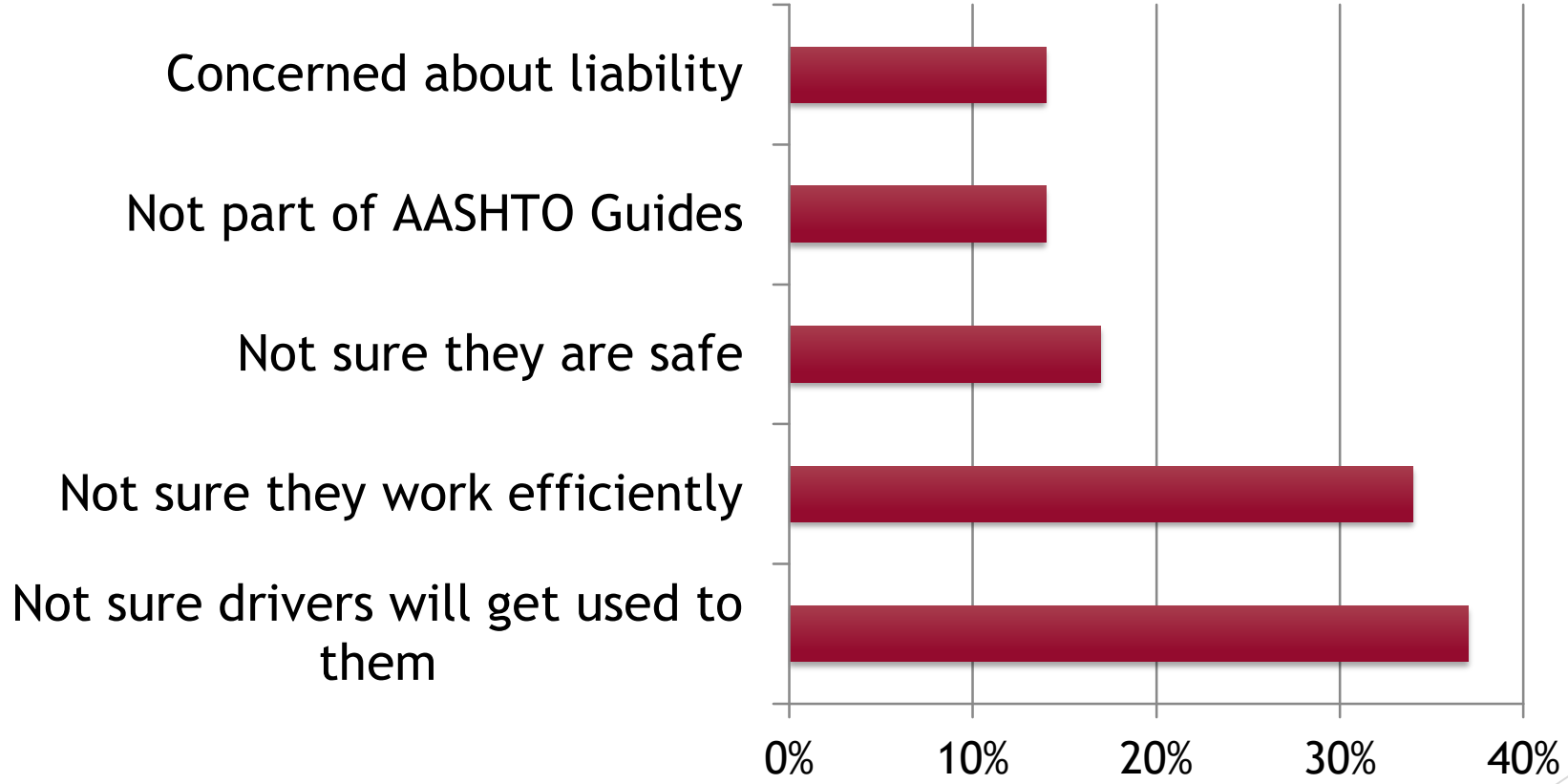
- Increased Safety - reduced injury crash frequency
- Operational Efficiency - higher intersection capacities in most cases
- Difficult Geometry – more than 5 legs
- Wide Nodes/Narrow Roads
- Safer for Pedestrians
- Reduced Costs (Lifecycle) – collision reduction savings (societal) are substantial
- Quality of Life – improved retail access, community gateways, aesthetics, harmonized transportation and land use (“complete streets”)

U.S. sites by state c. 2013



Source: Rodegerdts, L. A., "Status of Roundabouts in North America", TRB 4th International Conference on Roundabouts, Seattle, WA, April 2014.

Historical Concerns



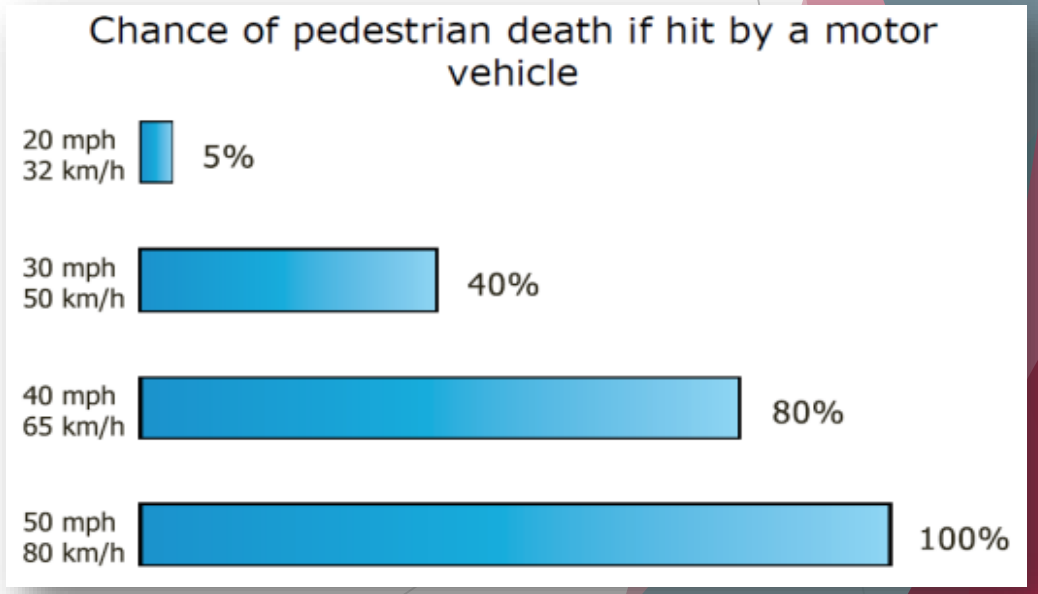
Source: NCHRP Synthesis 264

Benefits

- Can improve safety
  - Vehicle
  - Pedestrian/Bicyclists
- Can improve operations
  - Higher capacity, less delay
- Can reduce footprint

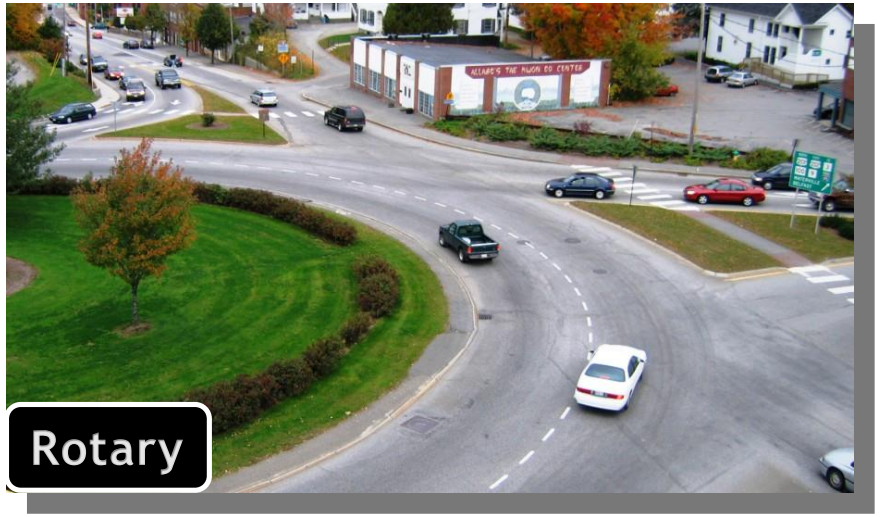
Traffic Control Prior to RBT	% Reduction in Injury Crashes
Signalized	78
All-Way Stop	46
Two-Way Stop	82

NCHRP 672, Exhibit 5-15



NCHRP 572, Table 28

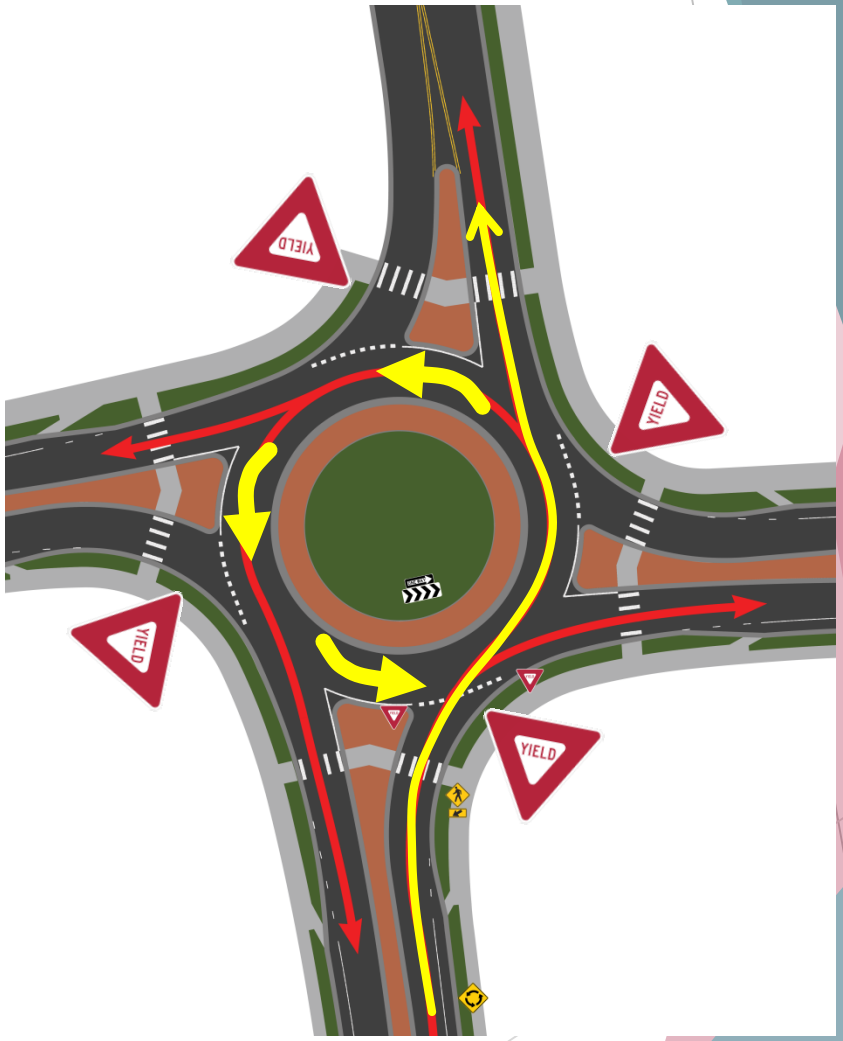
What a Modern Roundabout is not…



Nonconforming Traffic Circle

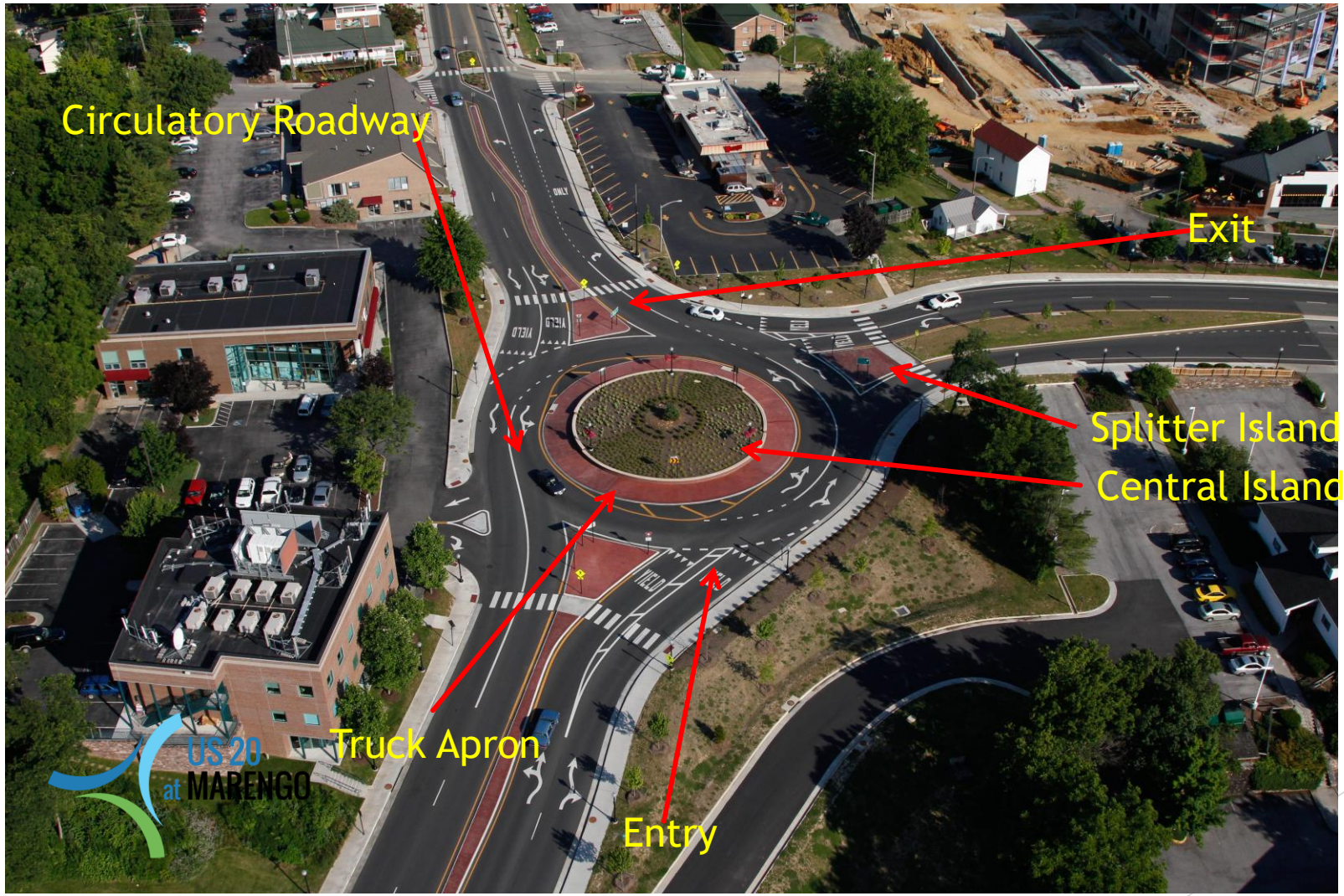
What is a modern roundabout?

- A compact circular intersection in which traffic flows counter-clockwise around a center island
- Entering traffic yields
- Approaches are channelized to deflect traffic into a proper entry path
- Designed to slow the speed of vehicles



Traffic Flow (comparable to Mallory/Liberty Pike)

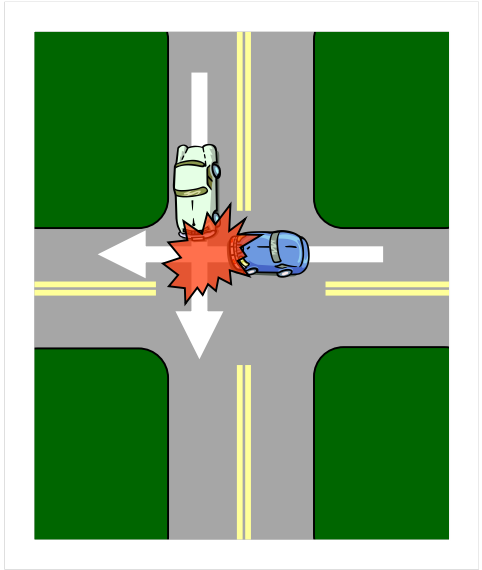
Physical Features



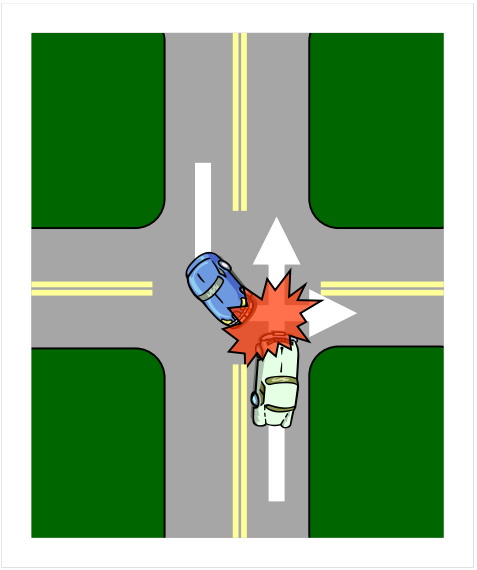
Type of Crashes

Typical 4-leg intersection

Angle

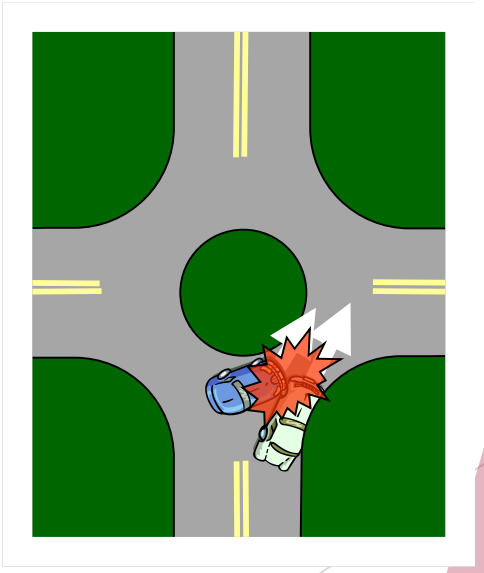


Left turn



Roundabout

Sideswipe



Avoidable Collisions

- Severe Angle and turning movement collisions are avoidable

At a Traffic Signal…	At a Roundabout…
High speeds	Low speeds
Short response time	Situation changes slowly/More Perception Reaction Time
High energy crashes	Low energy crashes
Unforgiving environment	Forgiving environment
High severity crashes	Low severity crashes
Complexity	Gap-seeking can be complex
Wide visual scans required	Narrow visual scans required
Traffic from multiple directions	Traffic from one direction

Uncontested Safety History with injury reduction stats.

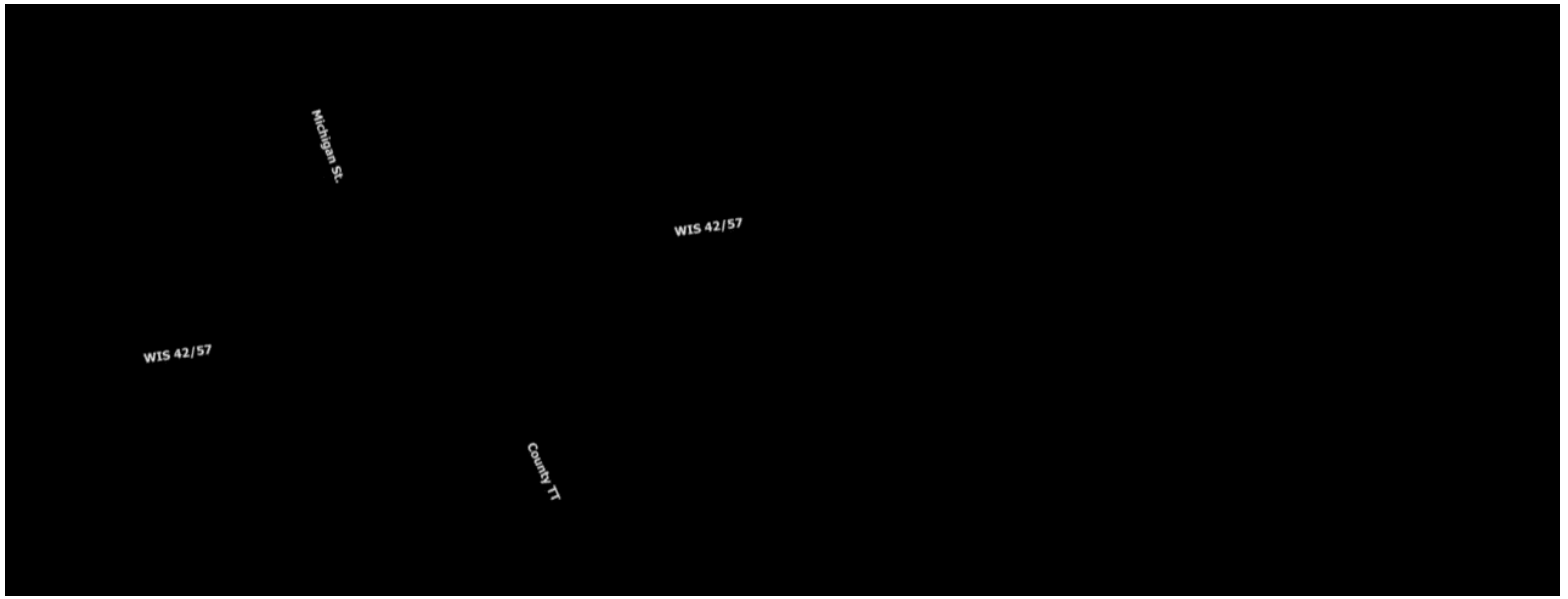
(FHWA/NCHRP Report 888)

Table 2-6. CMFs for conversion of stop-control and signalized intersections to a roundabout.

Treatment	Setting	Crash Type		Source
		All	Injury	
TWSC to single-lane roundabout	Rural	0.29	0.13	HSM 2010
	Suburban	0.22	0.22	HSM 2010
	Urban	0.61	0.22	HSM 2010
TWSC to two-lane roundabout	Suburban	0.81	0.32	HSM 2010
	Urban	0.88	–	HSM 2010
TWSC to single-lane or two-lane roundabout	Suburban	0.68	0.29	HSM 2010
	Urban	0.71	0.19	HSM 2010
	All	0.56	0.18	HSM 2010
AWSC to single-lane or two-lane roundabout	All	1.03	–	HSM 2010
Signal to single-lane roundabout	All	0.74	0.45	Gross et al. 2010
Signal to two-lane roundabout	Suburban	0.33	–	HSM 2010
	All	0.81	0.29	Gross et al. 2010
Signal to single-lane or two-lane roundabout	Suburban	0.58	0.26	Gross et al. 2010
	Urban	0.99	0.40	HSM 2010
	Urban	1.15	0.45	Gross et al. 2010
	3-approach	1.07	0.37	Gross et al. 2010
	4-approach	0.76	0.34	Gross et al. 2010
	All	0.52	0.22	HSM 2010
	All	0.79	0.34	Gross et al. 2010

NOTES: TWSC = two-way stop-controlled; AWSC = all-way stop-controlled.

Compare Traffic Operations

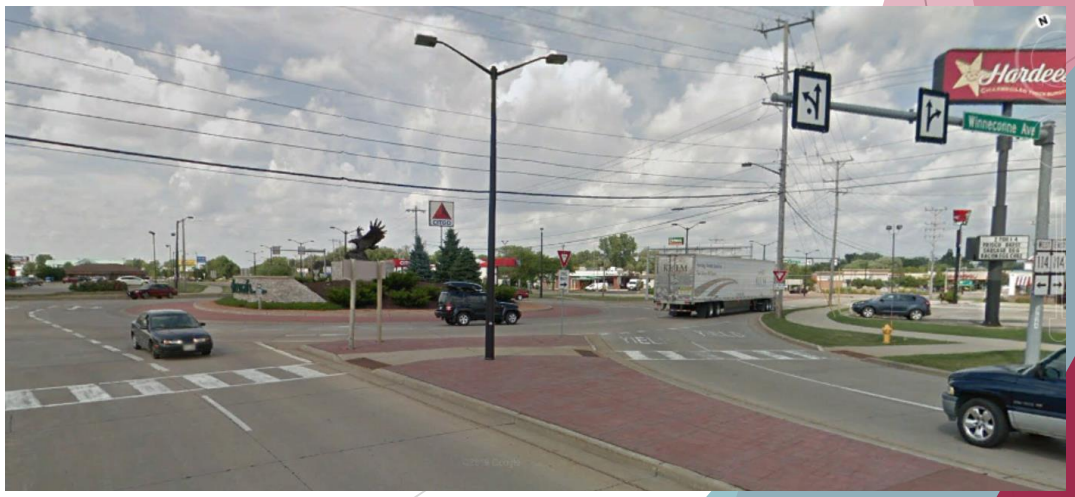


Roundabouts and Driveway Access

Place-making using roundabouts…

Before

After



Trucks in Roundabouts

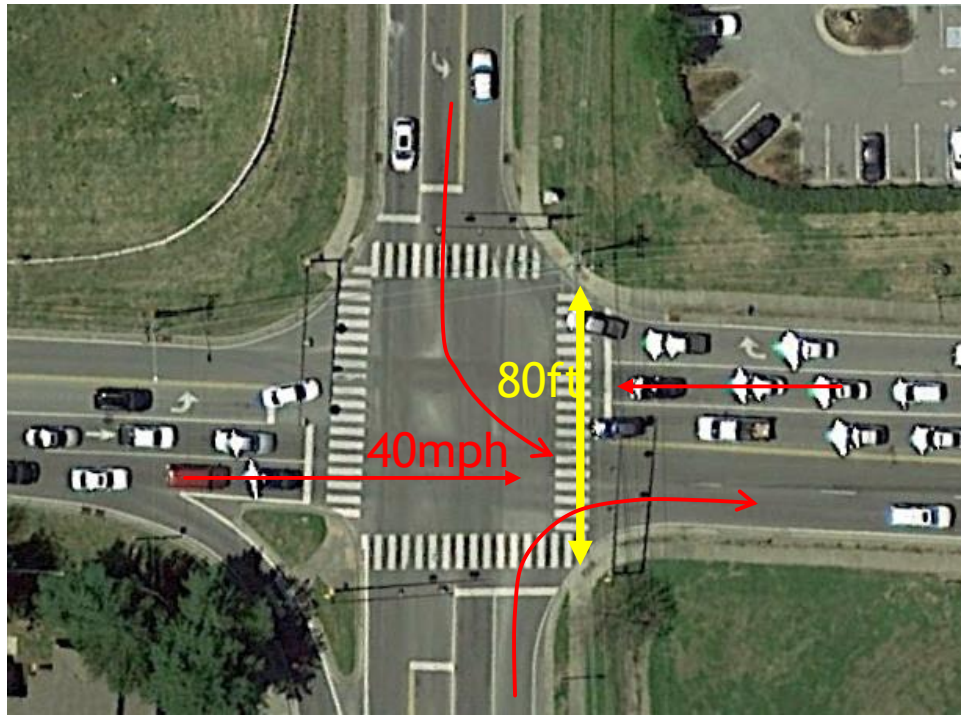
Roundabouts next to schools

Work with young drivers

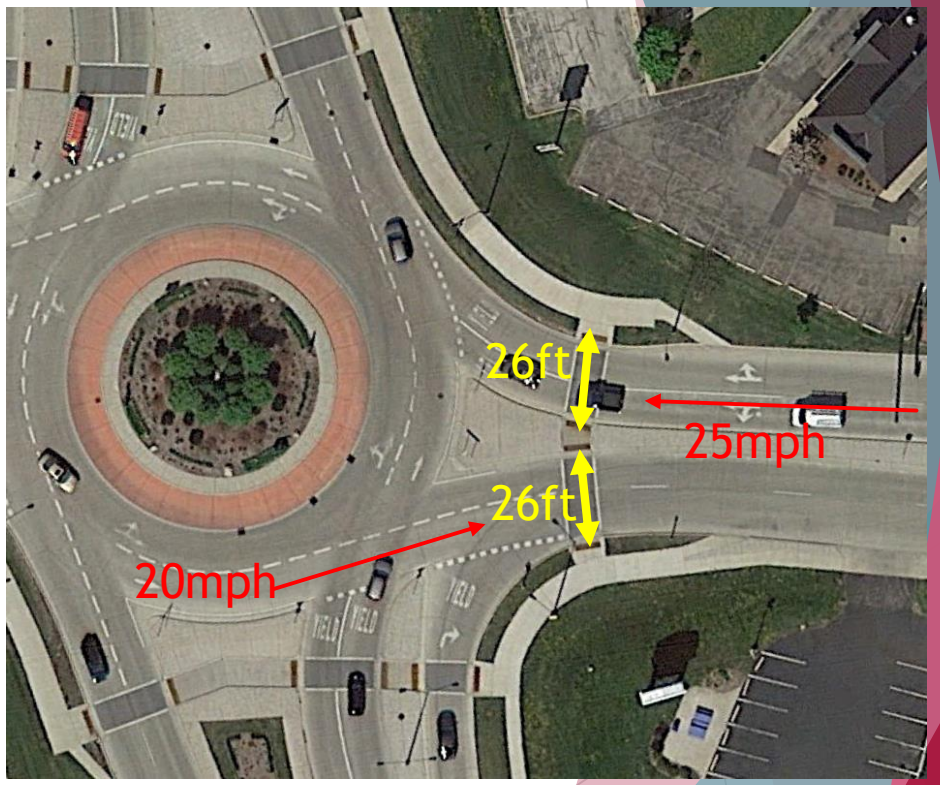
Roundabouts and Pedestrian Safety

- Roundabouts that replace stop signs and traffic signals have reduced the number of and severity of pedestrian crashes throughout the world.
- Pedestrian injuries have been reduced by as much as 89 percent.
- Roundabouts are safer for pedestrians than other intersection control types because:
  - They minimize vehicle speeds
  - There are fewer opportunities for crashes to occur
  - They maximize drive and pedestrian awareness
  - They minimize pedestrian exposure to traffic

Compare Crossing Risks



- Longer crossing
- Traffic from 3 directions
- High speed crossing



- Short crossing
- Traffic from 1 direction
- Low speed crossing

Crossing a Roundabout

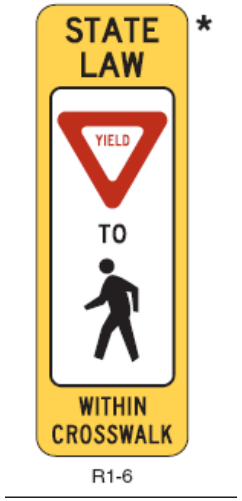
School Crossings

Roundabouts Maximize Driver and Pedestrian Awareness

- Pedestrian crashes that happen when motorists run red signals, miss stop signs, and make right-turn-on-red movements do not happen at roundabouts
- The yield rule also encourages pedestrians to make sure motorists see them before crossing, eliminating the sense of security present at stop signs and signals
- There is no guaranteed stop condition at any intersection, so pedestrians and motorists need to pay attention to each other

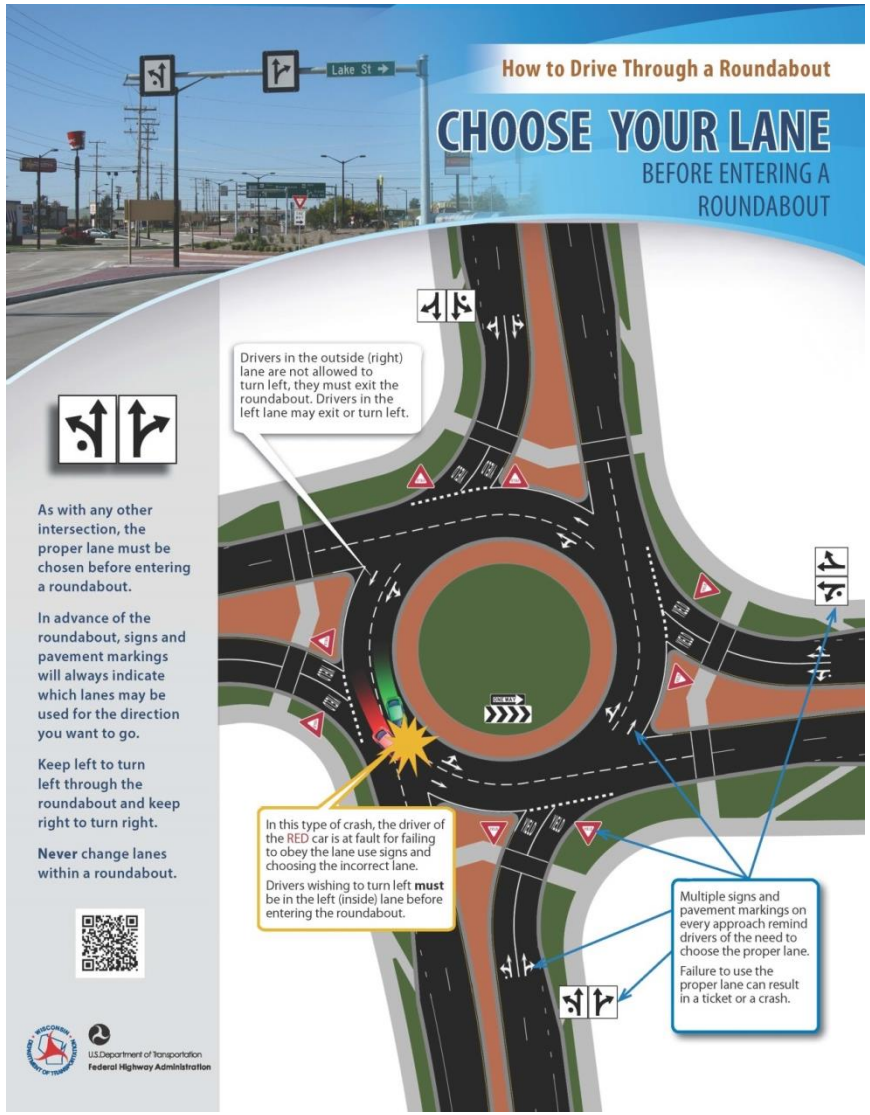
Alternative Crosswalk Traffic Control

- Rectangular Rapid Flashing Beacon (RRFB)

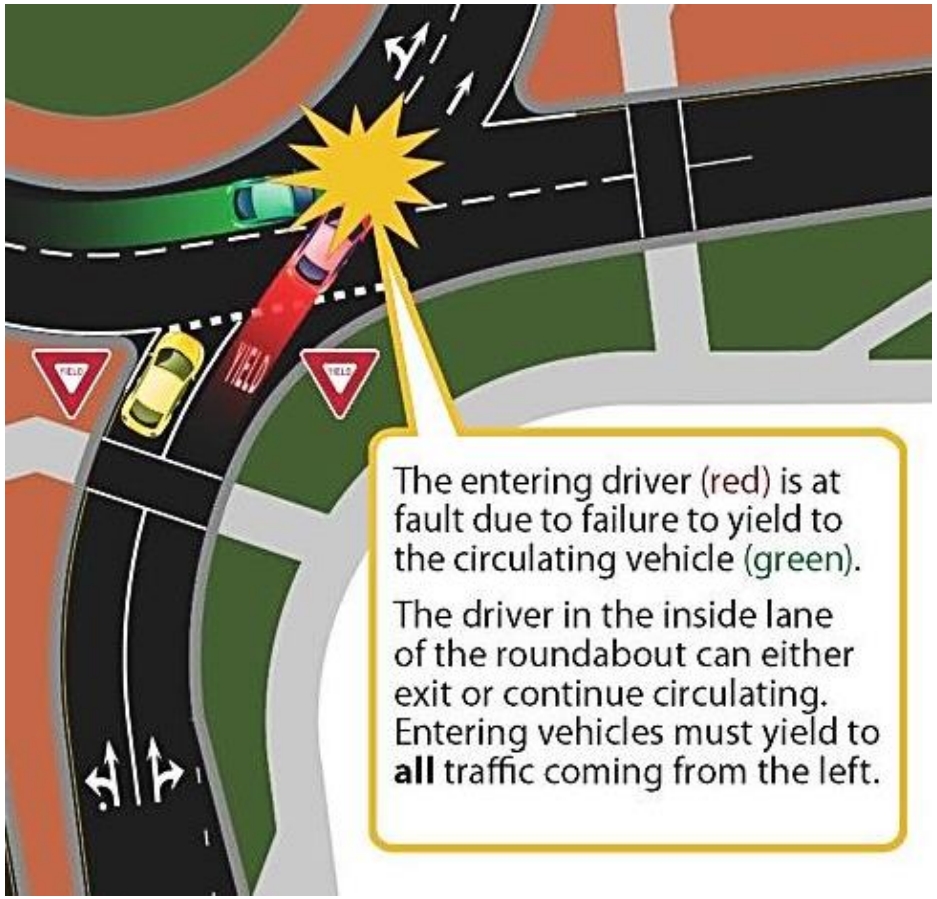


Ground-mounted regulatory signs – on the medians

Local Education is Needed



The 3-E's of Traffic Management:
Engineering
Education
Enforcement



Questions?