

Circular Logic: Roundabouts vs. Traffic Signals

First Questions: What problem are you trying to solve?

What data do you have?

- Traffic volumes by time of day / day of week
- Crash records – location, type and conditions
- Design Criteria
- Comprehensive Plan
- Funding resources

Then, answer:

- What are your stakeholder needs?
- What are the functional requirements
- What are the design elements
- What are the life cycle costs of operations, maintenance and renewal.

Why use a roundabout (or mini-roundabout)?

- **Safety** — Roundabouts have been shown to reduce fatal and injury crashes as much as 75 percent. The reduction in crashes is attributed to slower speeds and reduced number of conflict points.
- **Low maintenance** — Eliminates maintenance and electricity costs associated with traffic signals, which could possibly be as much as \$5,000 per year per intersection.
- **Reduced delay** — By yielding at the entry rather than stopping and waiting for a green light, delay is significantly reduced.
- **Capacity** — Intersections with high volumes of left turns are often better handled by a roundabout than a multiphased traffic signal.
- **Environmental** — A reduction in delay corresponds to a decrease in fuel consumption and air pollution.
- **Aesthetics** — The central island provides an opportunity to beautify the intersection with landscaping.

Drawbacks?

- High volume directional arterial roads
- Multi-lane approaches trigger Public Rights of Way Access Guidelines (PROWAG)
- Stormwater design implications
- Traffic signal operations for volume/movements (w/ performance measures) more effective.
- Longer pedestrian path and different use of right-of-way.


Resources:

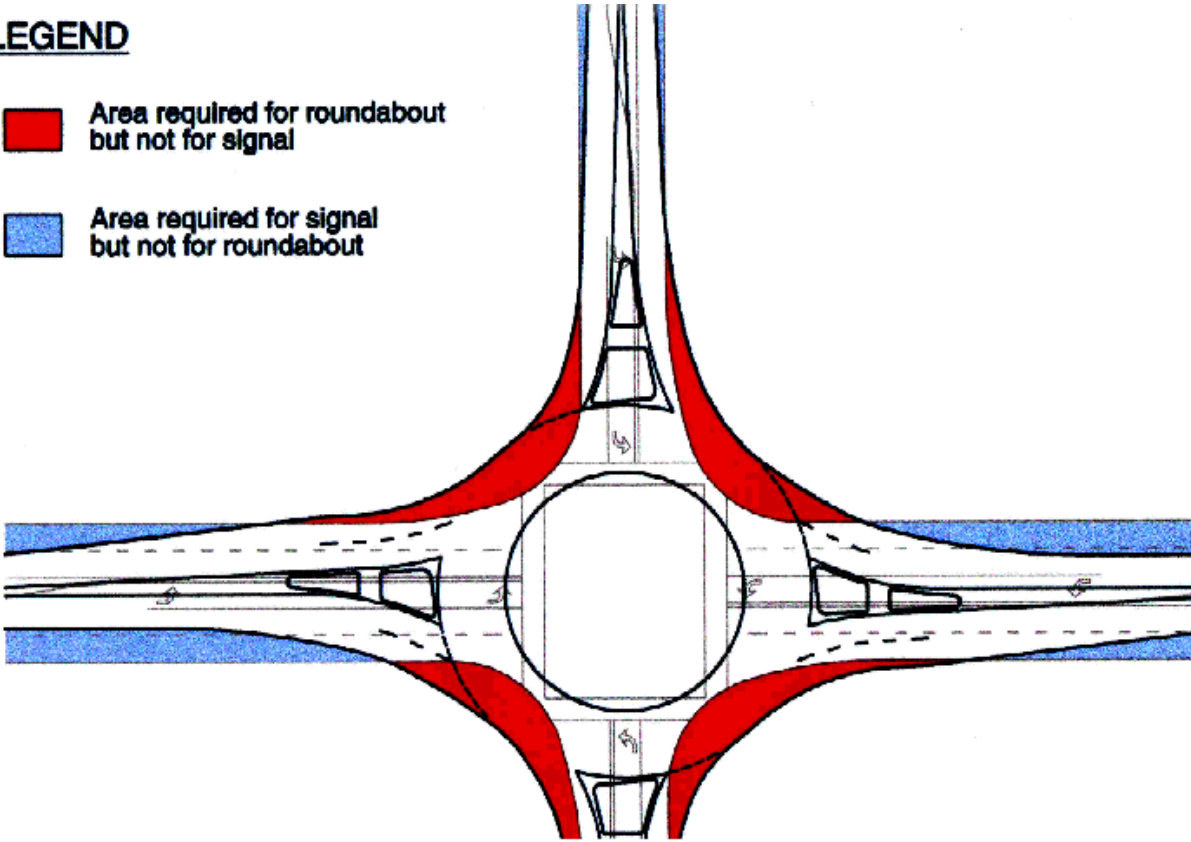
- VDOT: <http://www.virginiadot.org/info/faq-roundabouts.asp> (in 2016, 179 operational and 90 planned)
- FHWA: <https://safety.fhwa.dot.gov/intersection/innovative/roundabouts/>
- Carmel, IN: <http://www.carmel.in.gov/departments-services/engineering/roundabouts>

Example Right of Way Requirements

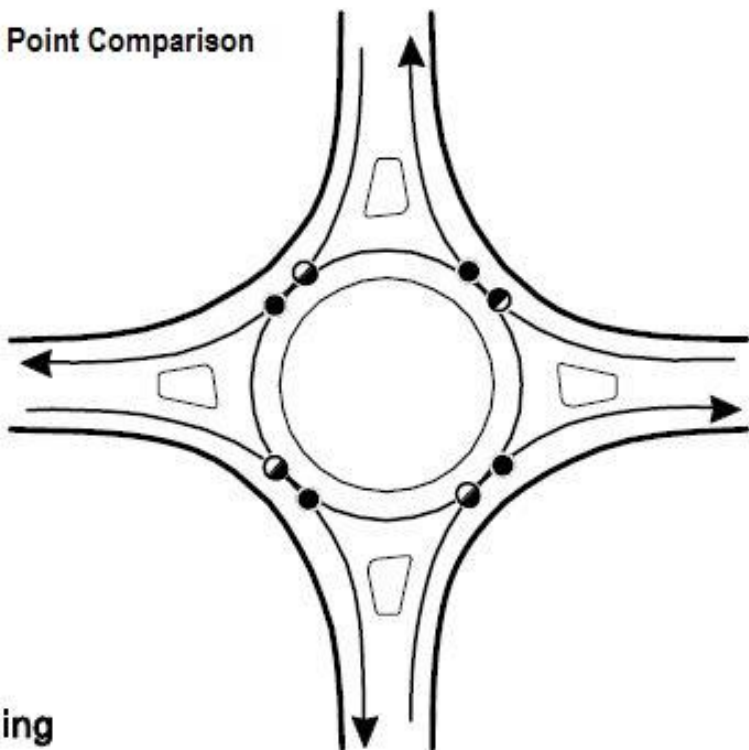
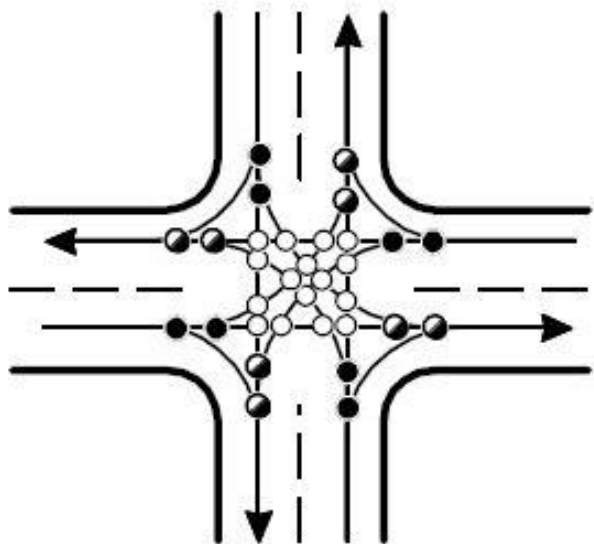
LEGEND

 Area required for roundabout but not for signal

 Area required for signal but not for roundabout



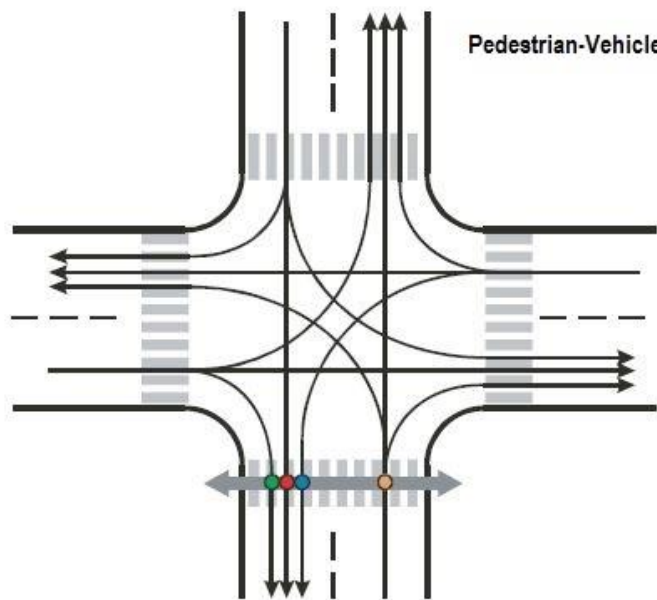
Vehicle Conflict Point Comparison



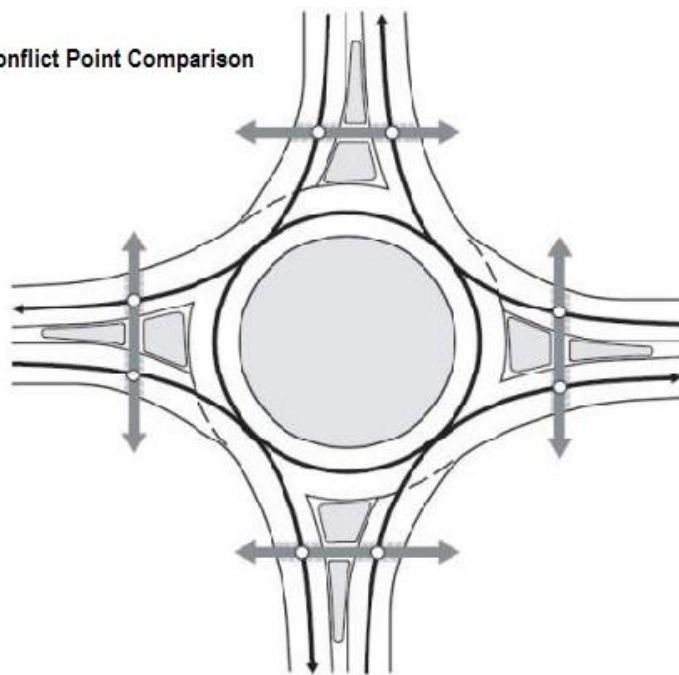
- Diverging
- ◐ Merging
- Crossing

Source: NCHRP Report 672 Exhibit 5-2

Pedestrian-Vehicle Conflict Point Comparison



- Right turn on green conflict
- Red light running conflict
- Left turn on green conflict
- Red light running or right turn on red conflict



○ Vehicle/Pedestrian Conflicts

Source: NCHRP Report 672 Exhibits 5-7 and 5-8