

AASHTO

INNOVATION INITIATIVE

Gateway Treatment for Pedestrian Crossings



Carissa McQuiston, P
Non-Motorized Safety Engineering Special

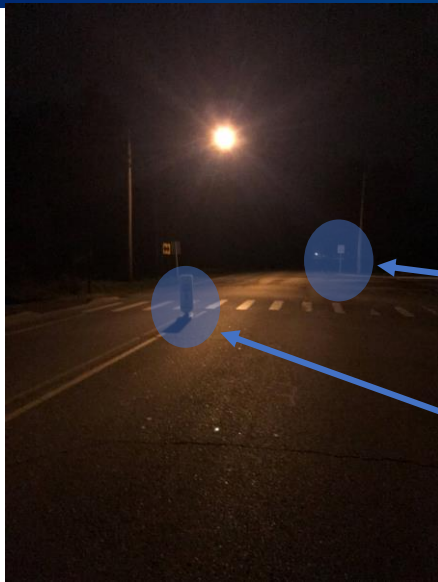
October 2019



Western Michigan
University



Gateway Treatment





Gateway Treatment Components



Minnesota



10% - 36%

Jackson Hole

36%

Ft. Lauderdale

Gateway 80% - 89%



Gateway Treatment Components



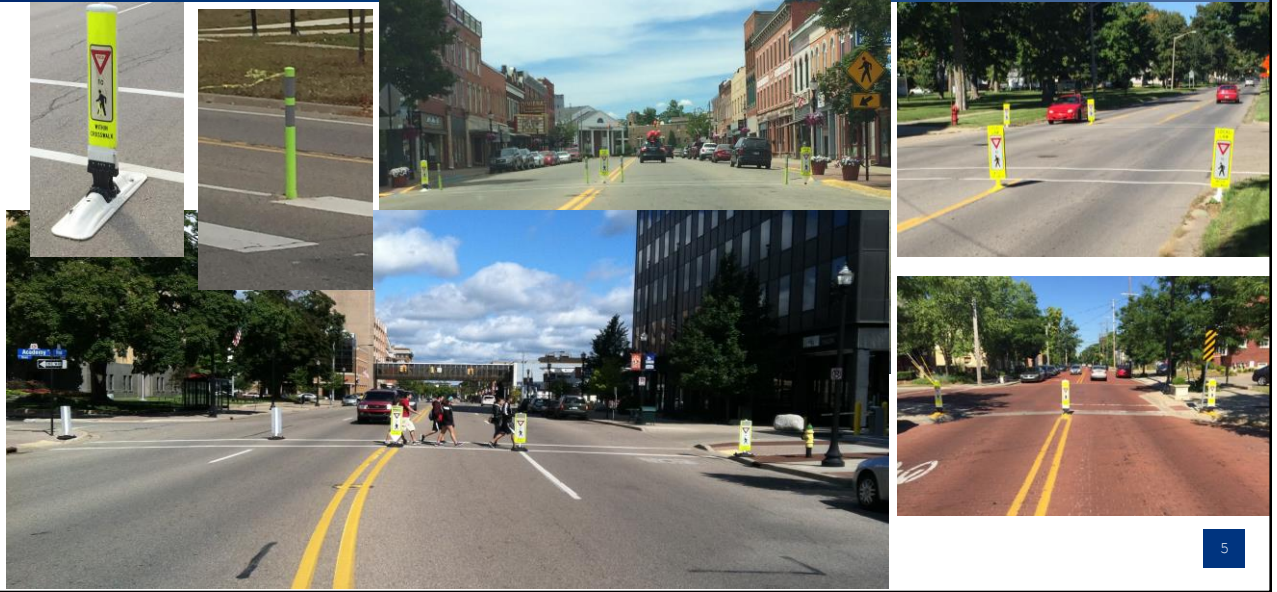
80%



32%



Gateway Treatment



Gateway Treatment Components





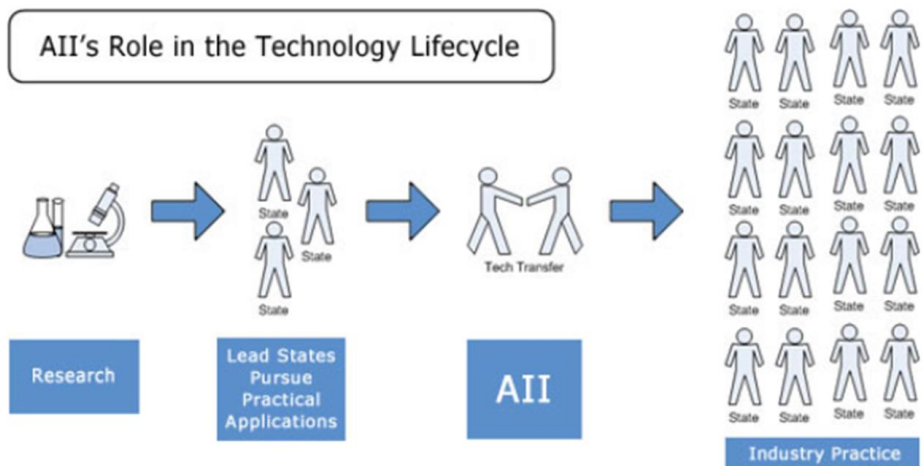
Gateway Treatment Components



7



Gateway Treatment



MDOT Gateway Treatment became a Focus Innovation in October 2017

8



Gateway Treatment



Pedestrian Gateway 3 Simple Signs to Save Lives

How much?

How long?

Why?

Less than \$2000

About 2 hours

Immediate Results
Drivers Yield Intuitively
Works Almost Anywhere



Gateway Treatment

Pali Highway

Stop for pedestrian signs and plastic posts added to site of deadly crash.



State adds 'gateway' crosswalk system to protect pedestrians on Pali Highway

By [Jim Mendoza](#) | October 19, 2018 at 6:11 PM HST - Updated October 20 at 9:29 AM

HONOLULU (HawaiiNewsNow) - On Friday morning, the Hawaii Department of Transportation installed yellow stop-for-pedestrian signs and plastic lane delineators across a crosswalk on Pali Highway.

Highways Division deputy director Ed Sniffen said the "gateway" system should get drivers to closer attention.

"When people see this they know they should be expecting pedestrians to come through the crosswalk," Sniffen said.

The un-signalized crosswalk is adjacent to Wood Street where 83-year-old Raymond Endow was killed in a fatal crash.



DEPARTMENT OF TRANSPORTATION

DAVID Y. IGE
GOVERNOR

JADE T. BUIYAT
DIRECTOR

October 20, 2018

PEDESTRIAN SAFETY TREATMENTS INSTALLED ON PALI HIGHWAY

Gateway in-street signs remind drivers that state law requires vehicles to stop for pedestrians in crosswalks.

The Department of Transportation (HDOT) notifies the public that gateway in-street signs are being installed in both directions on Pali Highway at the Wood Street crosswalk between 9:30 a.m. and 12:30 p.m. on Friday, October 19, 2018. The Pali Highway and Wood Street crosswalk was the location of the fatal collision that claimed the life of a Nuuanu resident on Oct. 10, 2018.

HDOT Deputy Director for Highways said, "The safest transportation systems separate motorists from bicyclists and pedestrians to minimize the potential for human error, which is the most common cause of fatal crashes. We are working towards this end, and it will take time and money."

HDOT is always looking for solutions that can be implemented quickly to bring safety improvements to our roads. The gateway concept is one that the State of Michigan has found to be effective.



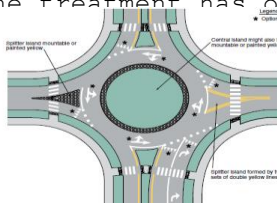
HAWAII NEWS NOW
PALI PEDESTRIAN SAFETY MEASURE
PHOTOJOURNALIST: DARIN AKITA



Gateway Treatment

Project/Research Goals

- Determine driver yielding compliance rates
- Determine how, when and where treatment should be used
- Determine the cost benefits of the treatment compared to other treatments
- Determine the effect the treatment has on speed reductions



Gateway Treatment

Project Specific



Site	OHV/ATV	White	Yellow	Painted Bollards	CH Post
Interstate Interchange Ramp, Uncontrolled					
Interstate Ramp 134 and S. Westledge, North	2	1	1	2	2
Interstate Ramp 134 and S. Westledge, South				2	2
Roundabout					
Roundabout East Main and 5th Street, Benton Harb	2	2		2	
Roundabout East Main and Riverview, Benton Harb	2	2		2	
Marshall Traffic Circle, Marshall, SE by City Hall	1	1		1	6
Marshall Traffic Circle, Marshall, NW	1		1	1	6
Hybrid Beacon/ RFB					
Hybrid Beacon West Huron St. at Chapin St. Ann Ar	2	1	1	1	2
Midblock RFB Monroe St., Allegan	2	1	1	2	2
East Stadium and Ferdon, Ann Arbor	2	1	1	2	2
Midblock Crosswalk					
US 131 N Main St. between (M60-Portage), Three Fin	1	1		2	2
Rosse and KVIC, Kalamazoo (not an MDDT road)					
T Intersection					
S. Westledge and Ranney St. Kalamazoo	1	1		1	1
Rosse St at Academia, Kalamazoo (Not MDDT site)					
Full Intersection					
Monroe St. and N. Walnut, Allegan	2	1	1	2	
W. Michigan and Grand, Marshall	2	1	1	1	2
E. Michigan and Madison, Marshall	2	2		1	2
E. Michigan and Hamilton, Marshall	1	1	1	2	2
MSS at Kalamazoo St., Ctsgeo	1	1		2	2
Trail Crossing					
Celleni Plate Trail, Portage, Not MDDT site					
Oakland Rd Trail Crossing, Not MDDT site					
TOTAL	24	16	8	24	31





Some examples from the study

Following are locations with:

- Initial collected data (compliance rates)
- Study findings on yielding compliance
- Installation guidance from the Final User Guide





Gateway Treatment

Rose Street at KVCC -
#1 - The Initial Uncontrolled



Full Gateway



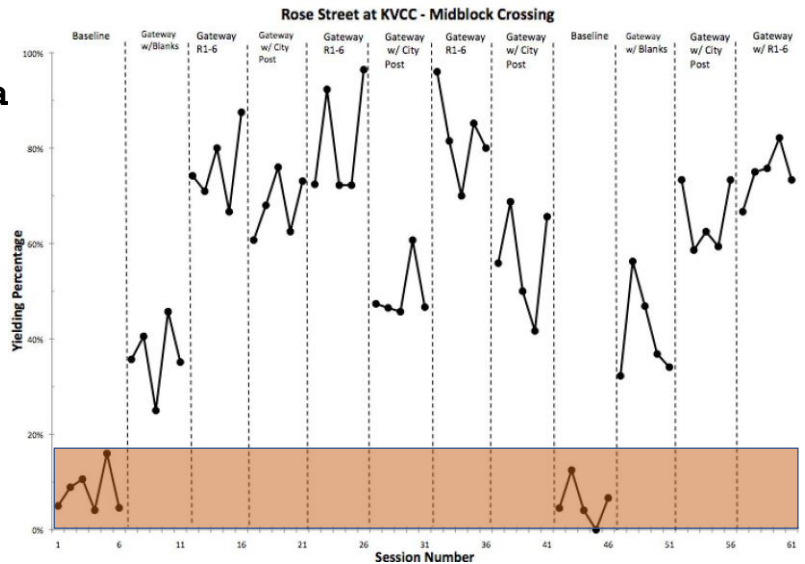
Gateway with City



Gateway Treatment

#1 - The Initial Data

Baseline

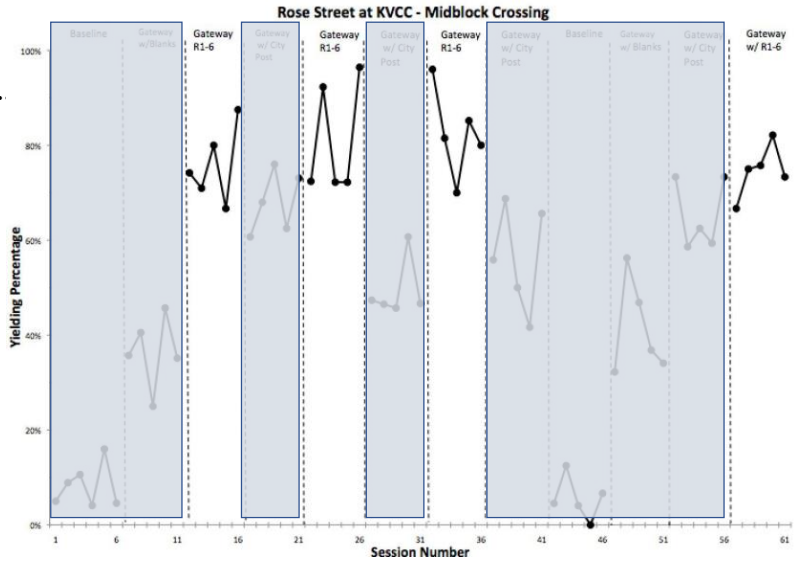




Gateway Treatment

#1 - The Initial Data

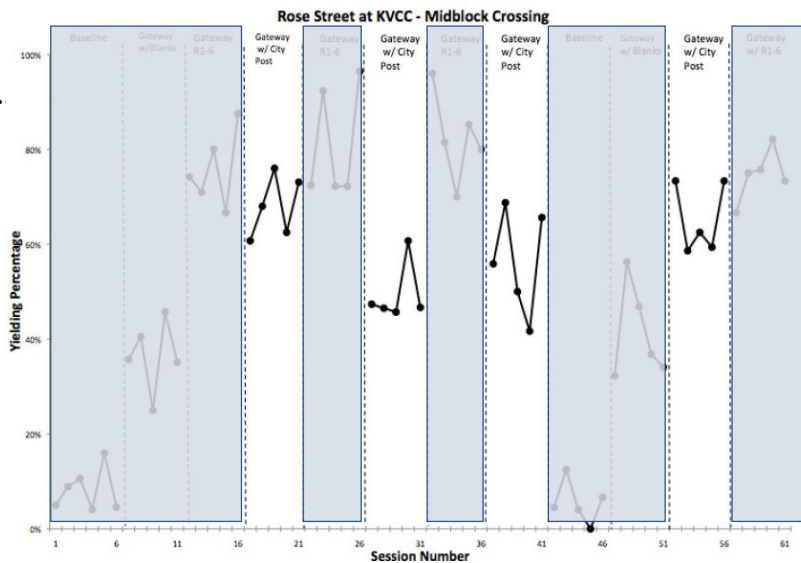
Gateway Treatment



Gateway Treatment

#1 - The Initial Data

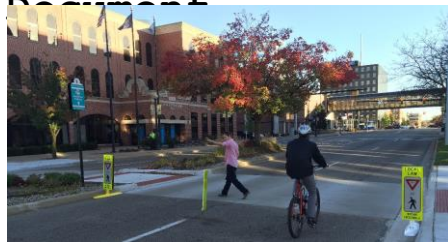
Gateway with City Post



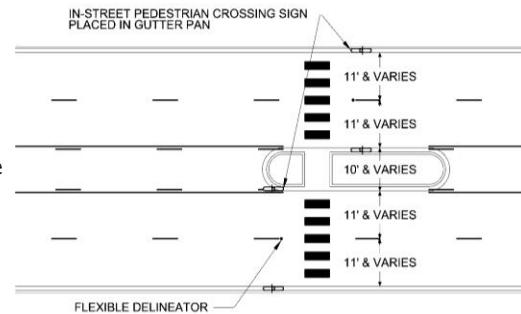


Gateway Treatment

#1 - Final Results - Guidance



Gateway Treatment,
Four-Lane Configuration with
Refuge Island



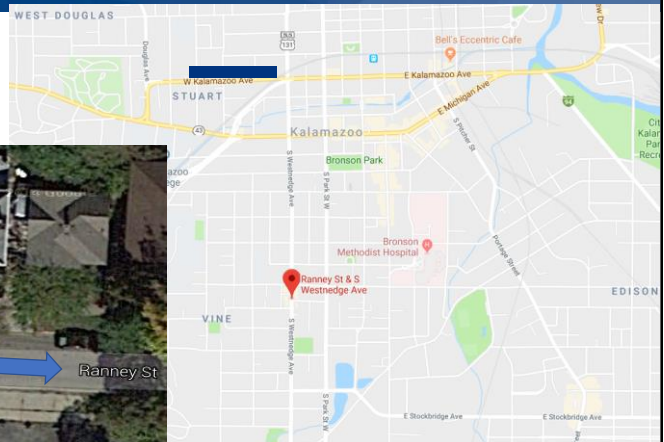
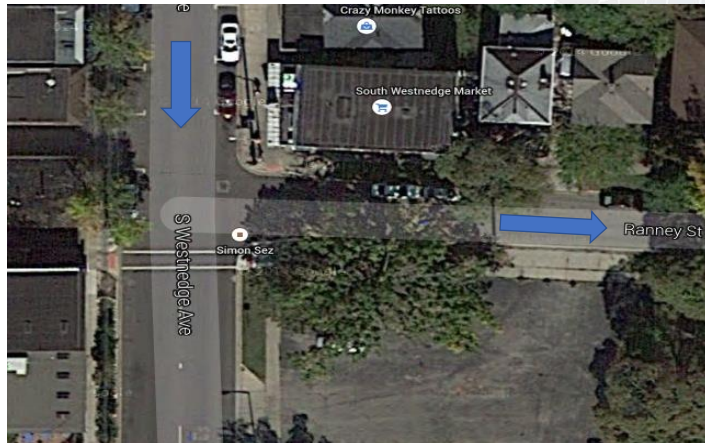
Between 70% and 90% compliance

- Posted speeds of 30 mph or lower
- ADT up to 25,000



Gateway Treatment

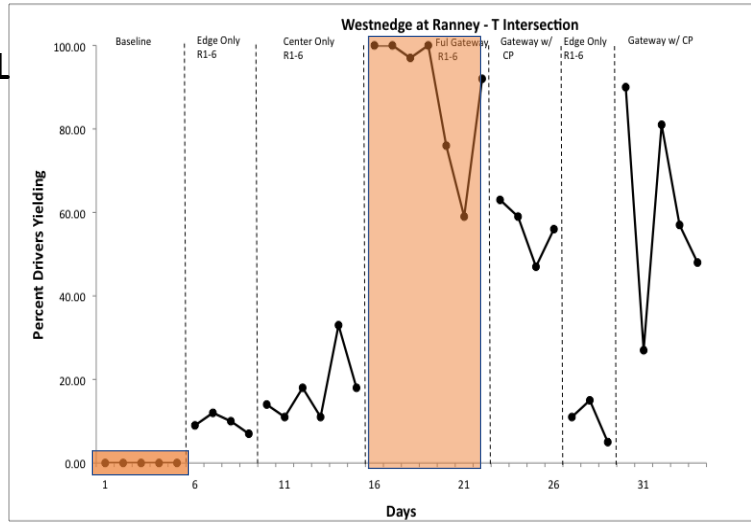
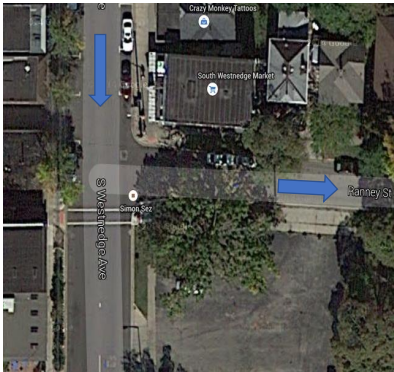
#2 - The Initial Data





Gateway Treatment

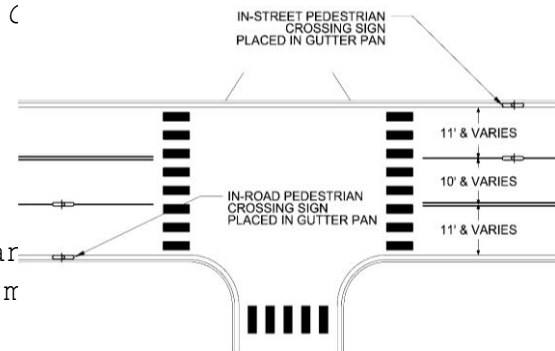
#2- The Initial Data



Gateway Treatment

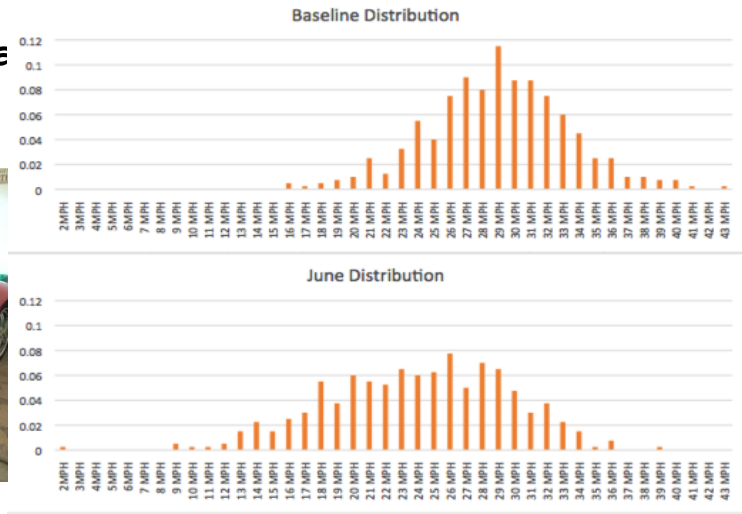
#2 - Final Results - Guidance Document

Gateway Treatment, Three-Lane Configuration, T-Intersection with



Between 70% and 80% compliant
 • Posted speed limit is 30 mph

#2 - Speed Data



#3 - The Initial Data

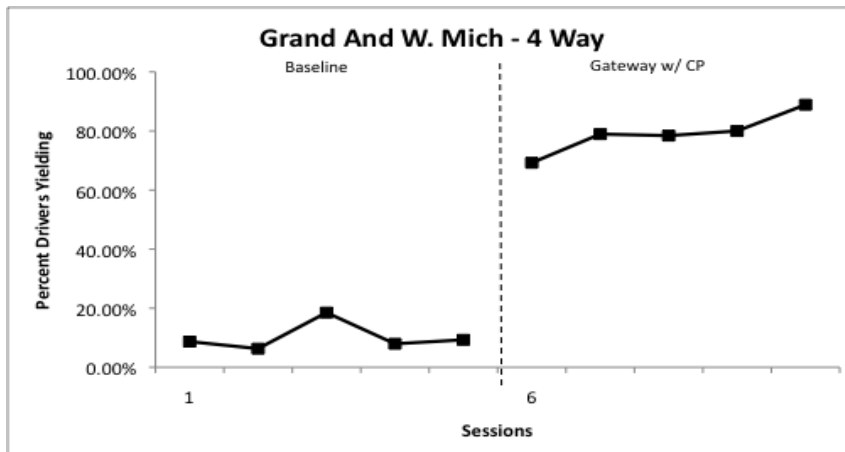


- Four lane undivided
- Parking on both sides
- Two-way STOP controlled

West Michigan Avenue and Grand Street



#3- The Initial Data

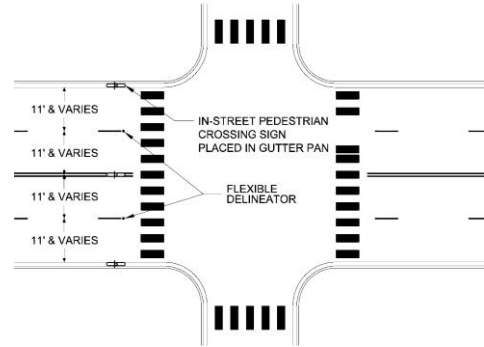




Gateway Treatment

#3 - West Michigan Ave & Grand St. Final Results - Guidance Document

Gateway Treatment,
Four-Lane
Configuration, No
Refuge Island



- Between 55% and 80% compliance
- Posted speeds of 30 mph or lower
 - ADT up to 25,000



Gateway Treatment



Other Geometric Layouts

Speed Data

	Baseline		Jun		Aug		Oct	
	Mean Speed		Mean Speed		Mean Speed		Mean Speed	
SW Michigan	Dilemma Zone	Crosswalk	Dilemma Zone	Crosswalk	Dilemma Zone	Crosswalk	Dilemma Zone	Crosswalk
Westnedge & Ranney	27.6	29	24.3	23.0	NA	NA	NA	NA
Three Rivers N.Main	23.9	22.6	22.8	21.6	21.5	14.0	20.5	19.7
Benton Harbor	29.4	19.2	27.6	18.8	27.4	15.7	27.2	16.4
Allegan	27.2	28.1	25.9	25.4	27.2	27.1	26.9	26.9
Grand Rapids								
Cherry & Hollister	25.6	25.2	22.8	21.9	21.5	20.5	21.5	20.5
Wealthy & Henry	24.8	24.4	24.4	22.0	24.7	23.6	23.0	22.3
Ann Arbor								
7th & Stadium	34.1	30.6	31.6	27.6	32.1	28.9	29.6	28.4
Division & Jefferson	28.1	27.4	25.4	19.1	22.6	19.5	NA	NA
Nixon & Bluett	32.8	32.3	28.5	27.1	31.6	29.3	29.9	28.8
Huron	32.8	32.9	29.4	28.3	24.6	23.5	23.4	22.6

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Speed Data

Location	Speed Redution at Crosswalk			Speed Reduction Dilemma Zone		
	Jun	Aug	Oct	Jun	Aug	Oct
Monroe	2.7	1	1.2	1.3	0	0.3
Stadium	3.2	1.9	2.4	0	0	1
Huron	4.6	9.4	8.3	3.4	8.2	7.4
Westnedge	6.1	NA	NA	3.3	NA	NA
Nixon	3.6	3	3.5	2.4	1.9	3
Division	8.3	7.9	NA	3	5	NA
Cherry	3.3	4.7	3.3	2.8	4.1	3.5
Mean	4.5	4.7	3.7	2.3	3.2	3.0

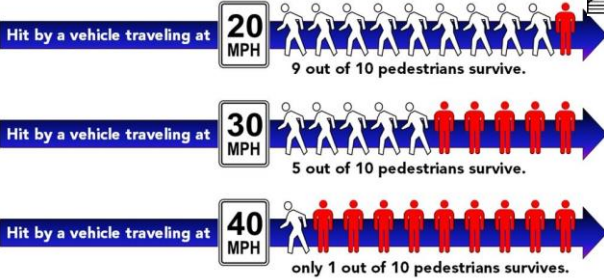
30



Gateway Treatment

As speed increases, driver focuses less on surroundings

Speed Matters



Michigan State University CE 449

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Gateway Treatment




Coldwater, MI

32



MDOT
Michigan Department of Transportation

Pedestrian Safety



720 Toward Zero Deaths
National Strategy on Highway Safety

...can contribute to the vision of 0 deaths on Michigan roadways.

...fatalities and serious injuries have been reported, representing approximately 10% of total fatalities on MI roadways.

...not crossing at an intersection prior to a crash accounting for the fatalities.

...the highest number of pedestrian-related fatalities.

...trucks make up the majority of fatalities in MI.

...21-64 account for the majority of pedestrian fatalities.

720 Toward Zero Deaths
National Strategy on Highway Safety

MICHIGAN STATE POLICE | MICHIGAN DEPARTMENT OF TRANSPORTATION

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Walking and Pedestrian Safety in Michigan

MDOT is working to create better, safer roadways for all users by providing a variety of services and information supporting walking and pedestrian safety, including:

- Training for Engineers and Planners
- Educational Safety Videos and Publications
- Non-Motorized Regional Plans
- Senior Mobility
- Americans with Disabilities Act (ADA) Guidance

This new hiking and bicycling route showcases Michigan's spectacular natural, cultural and historic resources. It builds upon Michigan's extensive trail network, linking many existing trails to provide you with a signature Pure Michigan experience.

Two routes, one for you, one for me.

Quick Links

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Ruth Johnson, Secretary of State
Department of State

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Pedestrian and Bicycle Safety Tips

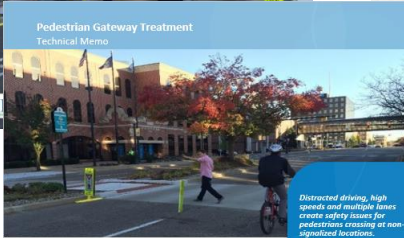
Reminders for Pedestrians
Reminders for Bicyclists
Reminders for Drivers
Key Information
Resources
Laws

Related Content

- Safe Driving Tips for Winter
- Child Restraint ("Booster Seat") Law (Public Act 43 of 2008)



Gateway Treatment



The Pedestrian Gateway Treatment can be made up of R1-6 pedestrian street signs installed at the curb and on all lane lines and/or R1-6 signs installed at the curb and flexible delineator posts installed on lane lines. Appropriate installation locations include intersections and midblock crosswalks on roads with speed limits of 35 mph or less. Because the treatment components are simple and adaptable, the treatment can be used in a variety of roadway configurations including one- and two-way travel lanes, with or without pedestrian refuge areas, and with or without traffic signals.

80% yield rates

Distracted driving, high speeds and multiple lanes create safety issues for pedestrians crossing at non-signalized locations.

The Pedestrian Gateway Treatment alerts drivers that a crosswalk is in place and future to yield to pedestrians in the crosswalk.



"We wanted a low-cost, effective treatment to improve pedestrian safety. It's exciting to show that the gateway treatment can be of value at lots of downtown locations."

Carissa McQuiston, P.E.
Project Manager

MDOT Project Manager
Carissa McQuiston, P.E.
State-Maintained Safety Engineering Specialist
Safety Programs Unit
Michigan Department of Transportation
1425 E. Chatham St.
Lansing, MI 48909
carissa.mcquiston@mdot.gov
567.505.2804

Research
The initial project evaluated the effectiveness of the gateway treatment. The research team installed the signs in seven configurations at a variety of sites, including one signalized intersection, traffic signals with crosswalk, midblock, and uncontrolled highway ramp entrances. To evaluate the effects of the signage, researchers also noted a gateway configuration using all blank signs.

In a follow-up project, researchers evaluated whether the response of the gateway treatment on driver behavior would persist over time, and they collected speed information as part of this study to see whether speed reductions were related with the installation of the gateway. During the initial study, researchers observed sites for two to three months. In the follow-up phase, they monitored sites for six months, from May through October.



Research Spotlight

Gateway treatment makes crosswalks safer for pedestrians

Project Information
REPORT NUMBER: Evaluation of R1-6 Gateway Treatment Alternatives for Pedestrian Crossings Follow-Up Report
START DATE: October 2015, February 2016
REPORT DATES: February 2016, December 2016
RESEARCH REPORT NUMBER: 625.0006 (R1-6A1)
TRIAL COST: \$30,000 (total for both periods)
COST SAVING: Job SAVED: 50%
FUNDING: through the SFPA, Part II, Program

Problem
Increasingly, there was more than 4,700 pedestrian fatalities in 2015, with 148 each fatality in Michigan. Enhancing pedestrian safety is one of the main goals of Michigan's Smart & Safe Durable roads safety campaign, and supporting the vision of which drivers yield to pedestrians at crosswalks is an important part of that campaign. However, the established an angle of yielding.

MDOT's cost goals at an expenditure of the gateway treatment of approximately \$20,000 and \$10,000, respectively, for an average of \$15,000 per mile. The gateway treatment is a promising and low-regret option, costing only \$2,000 to \$4,000 per mile, and can be installed in a wide range of locations. MDOT conducted two research

Pedestrian safety is an important issue for MDOT but getting drivers to yield to pedestrians consistently at crosswalks is a significant challenge. The gateway treatment, which consists of yield signs installed both at the edge of the roadway and between travel lanes, is an inexpensive strategy to increase driver yielding rates. Two research projects evaluated and confirmed the strategy's effectiveness and durability.



This goal which was provided to the Michigan Department of Transportation. Control Districts have limited effectiveness, particularly at sites with more than one travel lane in each direction. The recommended rapid flash beacon and pedestrian yield signs are more effective, but with a total cost of \$20,000 and \$10,000, respectively, for an average of \$15,000 per mile. The gateway treatment is a promising and low-regret option, costing only \$2,000 to \$4,000 per mile, and can be installed in a wide range of locations. MDOT conducted two research

The final report is available online at: www.mdot.gov/documentsandreports/625.0006_r1-6a1.pdf and www.mdot.gov/documentsandreports/625.0006_r1-6a2.pdf.

Research Spotlight produced by CTE & Associates LLC, May 2017



Questions?



Carissa McQuiston, PE

October 2019