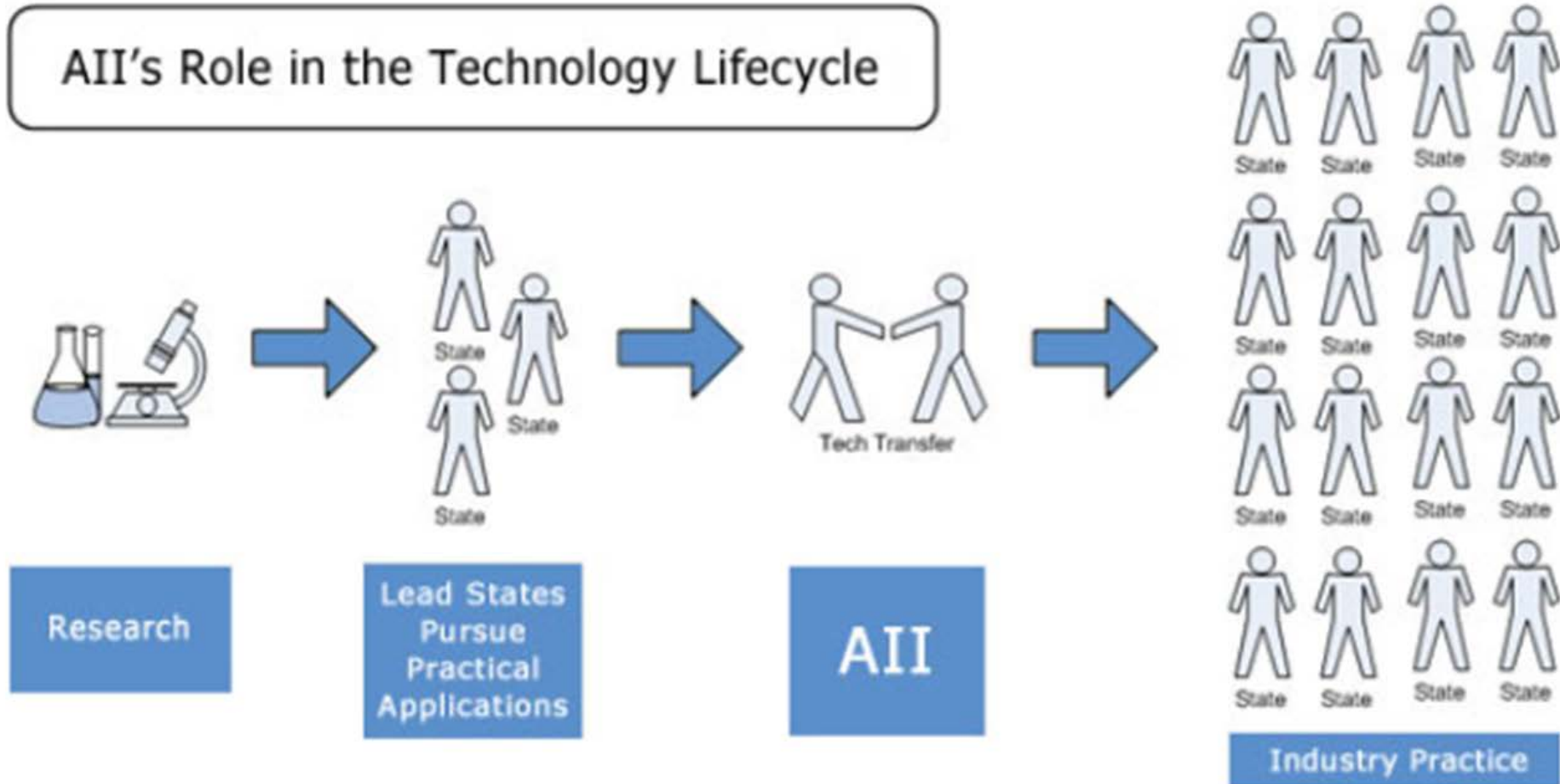




Gateway Treatment for Pedestrian Crossings



MDOT Gateway Treatment became a Focus Innovation in October 2017



Pedestrian Gateway 3 Simple Signs to Save Lives



How much?

Less than \$2000

How long?

About 2 hours

Why?

Immediate Results
Drivers Yield Intuitively
Works Almost Anywhere



What is the Gateway Treatment?

- **A gateway installation or the R1-6 signs can be installed at a crosswalk by:**
 - Placing them on the edge of the road and on all lane lines
 - This requires drivers to drive between two signs.
 - The message has been shown to influence the effectiveness of the treatment.



What We Learned

- **Effectiveness**
 - Driver yielding compliance increases
 - Speed reductions – traffic calming effect
 - Slowing at the dilemma zone and speed reductions over time
- **Factors Contributing to Effectiveness**
 - Gap Size
 - Speed Limit
 - Much higher yielding rates for gateways
 - R1-6 signs installed with removable curb type base survive better than those bolted to flush base

"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

projects to evaluate the effectiveness of the treatment in its various configurations, both initially and over the course of a spring-through-fall test period. In addition since the gateway treatment includes in-street signs, MDOT investigated the likelihood of the signs' survival and the effectiveness of a partial treatment if one sign is struck down by a vehicle.

Research
The initial project evaluated the effectiveness of the gateway treatment. The research team installed the signs in several configurations at a variety of sites, including non-signalized intersections, traffic circles, trail crossings, midblock crosswalk and Interstate highway ramp entrances. To evaluate the influence of the message imprinted on the signs, researchers also tested a gateway configuration using all blank signs.
In a follow-up project, researchers evaluated whether the impact 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 noticed with the installation of the gateways. During the initial study, researchers observed sites for two or 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

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.

Problem

Nationwide, there were more than 4,700 pedestrian fatalities in 2013, with 148 such fatalities in Michigan. Enhancing pedestrian safety is one of the main goals of Michigan's Toward Zero Deaths statewide safety campaign, and improving the rates at which drivers yield to pedestrians at crosswalks is an important part of that campaign.

However, the established strategies for achieving this goal (which are provided in the Michigan Manual on Uniform Traffic Control Devices) have limited effectiveness, particularly at sites with more than one travel lane in each direction. The rectangular rapid flash beacon and pedestrian hybrid beacon are more effective, but with



MDOT's user guide will aid implementation of the gateway treatment at appropriate locations by showing recommended configurations and providing usage guidelines.

installation costs of \$20,000 and \$100,000, respectively, they are too expensive for widespread implementation.

The gateway treatment is a promising and less-expensive option, costing only \$1,200 to \$1,800 for a six-sign configuration. MDOT conducted two research

Project Information

REPORT NAMES: Evaluation of R1-6 Gateway Treatment Alternatives for Pedestrian Crossings; Evaluation of R1-6 Gateway Treatment Alternatives for Pedestrian Crossings; Follow Up Report
START DATES: October 2013, February 2016
REPORT DATES: February 2016, December 2016
RESEARCH REPORT NUMBERS: RC-1638, RC-1643
TOTAL COST: \$265,695 (total for both projects)
COST SHARING: 20% MDOT, 80% FHWA through the SPR, Part II, Program

MDOT Project Manager

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study period, but among flush-mounted signs with a pivoting base, only 58 percent survived.

Value

The gateway treatment is an inexpensive and effective strategy for improving pedestrian safety in crosswalks. Appropriate locations include intersections and midblock crosswalks on roads with speed limits of 30 mph or less, or speed limits of 35 mph with average annual daily traffic levels below 12,000.

MDOT has published a [user guide](#) to aid implementation of the gateway treatment. This guide describes the signs

This final report is available online at www.michigan.gov/documents/mdot/SPR-1638_552736_7.pdf and www.michigan.gov/documents/mdot/SPR-1643_552737_7.pdf.

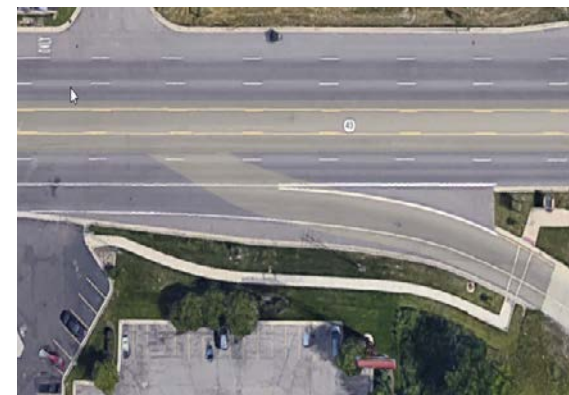
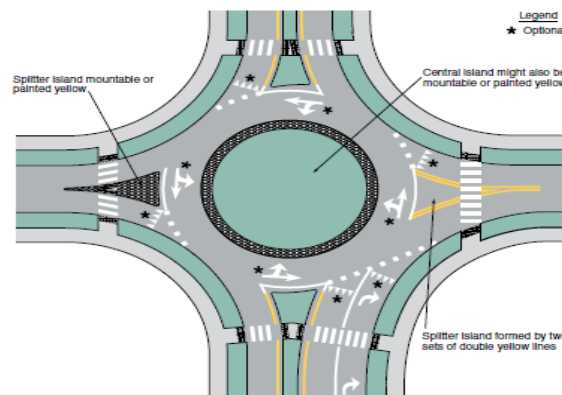
Research Spotlight produced by CTC & Associates LLC, May 2017.

What We Learned – General Guidance

- Signs and delineators should be installed 1.5 feet to 50 feet in advance of crosswalk
- Sign shall follow local law
- At locations with a median or pedestrian refuge island, in-street signs on top of the median or refuge island are allowed
- If two crosswalks exist at an intersection, the gateway need only be placed on the approach legs of the roadway.
- No portion of the sign or sign base shall be in the crosswalk or on the crosswalk lines.
 - In many cases placing signs further back will increase survival
- A refuge island and advance yield lines are recommended where AADT is 12,000 or greater.

Project 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



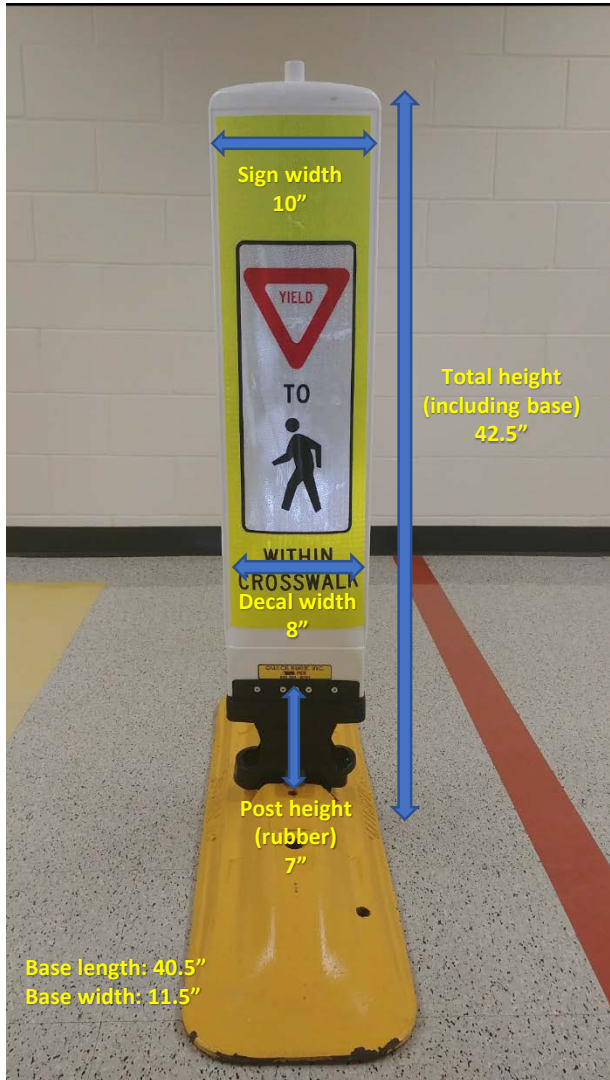
Project Specifics

- 20+ locations
 - City Post
 - Qwick Kurb
- Permission to experiment - installations on top of the curb
- Schedule



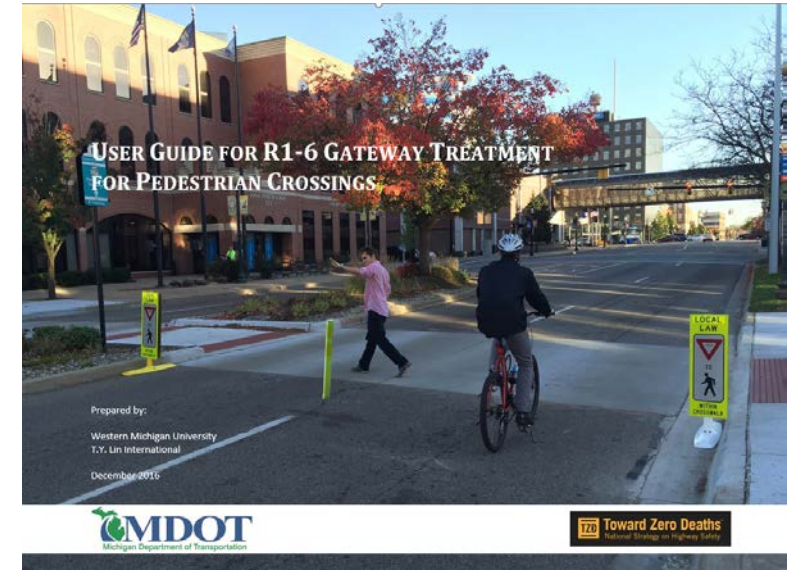
Site	Qwick Kurb	White	Yellow	Final Recovery	City Post
Interstate Interchange Ramp, Uncontrolled					
Interstate Ramp I 94 and S. Westnedge North	2	1	1		2
Interstate Ramp I 94 and S. Westnedge South				2	2
Roundabout					
Roundabout East Main and 5th Street, Benton Harbor	2	2		2	
Roundabout East Main and Riverview, Benton Harbor	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/ RRFB					
Hybrid Beacon West Huron St. at Chapin St, Ann Arbor	2	1	1	1	2
Midblock RRFB Monroe St., Allegan	2	1	1	1	2
East Stadium and Ferdon, Ann Arbor	2	1			
Midblock Crosswalk					
US 131 N Main St. between (M60+Portage), Three Rivers	1	1			
Rose and KYVC, Kalamazoo (not an MDOT road)					
T Intersection					
S. Westnedge and Ranney St. Kalamazoo	1	1			
Rose St at Academy, Kalamazoo (Not MDOT site)					
Full Intersection					
Monroe St. and N. Walnut, Allegan	2	1			
W. Michigan and Grand, Marshall	2	1			
E Michigan and Madison, Marshall	2	2			
E Michigan and Hamilton, Marshall	1				
M 89 at Kalamazoo St., Otsego	1	1			
Trail Crossing					
Cellery Flats Trail, Portage, Not MDOT site					
Oakland Rd Trail Crossing, Not MDOT site					
TOTAL	24	16			





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



#1 - The Initial Data



**Rose Street at KVCC -
Uncontrolled Midblock
Crossing**

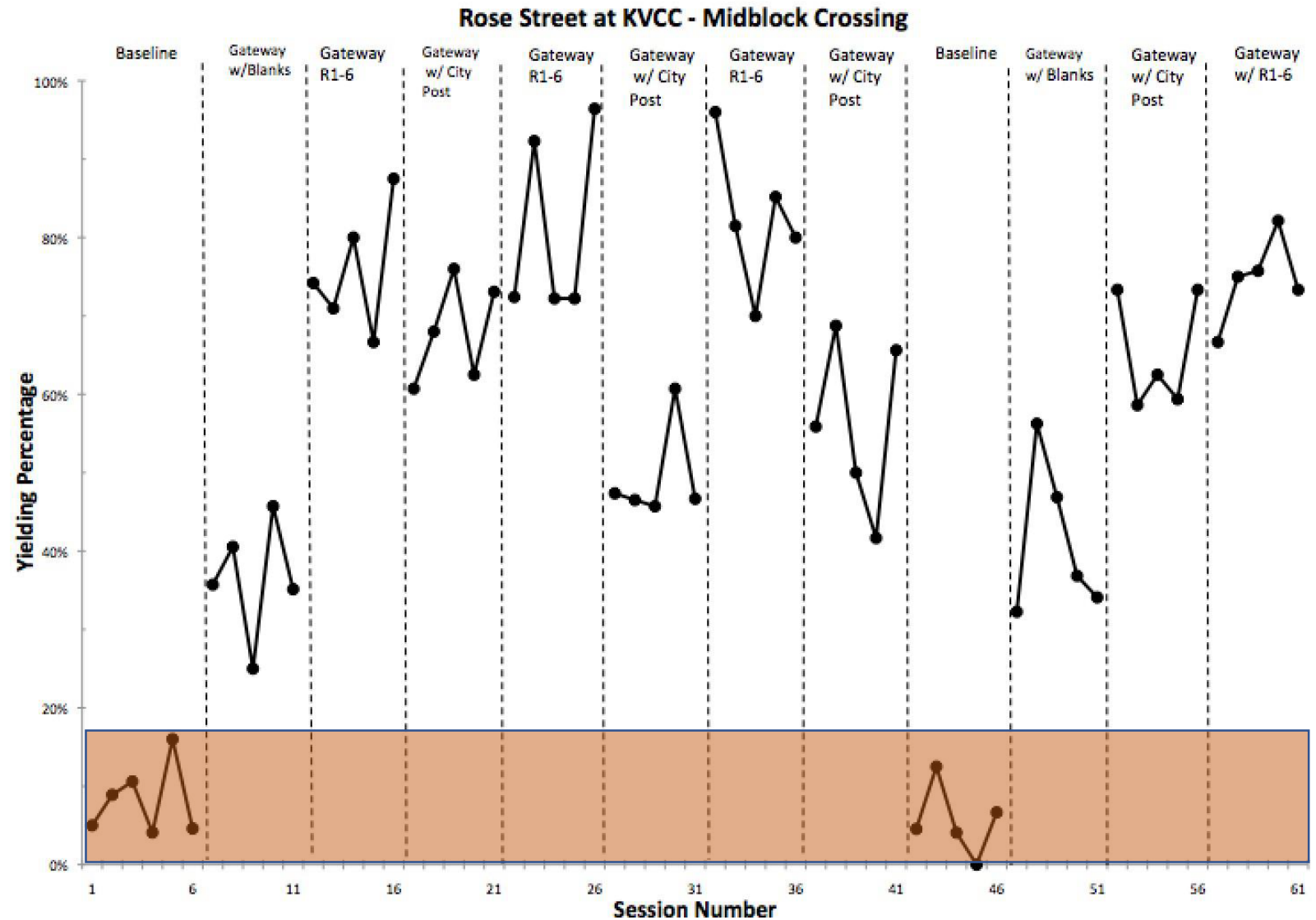


**Gateway
Treatment
with City Post**

**Full Gateway
Treatment**

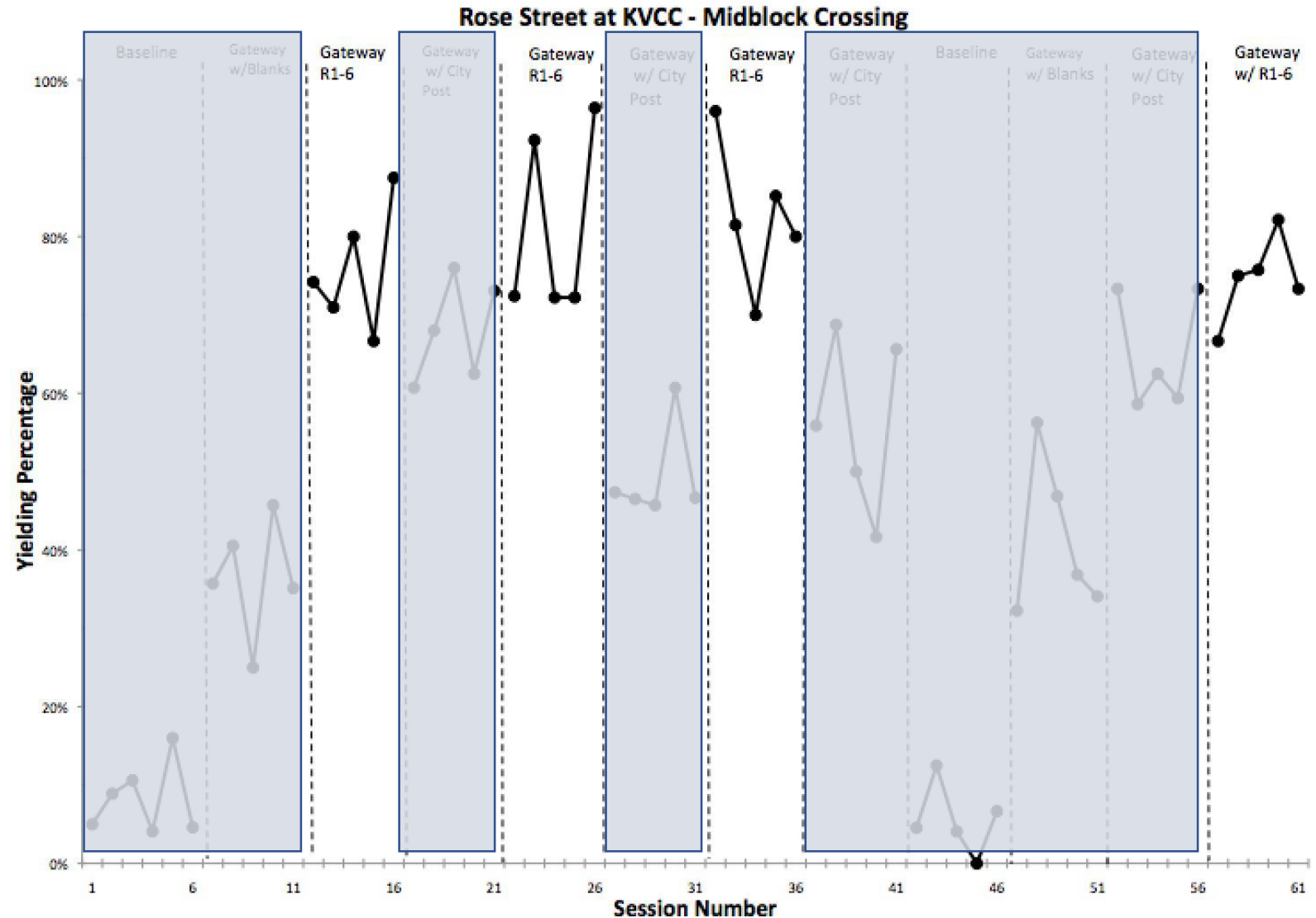
#1 - The Initial Data

Baseline



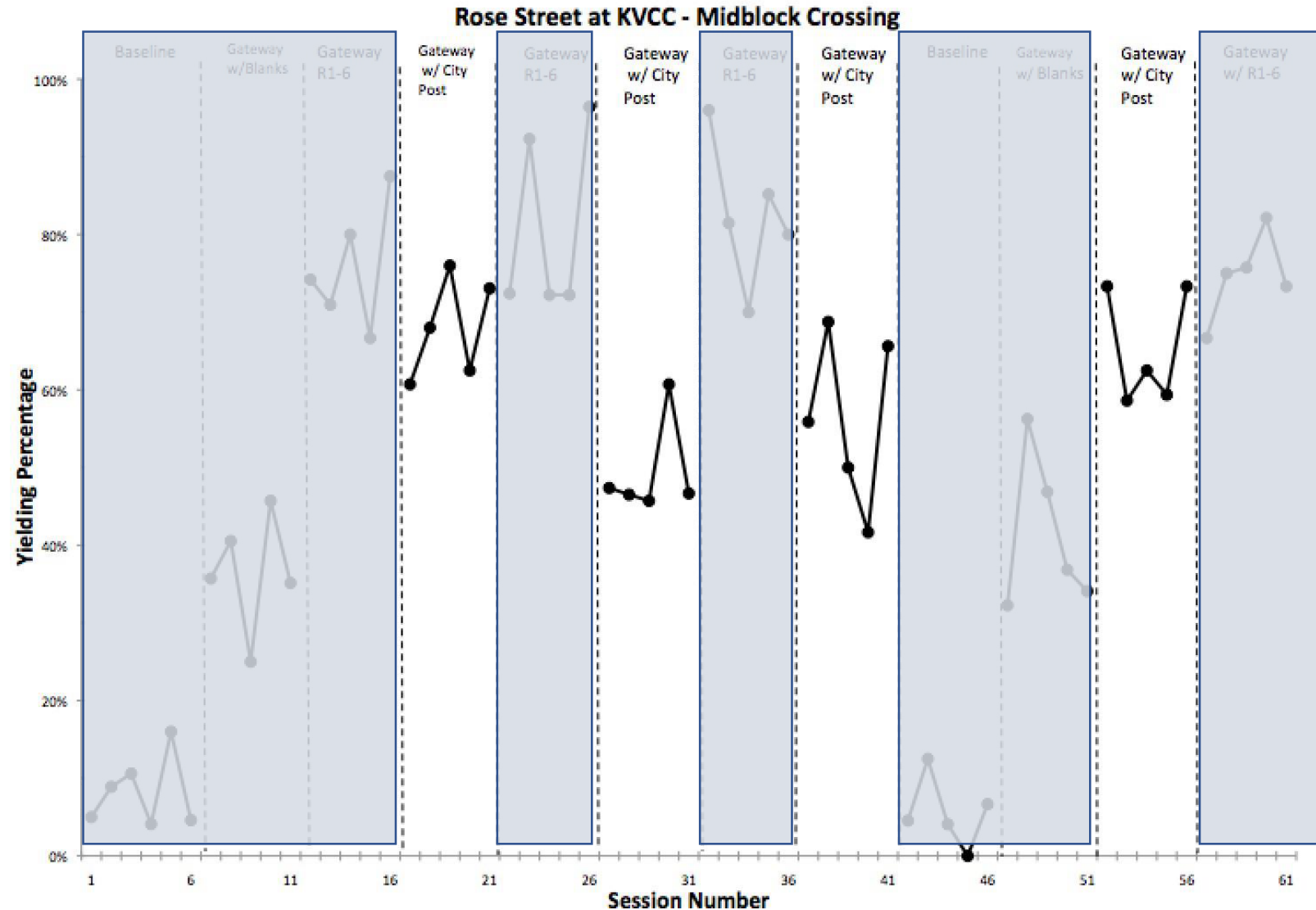
#1 - The Initial Data

Gateway Treatment



#1 - The Initial Data

Gateway with City Post

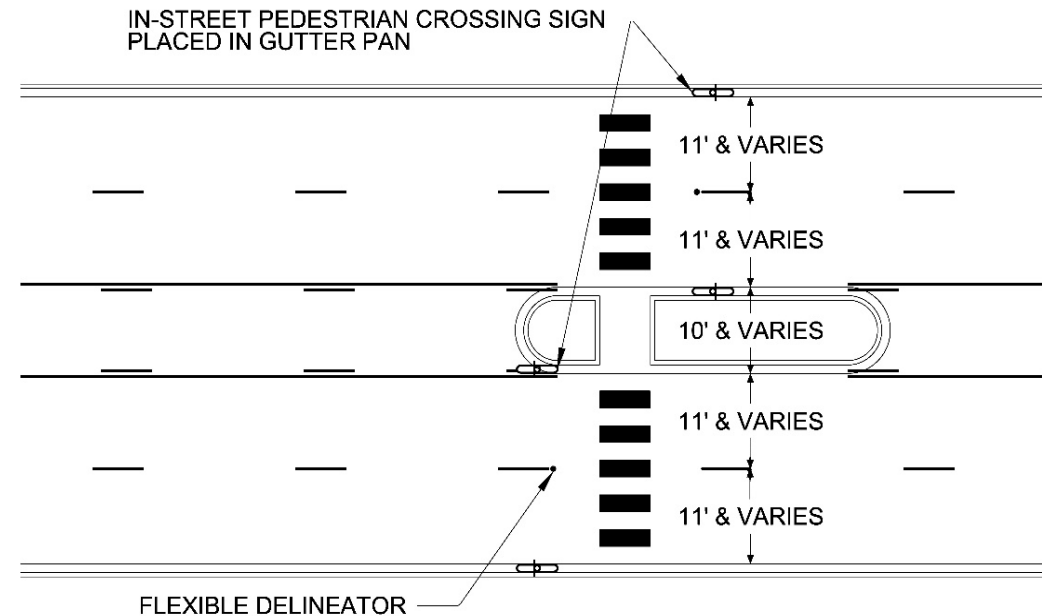


#1 - Final Results - Guidance Document

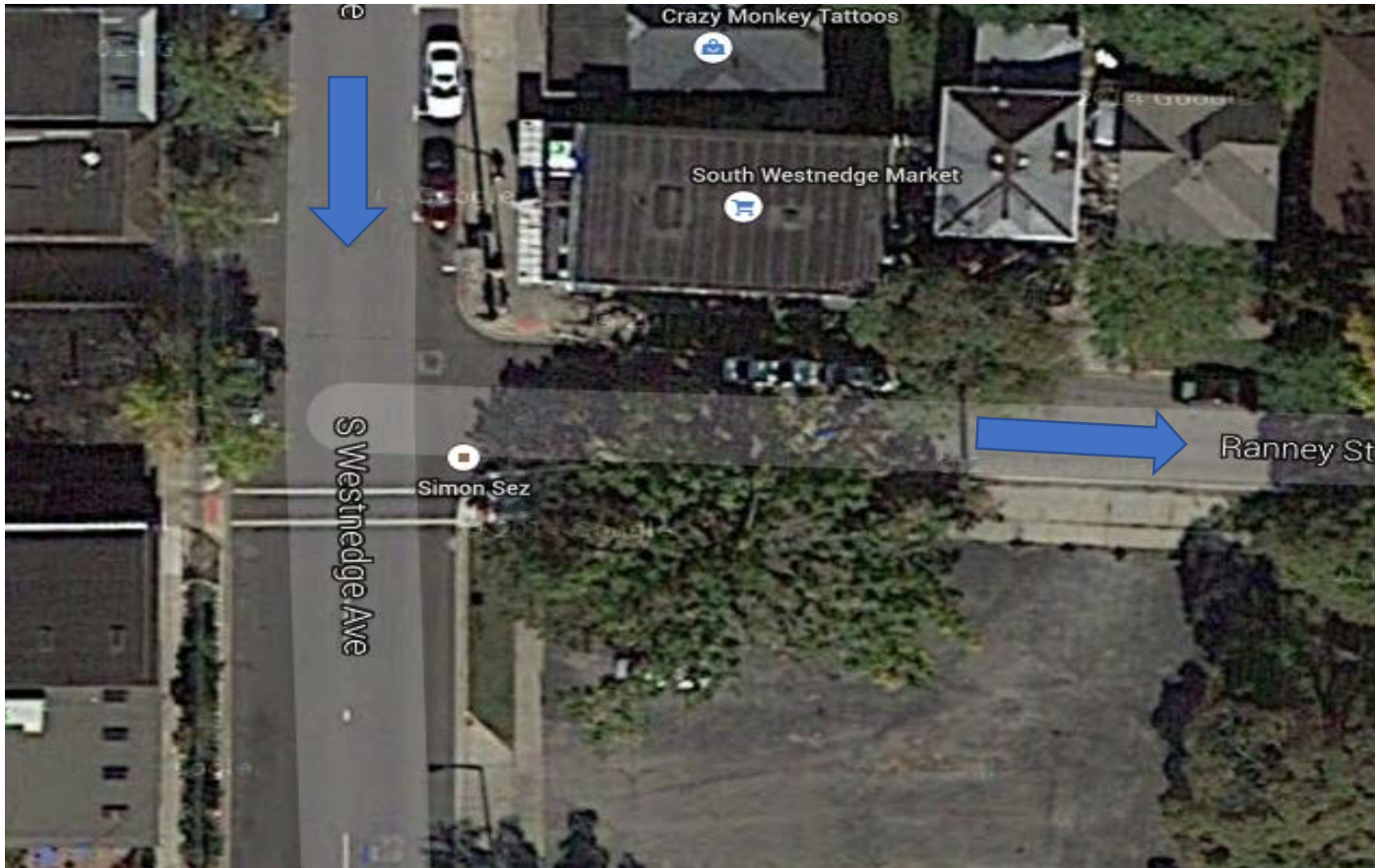


Between 70% and 90% compliance rate on roads with posted speeds of 30 mph or lower with ADT up to 25,000

Gateway Treatment, Four-Lane Configuration with Refuge Island



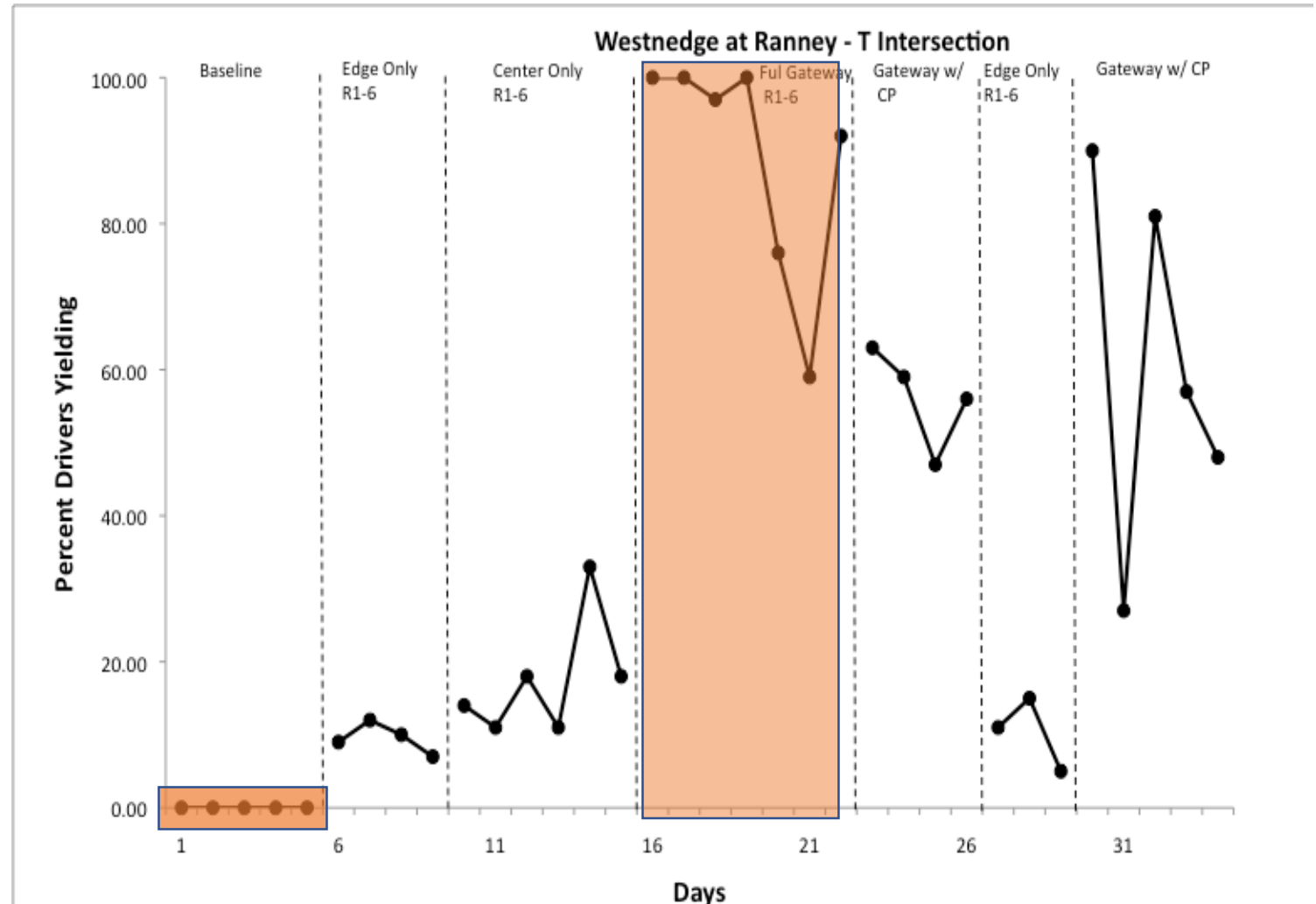
#2 - The Initial Data



**Westnedge Avenue and
Ranney Street - One Ways
T-Intersection**

#2- The Initial Data

Westnedge Avenue and Ranney Street – One Way Streets (T-Intersection)

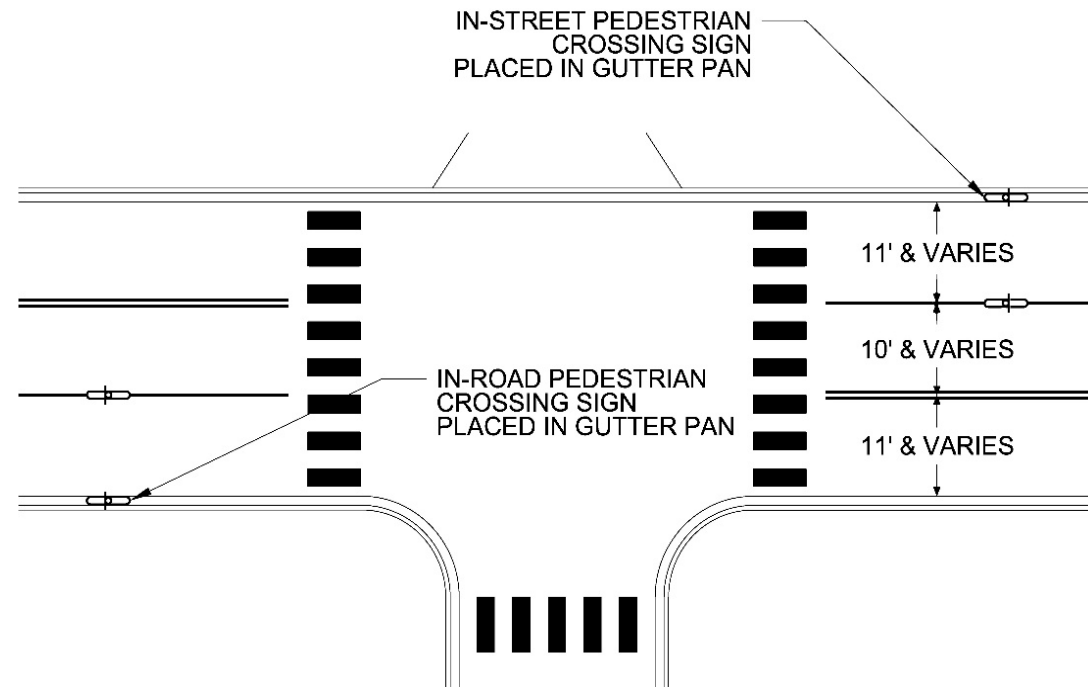


#2 - Final Results - Guidance Document



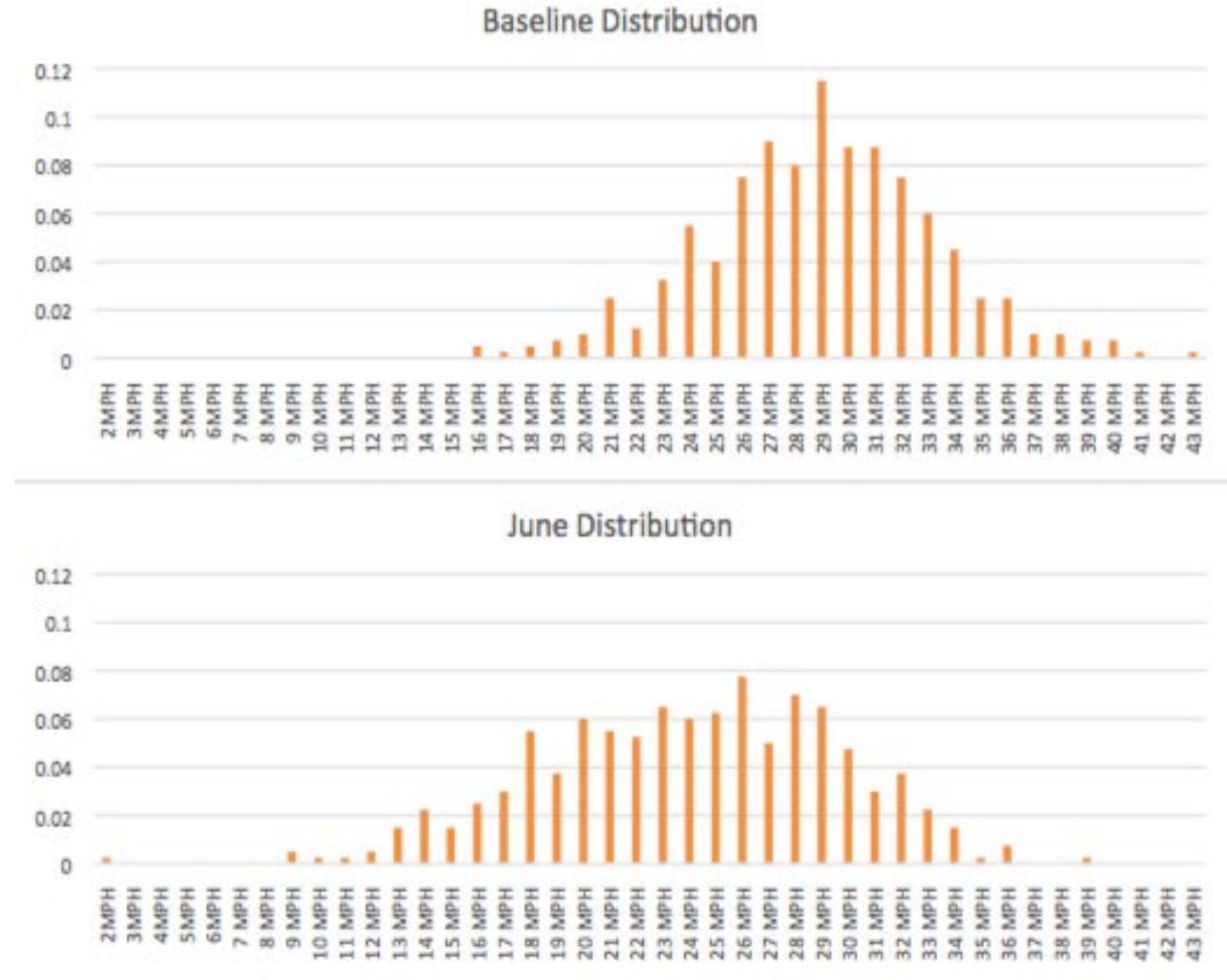
Between 70% and 80% compliance rate if posted speed limit is 30 mph

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



#2 - Final Results - Speed Data

The top frame shows the distribution of speeds for baseline, the bottom frame shows the distribution in June.



#3 - The Initial Data

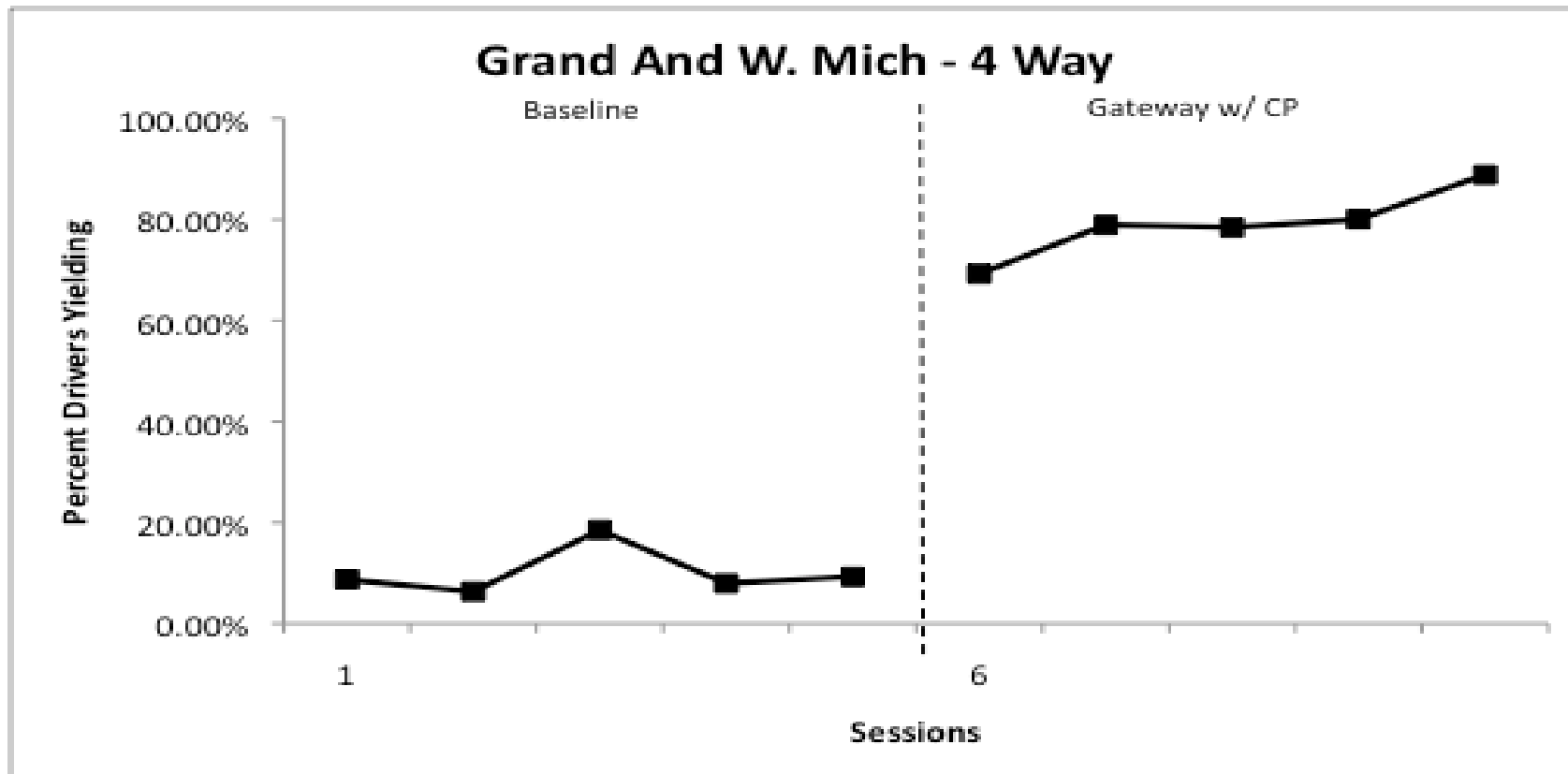


West Michigan Avenue and Grand Street



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

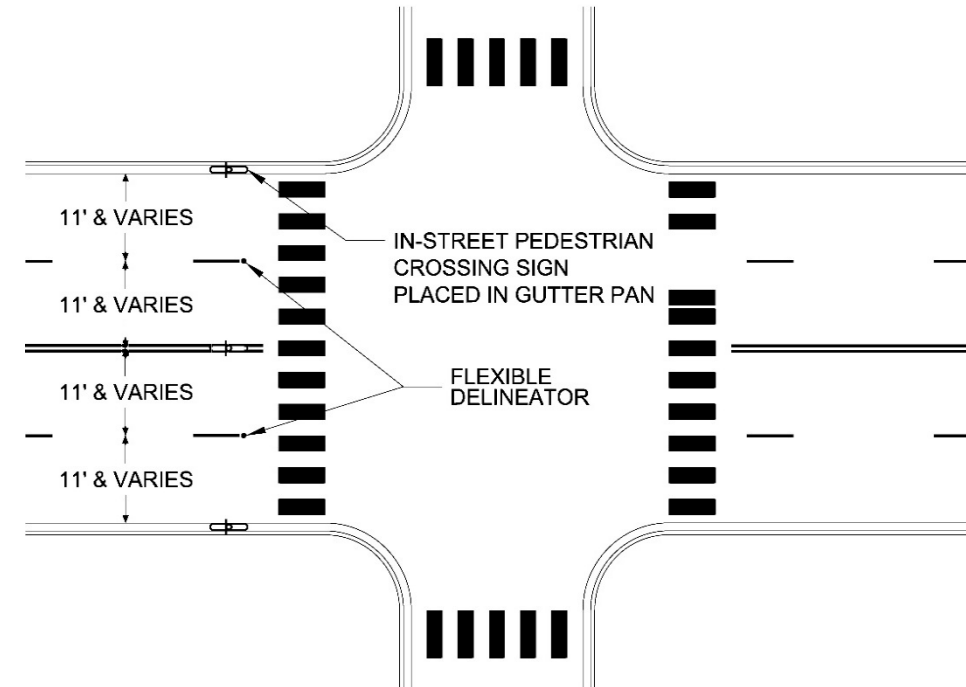
#3 - West Michigan Ave & Grand St. Initial Data - Full Intersection



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



Between 55% and 80% compliance rate on roads with posted speeds of 30 mph or lower with ADT up to 25,000



Other Site Types in Final User Guide:

- Three-Lane Configuration with Refuge Island
- Three-Lane Configuration w/out Refuge Island
- Two-Lane Configuration with Median Island and Bike Lanes
- Two-Lane Configuration with Curb Extensions



Speed Data Summary

	Baseline		Jun		Aug		Oct	
	Mean Speed		Mean Speed		Mean Speed		Mean Speed	
SW Michigan	<i>Dillema Zone</i>	<i>Crosswalk</i>	<i>Dillema Zone</i>	<i>Crosswalk</i>	<i>Dillema Zone</i>	<i>Crosswalk</i>	<i>Dillema Zone</i>	<i>Crosswalk</i>
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

Speed Data Summary

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



Questions?