

## A TIMELY, COST-EFFECTIVE SOLUTION

Whether signalized or unsignalized, the cost of an RCUT often is comparable to an equivalent conventional design. However, compared to a full, grade-separated interchange, RCUTs are much less costly, have fewer impacts, and can be constructed in a fraction of the time.<sup>3</sup> This makes an RCUT an attractive option as an interim design where an interchange may not be needed for many years.

## MEETING THE NEEDS OF THE COMMUNITY

The RCUT is an effective way for an agency to balance providing local access to the major highway with the need to deliver safer, more efficient projects. Access to local businesses and commercial areas can be maintained because the U-turns accommodate all movements. When signalized, the RCUT provides great flexibility in traffic signal timing to accommodate unbalanced traffic flow that may result from commuter patterns or retail developments.

An RCUT also can support community goals for pedestrians and bicycles. Provisions for walking and biking must be considered throughout the project development process, with the needs of pedestrians and bicycles shaping the overall design of the RCUT accordingly. This includes pedestrian crossings that are accessible to all users, and when signalized, phases that accommodate both pedestrians and bicycles. The channelization used in the RCUT design can serve as effective refuge islands for pedestrian crossings and/or as bicycle queuing areas.



Boone County, MO RCUT Intersection  
Source: RCUT Video FHWA-SA-14-020

## SOURCES

<sup>1</sup> FHWA, *Field Evaluation of a Restricted Crossing U-Turn Intersection*, FHWA-HRT-11-067 (Washington, DC: June 2012). Available at: <http://www.fhwa.dot.gov/publications/research/safety/hsis/11067/11067.pdf>

<sup>2</sup> Ibid.

<sup>3</sup> Minnesota DOT web page, "Reduced Conflict Intersection." Available at: <http://www.dot.state.mn.us/roadwork/rci.html>

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# RESTRICTED CROSSING U-TURN INTERSECTION



Frederick County, MD RCUT Intersection  
Source: RCUT Video FHWA-SA-14-020

AN INNOVATIVE, PROVEN  
SOLUTION FOR IMPROVING  
SAFETY AND MOBILITY AT  
SIGNALIZED AND UNSIGNALIZED  
INTERSECTIONS



U.S. Department of Transportation  
Federal Highway Administration

Safe Roads for a Safer Future  
Investment in roadway safety saves lives  
<http://safety.fhwa.dot.gov>

Motorists, pedestrians, and bicyclists face greater mobility challenges and safety risks at intersections as traffic volumes grow and congestion worsens. Agencies need safer, more balanced designs that keep people moving. Innovative intersection designs represent a solution, and are being built more often because they can deliver more for less.

## WHAT IS A RESTRICTED CROSSING U-TURN?

An RCUT is sometimes referred to as a **J-Turn** or a **Superstreet**

The Restricted Crossing U-Turn (RCUT) is an innovative intersection design that improves safety and operations by changing how minor road traffic crosses or turns left at a major road. The RCUT does not change any of the movements that are possible from the major road.

At an RCUT, drivers stopped at the minor road waiting to cross or turn left no longer must navigate a complex intersection of two directions of traffic often traveling at high speed.

Instead, all minor road traffic makes a right turn followed by a U-turn at a designated location—either signalized or unsignalized—to continue in the desired direction, as shown in Figure 1.

The RCUT is suitable for a wide variety of locations and circumstances, including, but not limited to:

- As a safer form of stop- or yield-control at minor road intersections along rural, high-speed, four-lane divided highways.
- As an alternative to signalization at select intersections to maintain the integrity of the major highway as a through route.
- As a corridor treatment along signalized routes to minimize travel times, while maximizing capacity and managing traffic speed.
- As an interim alternative to constructing a full, grade-separated interchange.

RCUTs work well when consistently used at intersections along a corridor, but they also can be used effectively at individual intersections.

## IMPROVING SAFETY AND OPERATIONS

The Restricted Crossing U-Turn design reduces the total number and overall severity of vehicle-to-vehicle conflict points. Comparing a conventional four-leg intersection to an equivalent RCUT design, and accounting for the U-turn locations on both sides of the main intersection, the total number of conflict points is reduced from 32 to 18— a nearly 50 percent reduction.

Furthermore, in an FHWA study of nine Maryland intersections with unsignalized RCUT treatments:

- A simple before and after analysis found intersection crashes were reduced by 49 percent.
- A control group crash rate comparison revealed a 28 percent reduction in crashes.
- Most notably, fatal crashes decreased by 70 percent and injury crashes declined by 42 percent over the 3-year post-installation period.<sup>1</sup>

The RCUT design also improves overall roadway operations, even when considering the additional distance traffic entering from the minor road must travel. While RCUTs can cause a slight increase in travel time during periods of low traffic volumes, they have been shown to decrease delay during periods of higher volumes, reducing the time it takes to clear an intersection and resume normal travel speeds.<sup>2</sup>



Figure 1: Frederick County, MD RCUT Intersection  
Source: Google Earth