Restricted Crossing U-Turn Intersections

Restricted Crossing U-Turn (RCUT) intersections replace direct through and left-turn movements from the minor approaches with an indirect movement of a right-turn/U-turn combination.

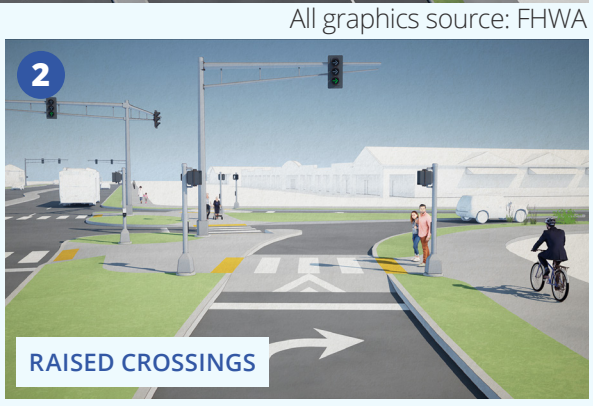
All graphics source: FHWA

Design Features

- An RCUT may be signalized or unsignalized.
- Direct left-turn and through movements are prohibited from the minor road approaches.
- The main intersection requires fewer traffic signal phases than a conventional intersection through the elimination of minor road through and left-turn movements.
- Install overhead lighting to illuminate bikeway and pathway networks and in advance of all intersection crossings.

Benefits

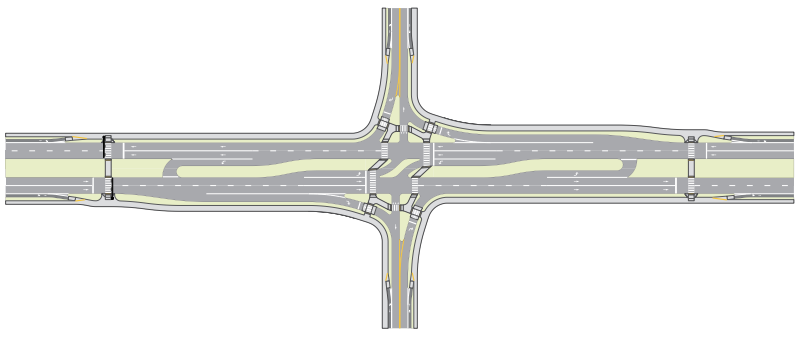
- RCUTs reduce the overall number of vehicular conflict points and present all users with fewer conflicting movements to cross at a time.
- When signalized, fewer phases are needed as compared to a traditional signalized intersection, resulting in shorter overall traffic signal cycle lengths and decreased delay.
- Specifically, the reduced number of conflict points and fewer number of conflicting movements crossed at a time can reduce risk while crossing.
- At signalized RCUT locations, shorter signal cycle lengths can result in less control delay, and signalized U-turns offer the opportunity for controlled midblock crossings, providing additional connectivity.



Intersection Types

SIDEPATH

This design features sidepaths through the intersection, as well as crosswalk positioning that more closely resembles a traditional intersection.



CONSIDERATIONS

- The position of the channelizing islands facilitates staggered crosswalks, which can improve safety but may also make maneuvering more challenging for cyclists and pedestrians using mobility assistance devices or with vision disabilities.
- Shared facilities may be appropriate even where only low volumes of bicyclists and pedestrians are expected to use the intersection.
- Bulb-outs, or "loons," can be implemented at the U-turn intersections to facilitate U-turns while decreasing the median width.

SIDEPATH Z-CROSSING

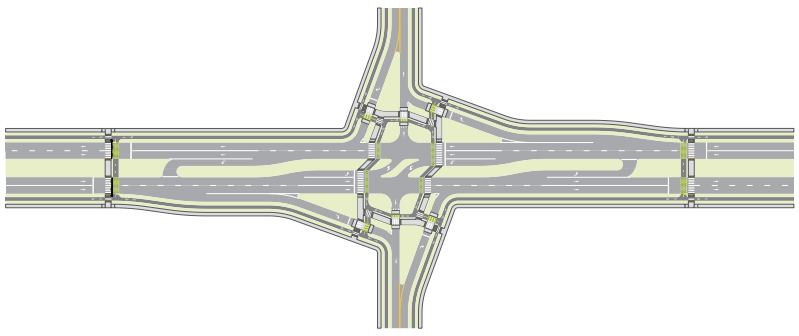
The RCUT layout optimized for motor vehicles calls for a "Z-pattern" pedestrian crossing at the main intersection. This reduces conflict points between motorists, bicyclists, and pedestrians, but causes crossing pedestrians and bicyclists to travel out of their direct, intended path.

CONSIDERATIONS

- Wayfinding signage and markings, APS, and carefully placed push buttons on corners and refuge islands are strongly encouraged to mitigate the complex routes for pedestrians with disabilities.
- Using high-angle channelized right turns provides refuge islands for pedestrians and bicyclists and encourages lower motor vehicle turning speeds, increased visibility, and driver yielding behavior.

SEPARATED BIKE LANE

This RCUT design features separated bike lanes and a more direct and intuitive pedestrian and bicyclist crossing configuration at the intersection.



CONSIDERATIONS

- In order to provide the needed traffic signal phases for pedestrians and bicyclists to cross, the left turns cannot operate simultaneously with the bicyclist and pedestrian movements crossing the major road unless multi-stage crossings are used.
- Using high-angle channelized right turns provides refuge islands for pedestrians and bicyclists and encourages lower motor vehicle turning speeds, increased visibility, and driver yielding behavior.r.

References

Hummer, J., Ray, B., Daleiden, A., Jenior, P., & Knudsen, J. (2014). Restricted Crossing U-Turn Informational Guide [FHWA-SA-14-070]. Federal Highway Administration, Washington, DC. Retrieved from https://safety.fhwa.dot.gov/intersection/rltci/fhwasa14070.pdf.

FHWA (2020). Proven Safety Countermeasure: Reduced Left-Turn Conflict Intersections [FHWA-SA-18-048]. Federal Highway Administration, Washington, DC. Retrieved from https://safety.fhwa.dot.gov/intersection/rltci/fhwasa18048.pdf.

U.S. Department of Transportation
Federal Highway Administration

ZERO IS OUR GOAL
A SAFE SYSTEM IS HOW WE GET THERE

For more information refer to *Improving Intersections for Pedestrians and Bicyclists Informational Guide* [FHWA-SA-22-017].