

# Low-Cost Improvements Increase Yielding at Crosswalks in Michigan

Michigan Department of Transportation

## KEY ELEMENTS:



Quick implementation



Speed reduction

As part of its ongoing Toward Zero Deaths statewide safety campaign, the State of Michigan is focusing on reducing the number of pedestrian crashes and enhancing pedestrian safety. The Michigan Department of Transportation (MDOT) sought a low-cost, effective option for improving crossings for pedestrians and increasing driver yielding. MDOT installed the gateway treatment and engaged Western Michigan University (WMU) in a multi-year study of the new treatment's impact.

## IMPLEMENTATION

The gateway treatment consists of multiple R1-6 signs installed at roadway edges and between travel lanes. R1-6 signs have yellow-green reflective material and read "Yield To (or Stop For) Pedestrians Within Crosswalk." Signs can be installed either on the curb, refuge island, or gutter pan, and on the roadway center line or lane markings (see Figure 1 for one possible configuration involving two same-direction motor vehicle lanes). On multilane roads, flexible delineators with reflective markings may be installed on the lane markings. The effect is to make R1-6 yield signs more

visible to motorists and to visually narrow the lane with the signage.

MDOT installed the gateway treatment at fifteen sites in south Michigan in 2013, including midblock crosswalks, trail crossings, unsignalized intersections, traffic circles, and ramp entrances. All of the sites had speed limits at or below 35 mph. Researchers studied multiple configurations of the gateway treatment on roads that varied by the number of lanes, lane width, presence of a median island, road speed, and location at midblock or intersection.

WMU has performed multiple studies to evaluate the treatment's overall effectiveness, including effectiveness of specific configurations and locations, long-term effects of the treatment, and the durability of the signs.



Figure 1. Gateway configuration of the R1-6 In-Street Pedestrian Crossing sign with two lanes in the same direction.<sup>1</sup>

### RESULTS

The gateway treatment proved to be extremely effective at increasing yielding at multilane uncontrolled crosswalks—comparable to the effect of a Rectangular Rapid Flashing Beacon (RRFB) or a Pedestrian Hybrid Beacon (PHB). Motorist yielding rates increased from the pre-treatment average of 15 percent to an average of 75 percent, and the yielding effect persisted as temporary sites were made permanent. Other benefits included speed reduction. Vehicle speeds dropped between 4 and 10 mph, even without pedestrians present, and drivers made fewer sudden stops. The gateway treatment was found to be effective at intersections and midblock crossings for roadways with speeds of 30 mph or less and 35 mph roadways with Annual Average Daily Traffic below 12,000.

The gateway study also found that the treatment's benefits came from the combination of the "Yield to Pedestrians" message, perceived narrowing of the roadways and lanes, and improved visibility of the pedestrian crossing. Lower vehicle speeds had the effect of traffic calming and would likely reduce crash numbers and severity. Future research on the gateway treatment may focus on its crash reduction effectiveness. The gateway treatment costs an estimated \$900 to \$1,800 per site and takes between 15 and 40 minutes to install. This treatment may take more or less time to install, depending on availability of a refuge island, whether the R1-6 signs will be mounted with a curb base, and if delineators will be used. The treatment can be easily removed in winter to allow for plowing and re-installed in spring.



"The Gateway treatments have proven to be an inexpensive and effective tool to increase safety for pedestrians. They have slowed drivers at crosswalks, enabling them to be more aware of pedestrians and made it easier to stop allowing pedestrians safe passage."

—Eli Cooper, Transportation Program Manager,  
City of Ann Arbor, MI

Figure 2. Gateway configuration of the R1-6 in-street sign with a reflective delineator on the lane markings. Location: Nixon Road at Bluett Road, Ann Arbor, MI.<sup>1</sup>

### References

1. Van Houten, R., Hochmuth, J., Dixon, D., McQuiston, C. "An Examination of the Effects of the Gateway R1-6 Treatment Effects on: Driver's Yielding Right-of-Way to Pedestrians, Speed at Crosswalk, and Sign Durability Over Time." Submitted for Publication in the ITE Journal June 19, 2017; Revised January 31, 2018.
2. CTC & Associates LLC, "Research Spotlight: Gateway treatment makes crosswalks safer for pedestrians." May-2017. [http://www.michigan.gov/documents/mdot/Spotlight\\_SPR\\_1638\\_1643\\_560921\\_7.pdf](http://www.michigan.gov/documents/mdot/Spotlight_SPR_1638_1643_560921_7.pdf)
3. Western Michigan University and T.Y. Lin International, "User Guide for R1-6 Gateway Treatment for Pedestrian Crossings." Michigan Department of Transportation, Dec. 2016. [http://www.michigan.gov/documents/mdot/SPR-1638\\_552736\\_7.pdf](http://www.michigan.gov/documents/mdot/SPR-1638_552736_7.pdf)