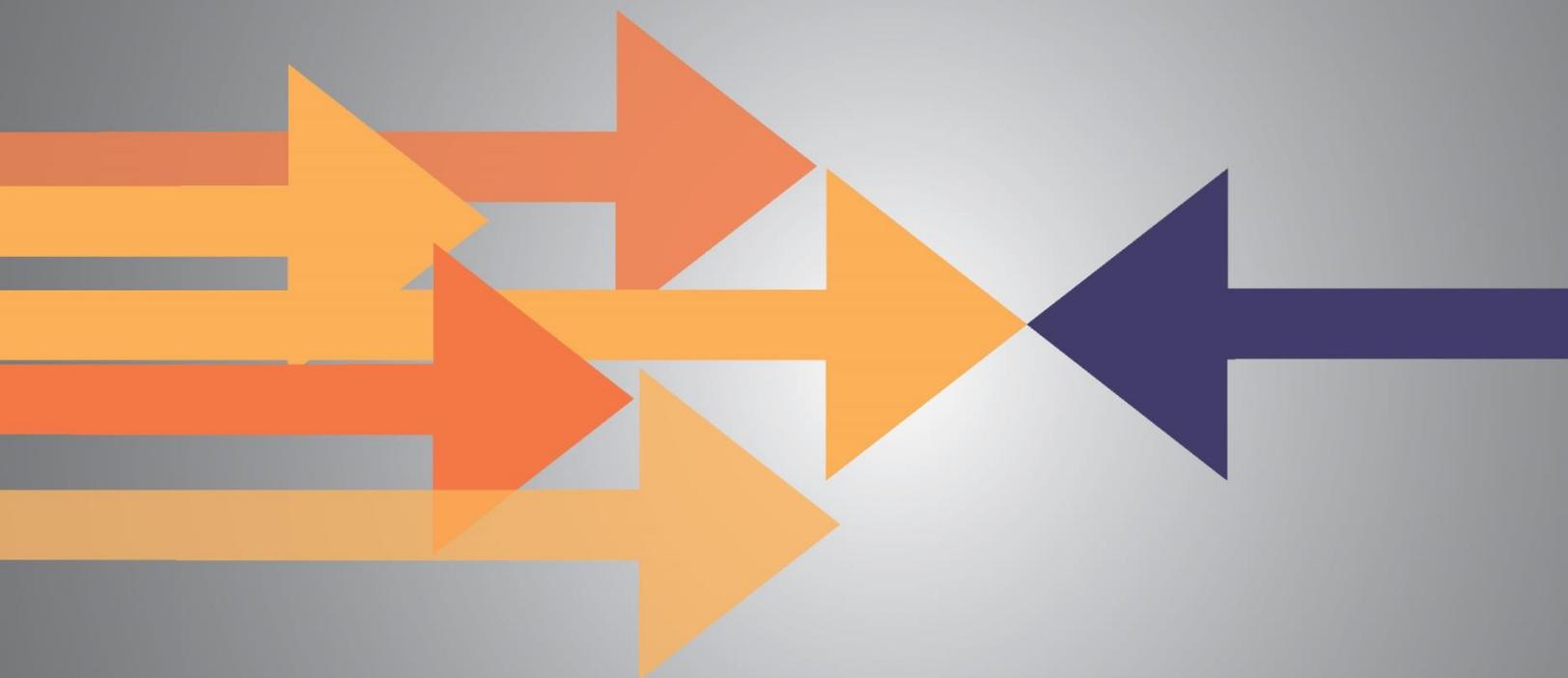


WRONG-WAY CRASH STUDY

INTERSTATES AND FREEWAYS | CALENDAR YEAR 2016



May 2018

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ARKANSAS DEPARTMENT OF TRANSPORTATION NOTICE OF NONDISCRIMINATION

The Arkansas Department of Transportation (Department) complies with all civil rights provisions of federal statutes and related authorities that prohibit discrimination in programs and activities receiving federal financial assistance. Therefore, the Department does not discriminate on the basis of race, sex, color, age, national origin, religion (not applicable as a protected group under the Federal Motor Carrier Safety Administration Title VI Program), disability, Limited English Proficiency (LEP), or low-income status in the admission, access to and treatment in the Department's programs and activities, as well as the Department's hiring or employment practices. Complaints of alleged discrimination and inquiries regarding the Department's nondiscrimination policies may be directed to Joanna P. McFadden Section Head - EEO/DBE (ADA/504/Title VI Coordinator), P.O. Box 2261, Little Rock, AR 72203, (501) 569-2298, (Voice/TTY 711), or the following email address: joanna.mcfadden@ardot.gov

Free language assistance for the Limited English Proficient individuals is available upon request.

This notice is available from the ADA/504/Title VI Coordinator in large print, on audiotape and in Braille.

Wrong-Way Crash Study Calendar Year 2016

Act 641 of the 87th Arkansas General Assembly requires the Arkansas Department of Transportation (Department) to analyze all wrong-way crashes on the Interstates and other freeways with full control of access and to prepare an annual report. Furthermore, the Act requires that based on the findings in the report, the Department is to implement appropriate countermeasures when warranted to reduce the possibility of wrong-way crashes. Accordingly, Minute Order 2009-035 was adopted by the Arkansas State Highway Commission on February 25, 2009. This Minute Order authorized an annual analysis of wrong-way crashes on these routes to determine if additional traffic control devices are warranted. Copies of Act 641 and Minute Order 2009-035 are shown in Appendices A and B respectively.

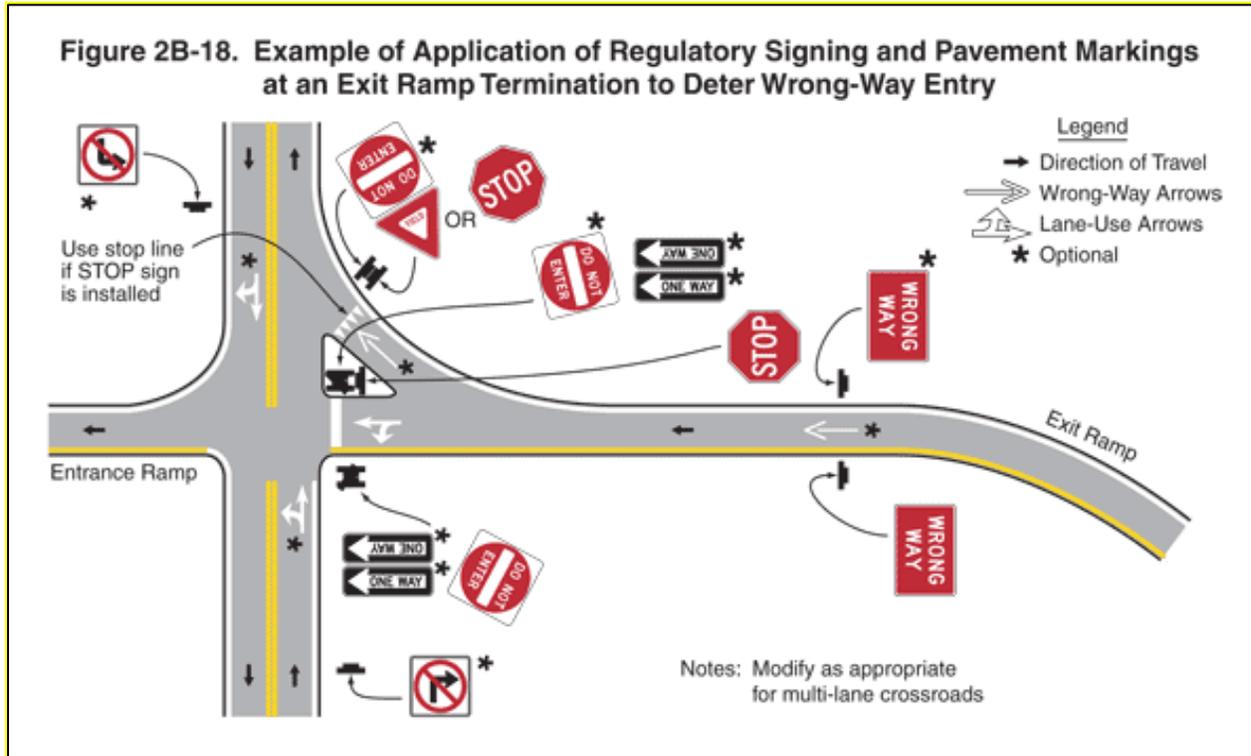
An annual analysis of wrong-way crashes identifies the locations to be investigated. The investigation consists of reviewing the signing and striping for compliance with the minimum requirements of the Manual on Uniform Traffic Control Devices (MUTCD) as well as compliance with the current Department signing practices. The minimum requirements as specified in Section 2B.41 of the MUTCD 2009 Edition include the following:

1. At least one "ONE WAY" sign for each direction of travel on the crossroad shall be placed where the exit ramp intersects the crossroad.
2. At least one "DO NOT ENTER" sign shall be conspicuously placed near the downstream end of the exit ramp in positions appropriate for full view of a road user starting to enter wrongly from the crossroad.
3. At least one "WRONG WAY" sign shall be placed on the exit ramp facing a road user traveling in the wrong direction.

The previous Department practice was to install the minimum required signs and markings from the MUTCD plus additional optional signs and markings (see Figure 1). If necessary, the oversized signs as shown in Table 2B-1 in the MUTCD were installed. This practice enhanced the conspicuity of the signage and provided added protection to ensure that the minimum required signage was in place if one of the sign assemblies was damaged or destroyed.

The analysis of 2016 crash data showed that 21 wrong-way crashes occurred on the Interstates and other freeways with full control of access (see Figure 2). The crash analysis was conducted on those crashes that involved a vehicle entering or traveling in the wrong direction on the controlled access facility; crossover crashes were not included. These crashes are summarized in Table 1. Table 2 shows a comparison of the 2016 wrong-way crashes with 2014 and 2015 and Figure 3 provides an overview of wrong-way crash history since Calendar Year 2008.

Figure 1. Minimum Required Signs and Markings from the MUTCD



Source: Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), 2009 Edition

Table 1. Summary of Wrong-Way Crash Analysis in Calendar Year 2016

Crash Severity	5 Fatal Crashes (7 fatalities)				
	12 Non-fatal Injury Crashes that include:			4 Incapacitating Injury Crashes	
				5 Non-Incapacitating Injury Crashes	
				3 Possible Injury Crash	
4 Property Damage Only Crashes (PDO)					
Crash Type	Head On	11	Road Surface Condition	Dry	19
	Angle	2		Wet	2
	Sideswipe	7			
	Single Vehicle	1			
Light Conditions	Dark	10	Contributing Factors	Alcohol	7
	Daylight	6		Drugs	4
	Dark but Lighted	5		*None	3
				**Unknown	6
				Illness or Fatigue	1
* Driver was not impaired					
**Not determined if driver was impaired					

Figure 2. Wrong-Way Crash Locations in Calendar Year 2016

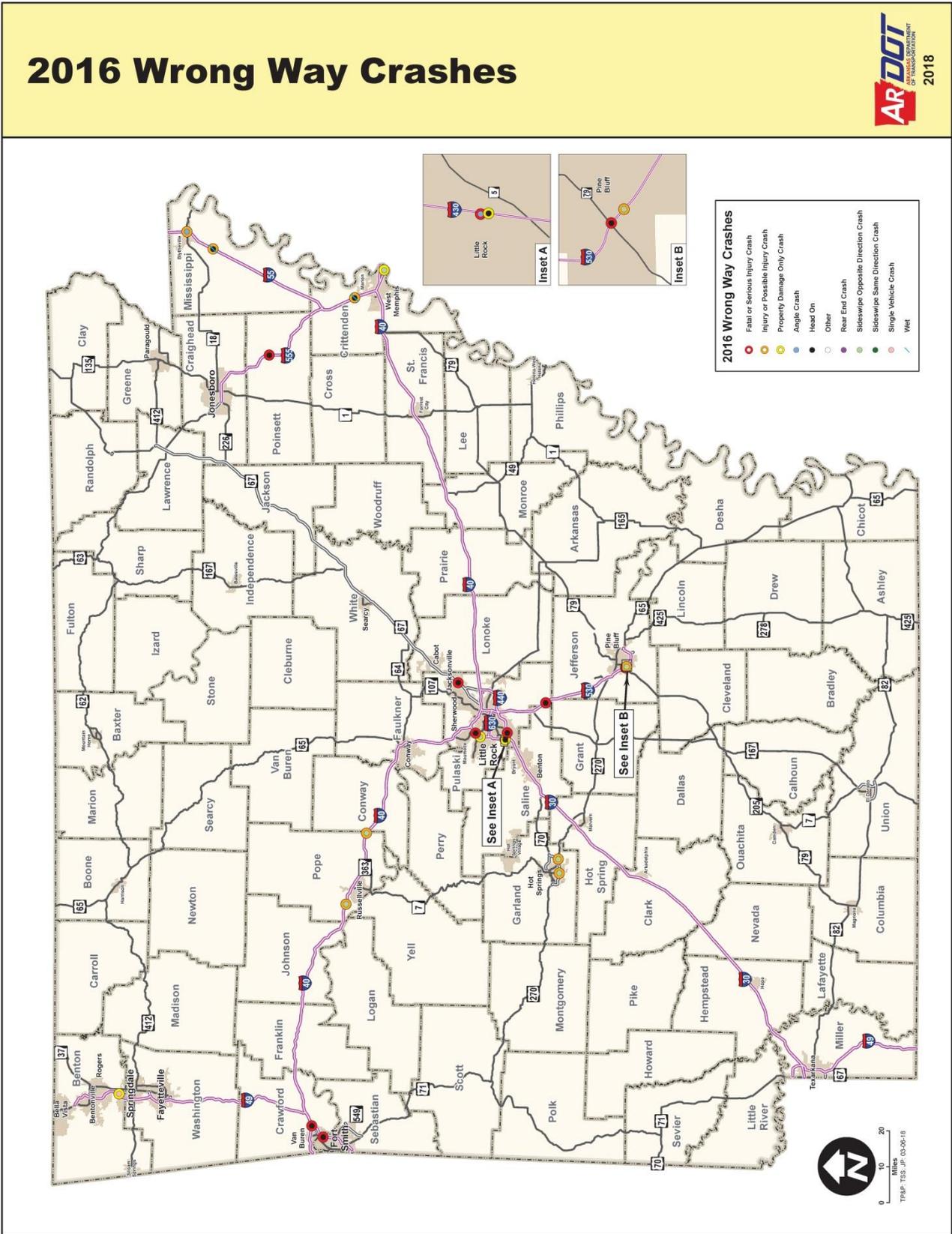
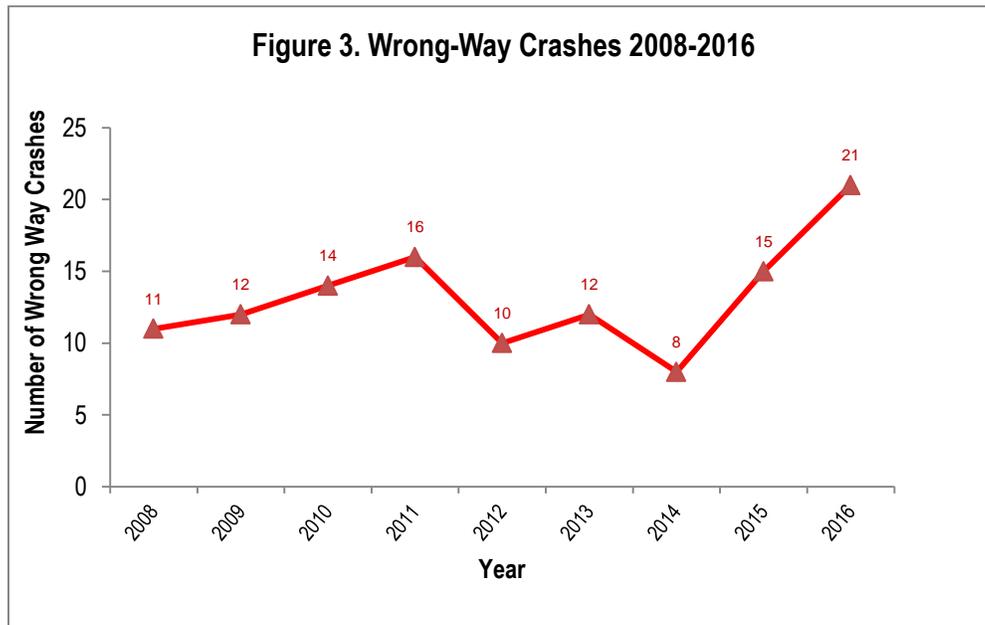


Table 2. Wrong-Way Crashes 2014-2016

Year	Total Wrong Way Crashes	Fatal Crashes	Fatalities	Serious Injury Crashes	Number of Dark Crashes	Driver Impaired Drugs or Alcohol	Fatal Crashes Driver Impaired on Drugs or Alcohol
2014	8	0	0	2	7	5	0
2015	15	5	8	2	12	6	1
2016	21	5	7	4	10	11	4



In January of 2017, the Department let a \$3.1 million contract for safety improvements (Job 012260), in an effort to reduce wrong-way incursions on Arkansas’ freeways. Low-cost countermeasures, primarily signs and pavement markings, were chosen, and applied on a statewide basis to maximize effectiveness. “WRONG WAY” and “DO NOT ENTER” signs were lowered with brighter sheeting and reflective post panels to increase the conspicuity of these important signs. Thermoplastic wrong-way pavement arrows were added to every exit ramp, and lane use arrows were applied to two-way frontage roads that intersected an exit ramp. Other pavement markings included stop and yield lines at every exit ramp, as well as “cat track” pavement markings to guide left-turning motorists to the correct ramp at side-by-side-ramps. Lastly, red delineators were installed at every exit ramp to give potential wrong-way drivers more visual cues they were traveling the wrong direction. To further curtail wrong-way driving, the Department has incorporated these countermeasures into the previous standard as standard practice when building new ramps or rehabilitating existing ones.

Job 012260 was recently completed on all freeway/interstate exit ramps as shown in Appendix C; therefore, no signage investigation is necessary for this reporting period (see Appendix D).

Table 3. List of Wrong-Way Crashes on Interstates and Other Freeways in Calendar Year 2016

County	Crash #	Route	Sec	LM	¹ Crash Severity.	# Fat.	# Inj.	Type	Date	Time	Urban/Rural	Light Condition	Surf. Cond.	Impaired	System
Benton	2016509624	49	290	76.489	5	0	0	Single Vehicle Crash	5/10/2016	14:55:00	Urban	Daylight	Dry	Alcohol	Interstate
Crawford	2016518911	40	110	8.113	1	1	1	Head On	8/8/2016	3:38:00	Rural	Dark	Dry	Drugs	Interstate
Crittenden	2016510106	55	110	1.349	5	0	0	Sideswipe Opp. Direction	5/15/2016	0:00:00	Rural	Dark	Dry	Unknown	Interstate
Crittenden	2016535854	55	110	13.57	3	0	2	Head On	12/4/2016	4:19:00	Rural	Dark	Wet	Alcohol	Interstate
Garland	2016006650	70	090	0.08	3	0	1	Sideswipe Opp. Direction	2/16/2016	19:42:00	Urban	Dark	Dry	Unknown	U.S. Highway
Garland	2016011565	270	050	22.66	4	0	1	Sideswipe Opp. Direction	6/6/2016	10:12:00	Urban	Daylight	Dry	No	U.S. Highway
Jefferson	2016509368	530	050	39.876	4	0	1	Sideswipe Opp. Direction	5/11/2016	2:35:00	Urban	Dark	Dry	No	Interstate
Jefferson	2016528972	530	050	39.515	2	0	2	Head On	10/22/2016	14:23:00	Urban	Daylight	Dry	Illness	Interstate
Mississippi	2016504951	55	120	67.261	3	0	1	Angle	3/16/2016	23:38:00	Urban	Dark-Lighted	Dry	Alcohol	Interstate
Mississippi	2016511263	55	120	58.274	3	0	1	Head On	6/2/2016	4:48:00	Rural	Dark	Wet	Drugs	Interstate
Poinsett	2016528865	555	020	22.253	1	2	0	Head On	10/20/2016	18:52:00	Rural	Dark	Dry	Drugs	Interstate
Pope	2016502499	40	220	76.491	4	0	1	Sideswipe Opp. Direction	2/12/2016	13:32:00	Rural	Daylight	Dry	Drugs	Interstate
Pope	2016521956	40	220	98.227	3	0	1	Sideswipe Opp. Direction	8/28/2016	20:40:00	Rural	Dark	Dry	Alcohol	Interstate
Pulaski	2016502120	30	230	131.092	2	0	3	Head On	1/31/2016	3:44:00	Urban	Dark-Lighted	Dry	Alcohol	Interstate
Pulaski	2016504560	430	210	8.664	5	0	0	Sideswipe Opp. Direction	3/15/2016	1:57:00	Urban	Dark-Lighted	Dry	Unknown	Interstate
Pulaski	2016507937	530	030	14.28	2	0	2	Head On	4/22/2016	19:50:00	Rural	Daylight	Dry	Unknown	Interstate
Pulaski	2016507964	67	100	9.272	1	1	2	Head On	4/18/2016	13:22:00	Urban	Daylight	Dry	Unknown	U.S. Highway
Pulaski	2016508274	430	117	0.03	2	0	2	Angle	4/25/2016	21:40:00	Urban	Dark	Dry	No	Ramp
Pulaski	2016511628	430	210	10.488	1	2	0	Head On	6/1/2016	3:49:00	Urban	Dark-Lighted	Dry	Alcohol	Interstate
Pulaski	2016512279	430	117	0.114	5	0	0	Head On	6/12/2016	5:06:00	Urban	Dark-Lighted	Dry	Unknown	Ramp
Sebastian	2016523224	540	010	10.355	1	1	0	Head On	9/8/2016	20:51:00	Urban	Dark	Dry	Alcohol	Interstate

¹Crash Severity = 1-fatal crash; 2-incapacitating injury crash; 3-non-incapacitating injury crash; 4-possible injury crash; and 5-property damage only.

APPENDIX A

Act 641

Stricken language would be deleted from and underlined language would be added to the law as it existed prior to this session of the General Assembly.

Act 641 of the Regular Session

1 State of Arkansas
2 87th General Assembly
3 Regular Session, 2009

A Bill

HOUSE BILL 1961

4
5 By: Representative Pyle
6
7

For An Act To Be Entitled

8
9 AN ACT TO REQUIRE THE ARKANSAS STATE HIGHWAY AND
10 TRANSPORTATION DEPARTMENT TO ANALYZE WRONG-WAY
11 CRASHES ON INTERSTATES AND OTHER FREEWAYS THAT
12 ARE A PART OF THE STATE HIGHWAY SYSTEM; TO
13 IMPLEMENT WARRANTED AND FEASIBLE COUNTERMEASURES
14 THAT MAY REDUCE THE POSSIBILITY OF WRONG-WAY
15 CRASHES; AND FOR OTHER PURPOSES.
16

Subtitle

17
18 TO REQUIRE THE ARKANSAS STATE HIGHWAY
19 AND TRANSPORTATION DEPARTMENT TO ANALYZE
20 WRONG-WAY CRASHES ON INTERSTATES AND
21 OTHER FREEWAYS THAT ARE A PART OF THE
22 STATE HIGHWAY SYSTEM.
23
24

25 BE IT ENACTED BY THE GENERAL ASSEMBLY OF THE STATE OF ARKANSAS:
26

27 SECTION 1. Arkansas Code Title 27, Chapter 65, Subchapter 1 is amended
28 to add an additional section to read as follows:

29 27-65-144. Additional annual reporting.

30 (a) The Arkansas State Highway and Transportation Department shall
31 analyze all reported wrong-way crashes on interstate highways and other
32 freeways that are a part of the state highway system to determine whether the
33 installation of additional traffic control devices is warranted and feasible
34 in order to reduce the possibility of future wrong-way crashes.

35 (b) Any additional traffic control devices installed under subsection



03-05-2009 11:39 JSE199

1 (a) of this section shall conform to the Manual on Uniform Traffic Control
2 Devices for Streets and Highways, approved by the Federal Highway
3 Administration as the national standard in accordance with 23 U.S.C. 109(d),
4 23 U.S.C. 114(a), 23 U.S.C. 217, 23 U.S.C. 315, and 23 U.S.C. 402(a), 23
5 C.F.R. 655, and 49 C.F.R. 1.48(b)(8), 1.48(b)(33) and 1.48(c)(2), and is the
6 manual adopted by the State Highway Commission under § 27-52-104.

7 (c) A person may not file a legal action as a result of the
8 implementation of any recommendations made from studies conducted under this
9 section.

10
11 SECTION 2. DO NOT CODIFY. This act shall begin with a reporting
12 period in 2009 and annually thereafter.

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14 **APPROVED: 3/27/2009**
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APPENDIX B

Minute Order 2009-035

MINUTE ORDER

District: Statewide
County: Statewide
Category: Commission Policy

WHEREAS, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users of 2005 (SAFETEA-LU) requires each state to develop and implement a Strategic Highway Safety Plan (SHSP) that involves a comprehensive and collaborative approach to highway safety; and

WHEREAS, Minute Order 2007-091 adopted Arkansas' SHSP as a planning guide for improving highway safety in the State; and

WHEREAS, one emphasis area identified in Arkansas' SHSP is to reduce the number of head-on crashes; and

WHEREAS, head-on crashes occur from time to time on Interstates and other freeways as a result of wrong-way travel on these fully access controlled routes.

NOW THEREFORE, the Director is authorized to conduct an annual analysis, beginning with the 2009 reporting period, of all reported wrong-way crashes on Interstate highways and other freeways that are a part of the state highway system to determine whether the installation of additional traffic control devices is warranted and feasible to reduce the possibility of future wrong-way crashes.

FURTHERMORE, any additional traffic control devices installed as a result of the annual analysis will conform to the Manual on Uniform Traffic Control Devices for Street and Highways, which is approved by the Federal Highway Administrator as the National Standard in accordance with Title 23 U.S. Code, Sections 109(d), 114(a), 217, 315, and 402(s), 23 CFR 655, and 49 CFR 1.48(b)(8), 1.48(b)(33), and 1.48(c)(2), and is the manual adopted by the Arkansas Highway Commission pursuant to Arkansas Code Annotated Section 27-52-104.

Approved: [Signature] Chairman
[Signature] Vice-Chairman
[Signature] Member
[Signature] Member
[Signature] Member

ACE-P
Form 19-456
Rev. 08/01/2007

Submitted By: [Signature] Assistant Chief Engineer - Planning
Approved: [Signature] Director
Minute Order No. 2009 035 R
Date Passed FEB 25 2009

APPENDIX C

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

INTEROFFICE MEMORANDUM

December 9, 2015

TO: Mr. Emanuel Banks, Deputy Director and Chief Engineer

THROUGH: Kevin Thornton, Assistant Chief Engineer – Planning 

FROM: Jessie Jones, Division Engineer – Transportation Planning and Policy 

SUBJECT: Statewide Wrong-Way Crash Analysis

The Department is required by Act 641 of the 87th Arkansas General Assembly to conduct an annual wrong-way crash study on the freeway system. The Act also authorizes the Department to implement improvements to further discourage wrong-way driving. This analysis identifies low cost safety improvements aimed to reduce wrong-way crashes on Arkansas' interstates and freeways.

Background

Since 2010, the Department has reviewed wrong-way crashes on Arkansas' freeway system as required by Act 641. As part of the review, wrong-way crash locations and possible entry points are identified. Signs and markings are checked for compliance with the Manual on Uniform Traffic Control Devices (MUTCD), and are replaced or modified as needed.

However, the number of wrong-way crashes, including fatalities, has not decreased. Arkansas' 2013 Strategic Highway Safety Plan (SHSP) seeks to reduce roadway fatalities to 400 or fewer by 2017 as part of the overall Toward Zero Deaths vision. On average, four fatalities occur every year in Arkansas due to a wrong-way crash on the freeway system; however, eight fatalities have occurred so far in 2015.

Many of the wrong-way freeway crashes are largely random, although more common on higher-volume routes in urban areas. A total of 64 wrong-way crashes have occurred on Arkansas' freeways from 2009-2013 (Attachment A). Thirteen of those crashes were fatal resulting in 20 fatalities while another 25 were serious injury crashes. Further, approximately 70 percent of wrong-way crashes occur at night and 60 percent involve an impaired driver. For these reasons, a systemic approach to install low-cost safety improvements on Arkansas' freeways is warranted.

Recommendations

Low-cost safety improvements are recommended mainly to reduce the risk of impaired and night-time drivers entering the freeway system in the wrong direction. Traffic control devices that will more likely be

seen at night, particularly to impaired drivers with "tunnel vision", are considered effective and therefore recommended. A summary of these improvements are provided in Attachment B.

The total estimated cost for the recommended countermeasures is \$2.9 million, as shown in Attachment C. Upon your concurrence, a Minute Order will be prepared to program a project(s) using available Federal-aid Safety Funds and make distribution as shown below.

CONCUR: 

ATTACHMENTS

- A — Wrong-Way Crash Map
- B — Low Cost Safety Improvement Recommendations
- C — Cost Estimate

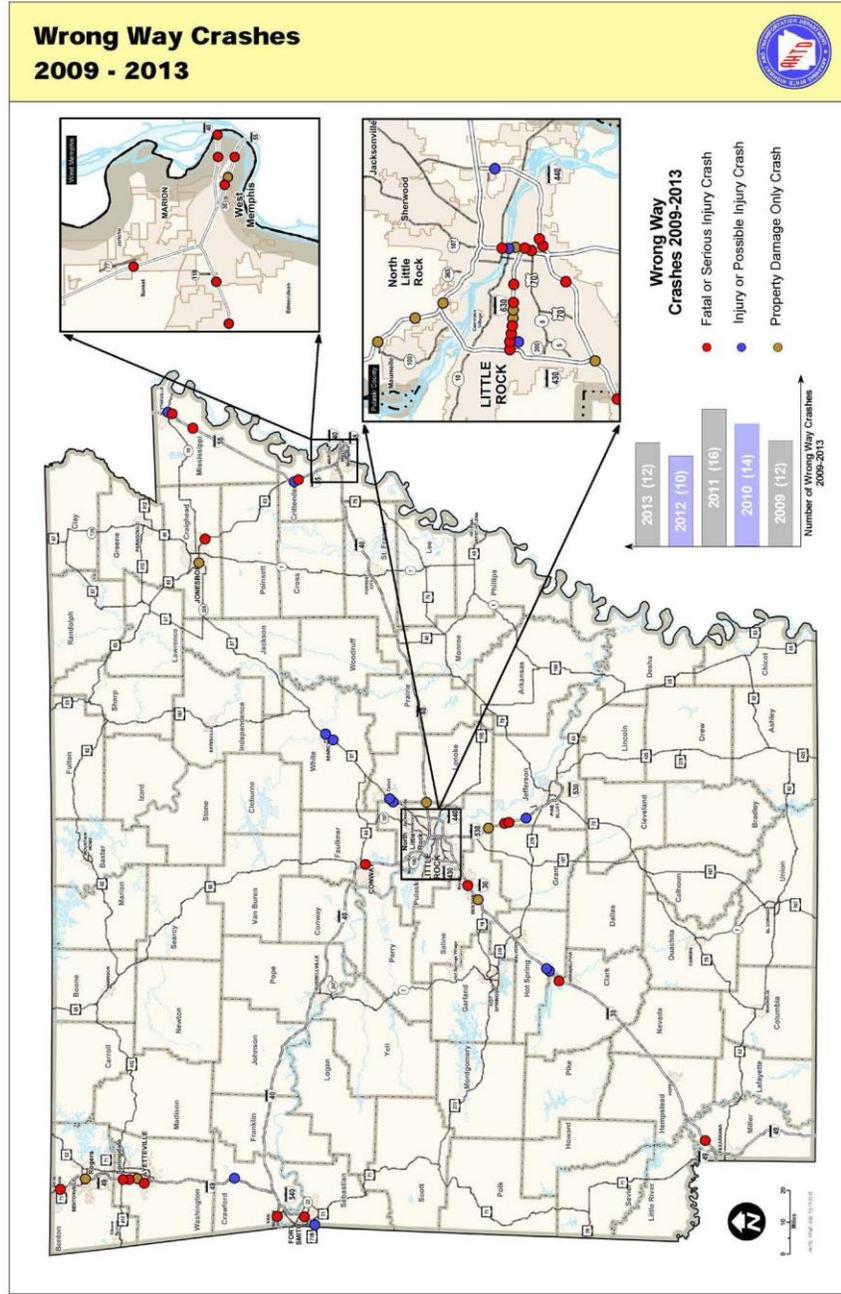
DISTRIBUTION

Deputy Director and Chief Operating Officer
Assistant Chief Engineer – Design
Assistant Chief Engineer – Operations
Program Management
Roadway Design
Maintenance
All Districts

JXJ:ARQ:BW

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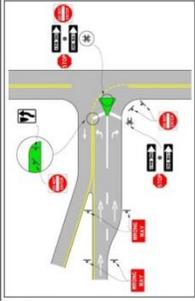
Attachment A — Wrong-Way Crash Map



Attachment B — Low Cost Safety Improvement Recommendations

COUNTERMEASURE	ILLUSTRATION	LOCATIONS	EXPLANATION AND PURPOSE
Sign Replacement and Lowered Signs		All exit ramps	All signs at exit ramps will be replaced. The DO NOT ENTER, WRONG WAY, and ONE WAY signs will have brighter, Type XI sign sheeting. DO NOT ENTER and WRONG WAY signs will be installed to a lower mounting height. Lowered signs are better illuminated by a vehicle's headlights making them more visible at night.
Retroreflective Sign Post Sheeting		All exit ramps	Retroreflective strips of material will be attached to the sign posts of DO NOT ENTER and WRONG WAY signs. At night, this enhanced conspicuity tends to bring a driver's eyes up to the sign, subsequently alerting the driver.
Thermoplastic Wrong-Way Pavement Arrows		All exit ramps near their termini	Installed near exit ramp termini, these pavement arrows indicate to wrong-way drivers that they are traveling in the wrong direction. They will be installed on all exit ramps.
Thermoplastic Directional Lane Arrows		Two-way frontage roads directly after an exit ramp	This will alert the exit ramp driver to keep to the right side of the roadway. Also, it will help those on the frontage road to know they must go straight, and not enter the exit ramp.

Attachment B — Low Cost Safety Improvement Recommendations

COUNTERMEASURE	ILLUSTRATION	LOCATIONS	EXPLANATION AND PURPOSE
Stop Lines		All exit ramp termini controlled by a stop sign	A Virginia study showed that adding stop lines at exit ramps was an effective wrong-way driving countermeasure. Additionally, the study stated that stop lines would probably discourage drivers on the cross-street from entering the exit ramp. Many exit ramps, especially in rural areas, do not have any transverse pavement markings at their termini.
Yield Lines		All exit ramp termini controlled by a yield sign	Yield lines are used to supplement yield signs. Additionally, these transverse pavement markings can deter a driver from entering a ramp in the wrong direction.
Line Extensions		Side-by-side ramps	Partial cloverleaf interchanges with side-by-side ramps can increase the risk of wrong-way entry. To help alleviate driver confusion, line extensions will be installed. Line extensions are pavement markings often used to guide left-turning motorists to the correct lane in an intersection. These markings will be installed at interchanges with side-by-side ramps to guide drivers to the correct ramp.
Ramp Delineation		All exit ramps	Ramp delineators will be added to both sides of off-ramps. Drivers traveling in the proper direction will see white delineators on the right side and amber delineators on the left. Drivers traveling in the wrong direction will see red delineators on both sides of the ramp. Side-by-side ramps with concrete barrier wall separation will also be delineated. Raised pavement markers will be installed on the concrete wall so that wrong-way vehicles will see a red reflection, while correct-way vehicles will see an amber reflection.

B-2

Attachment C — Cost Estimate

Sign Replacement and Lowered Signs

SIGN TYPE	TOTAL	COST ESTIMATE
36" STOP	508	\$ 71,000
48" STOP	232	\$ 58,000
48" YIELD	436	\$ 47,000
30" DO NOT ENTER	887	\$ 86,000
36" DO NOT ENTER	433	\$ 61,000
48" DO NOT ENTER	54	\$ 13,000
12"x36" ONE WAY	1040	\$ 48,000
18"x54" ONE WAY	868	\$ 91,000
30"x42" WRONG WAY	1074	\$ 146,000
24"x30" KEEP RIGHT	72	\$ 6,000
Sign Post Sheeting	729	\$ 30,000
Total:		\$ 657,000

Pavement Markings

COUNTERMEASURE	AMOUNT	LENGTH	UNIT	COST ESTIMATE
Reflectorized Pavement Arrows	729	N/A	Each	\$ 147,000
Directional Lane Arrows	21	N/A	Each	\$ 4,000
Stop Lines	729	40	LF	\$ 628,000
Yield Lines	500	12	LF	\$ 218,000
Line Extension Pavement Markings	66	60	LF	\$ 2,000
Total:				\$ 999,000

Ramp Delineation

COUNTERMEASURE	AMOUNT	DELINEATORS/RAMP	UNIT	COST ESTIMATE
Ramp Delineation*	729	32	Each	\$ 1,166,000.00
Barrier Delineation**	35	100	Each	\$ 28,000.00
Total:				\$ 1,194,000.00
*Based on a 1600' ramp with a delineator every 100' on all ramps				
**Based on a 1000' wall with an RPM every 10'				

COST ESTIMATE SUMMARY

LOW COST SAFETY IMPROVEMENTS	COST ESTIMATE
Signs	\$ 657,000.00
Pavement Markings	\$ 999,000.00
Ramp Delineation	\$ 1,194,000.00
Total:	\$ 2,850,000.00

APPENDIX D



ARKANSAS DEPARTMENT OF TRANSPORTATION

ArDOT.gov | IDriveArkansas.com | Scott E. Bennett, P.E., Director

MAINTENANCE DIVISION

11300 West Baseline Road | P.O. Box 2261 | Little Rock, AR 72203-2261 | Phone: 501.569.2661 | Fax: 501.569.2014

February 12, 2018

TO: Mr. Adnan Qazi, Traffic Safety Section Head

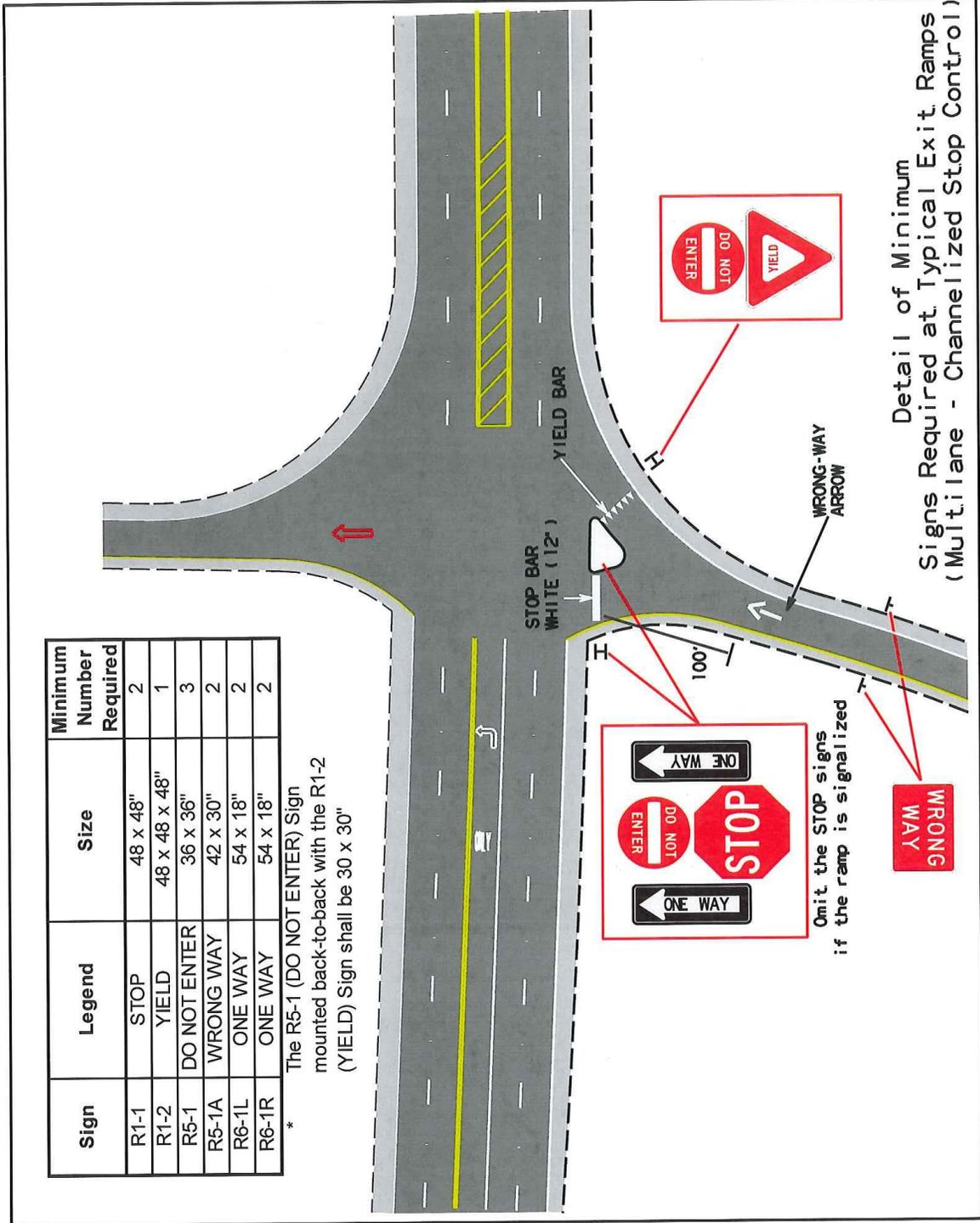
FROM: Mr. Joe Sartini, State Maintenance Engineer

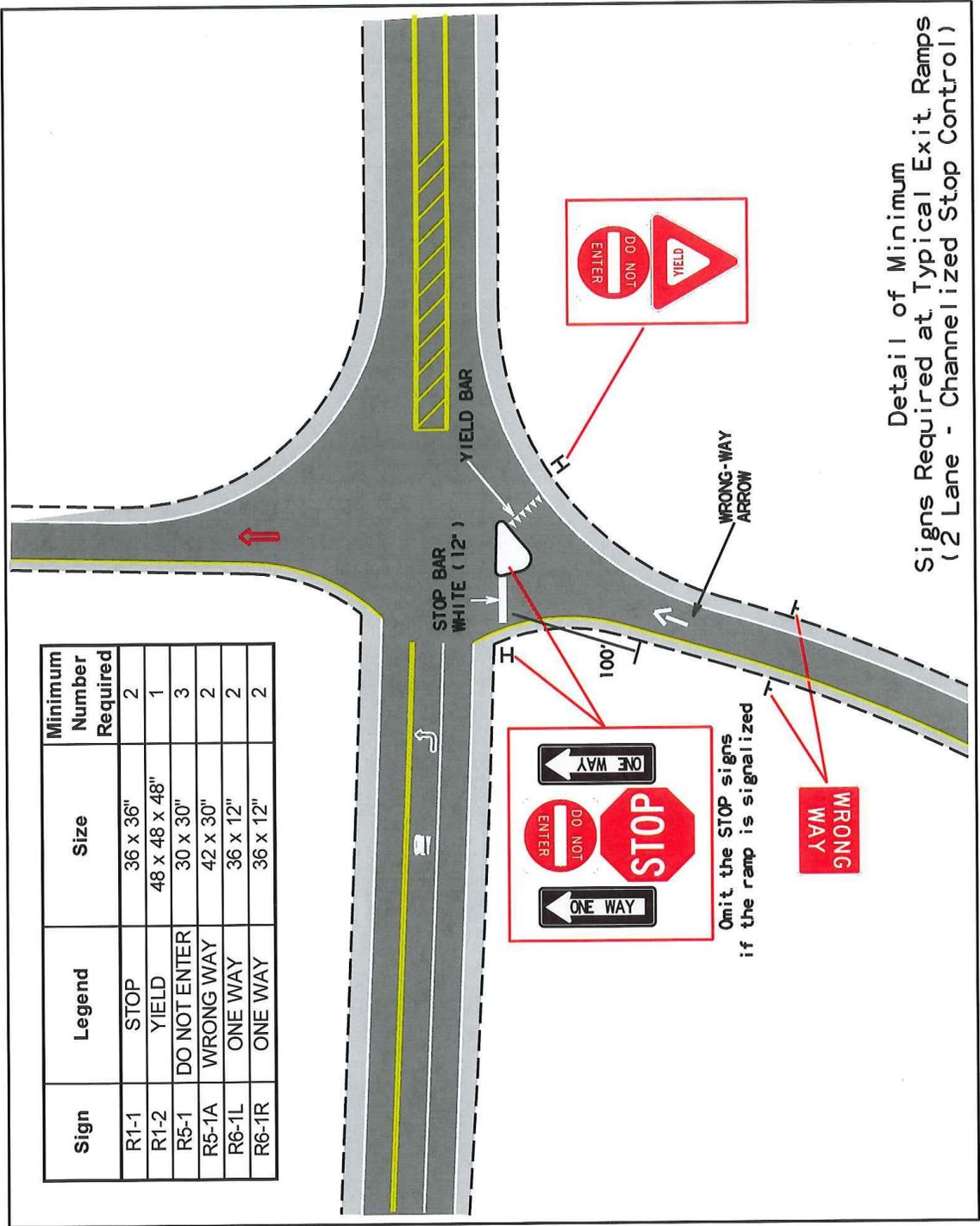
SUBJECT: Annual Analysis for Wrong-Way Crashes on Interstates and other Freeways

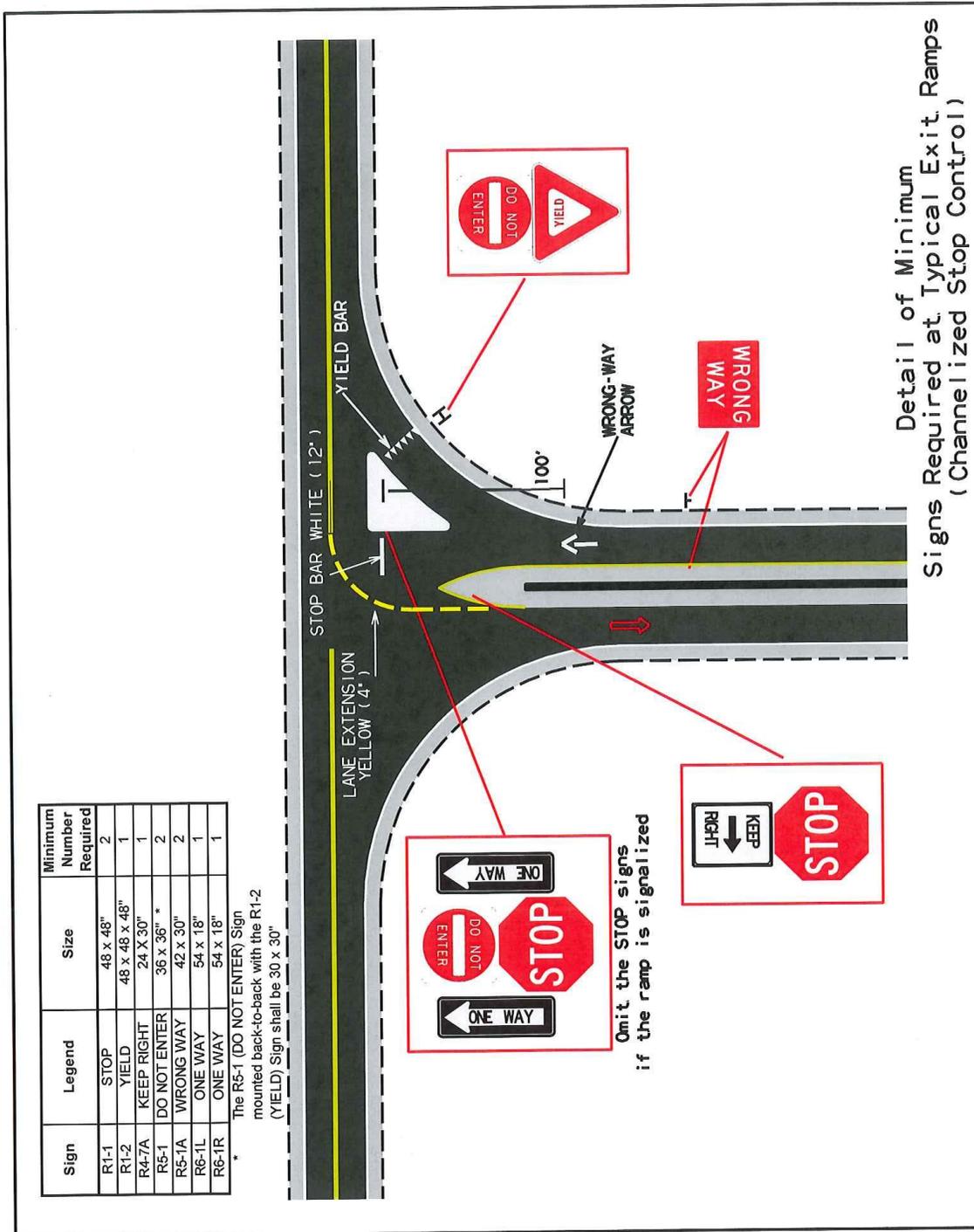
Job 012260, Statewide Wrong-Way Crash Freeway Impvts. (S), Federal Aid Project HSIP-0076 (121) was recently completed. This project made improvements in signing and striping at every intersection listed on the 2016 wrong way crash reports (details attached). Since these improvements were recently completed statewide, Maintenance feels that sending investigators to all of these locations would be redundant this year, since these statewide improvements have changed the intersection conditions of every one of these crash sites. Next year we will return to investigating these on a case by case basis, since these statewide improvements would have been in place for over a year at that point.

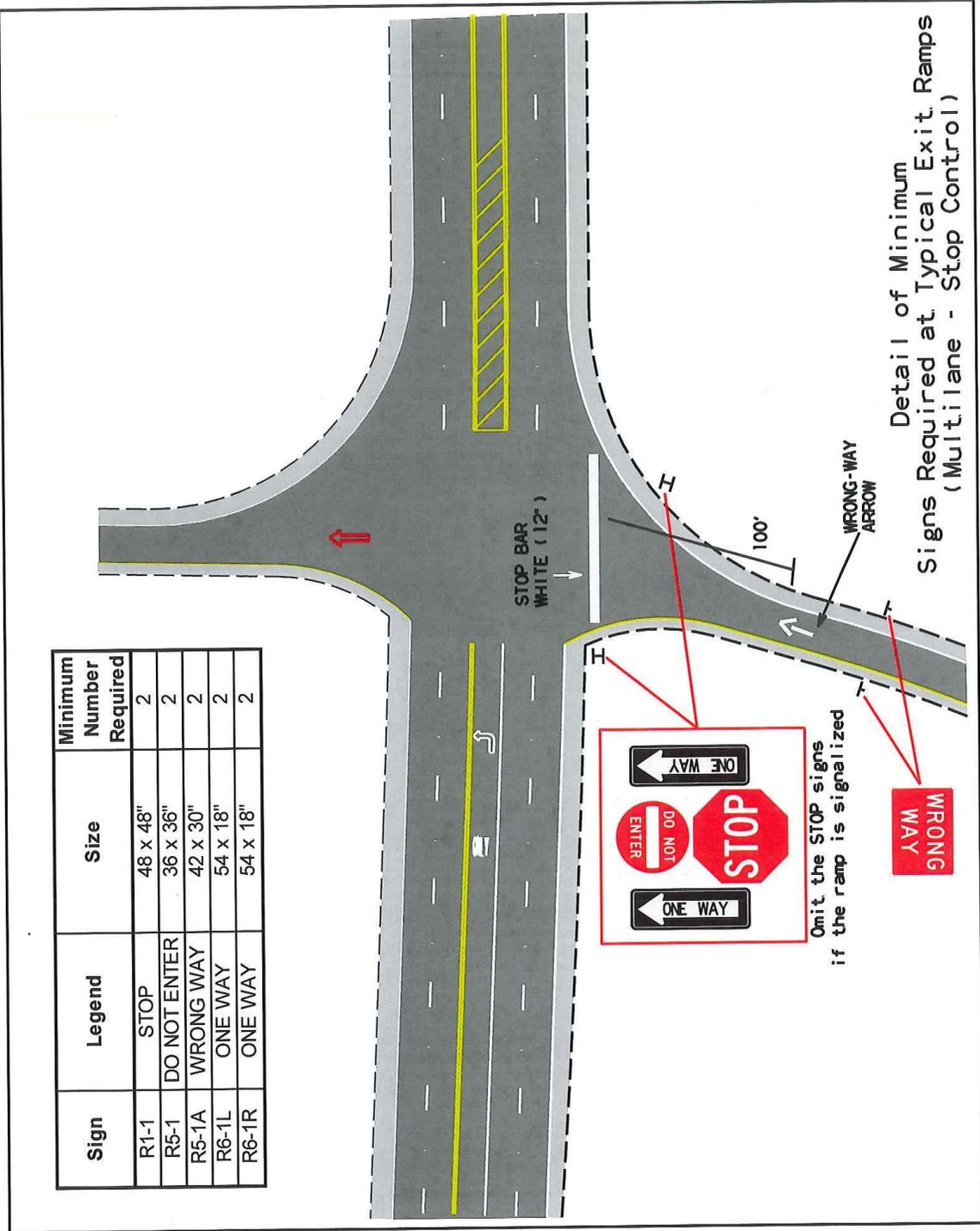

Joe Sartini
State Maintenance Engineer

Enclosure
c: Assistant Chief Engineer-Operations





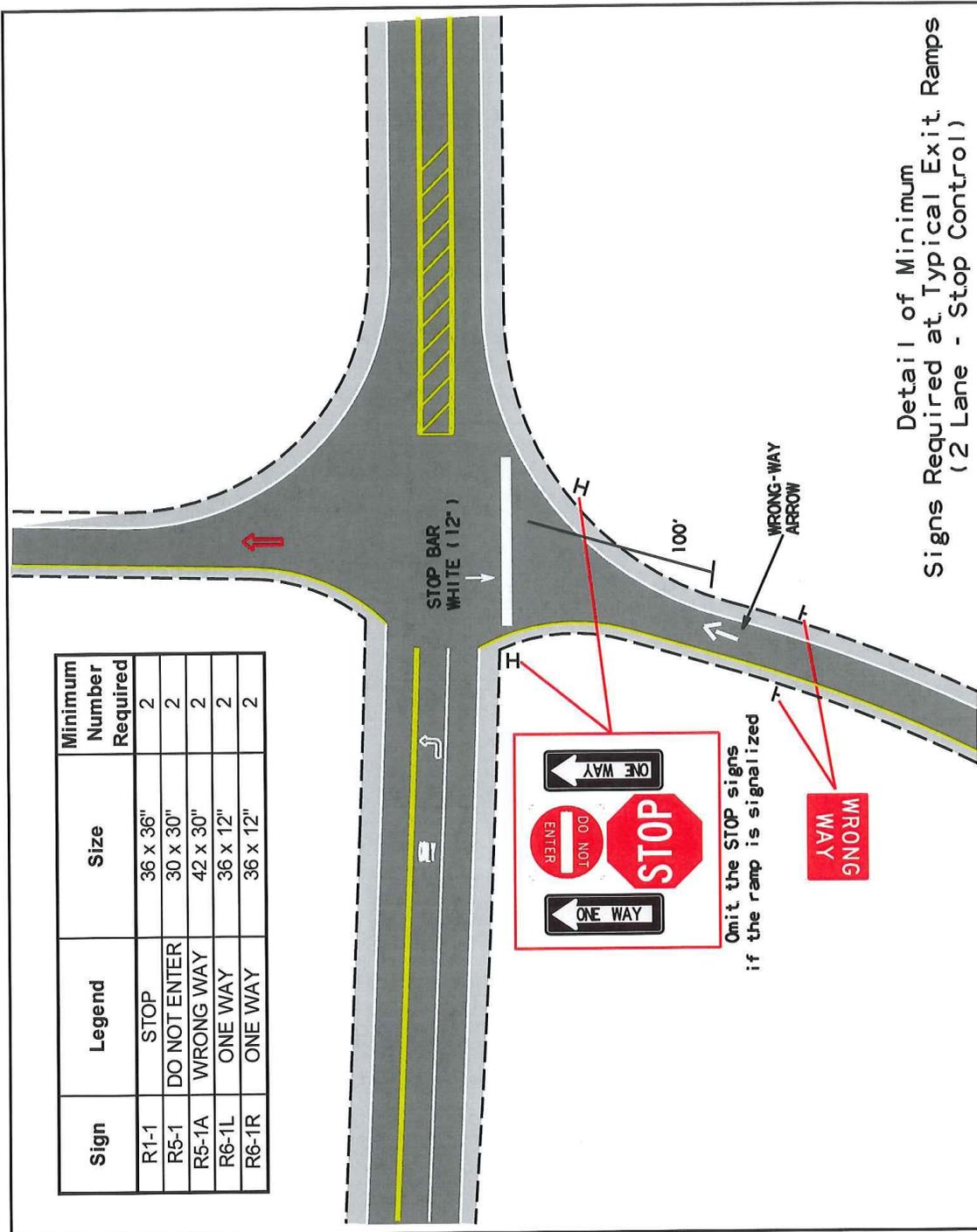




Sign	Legend	Size	Minimum Number Required
R1-1	STOP	48 x 48"	2
R5-1	DO NOT ENTER	36 x 36"	2
R5-1A	WRONG WAY	42 x 30"	2
R6-1L	ONE WAY	54 x 18"	2
R6-1R	ONE WAY	54 x 18"	2

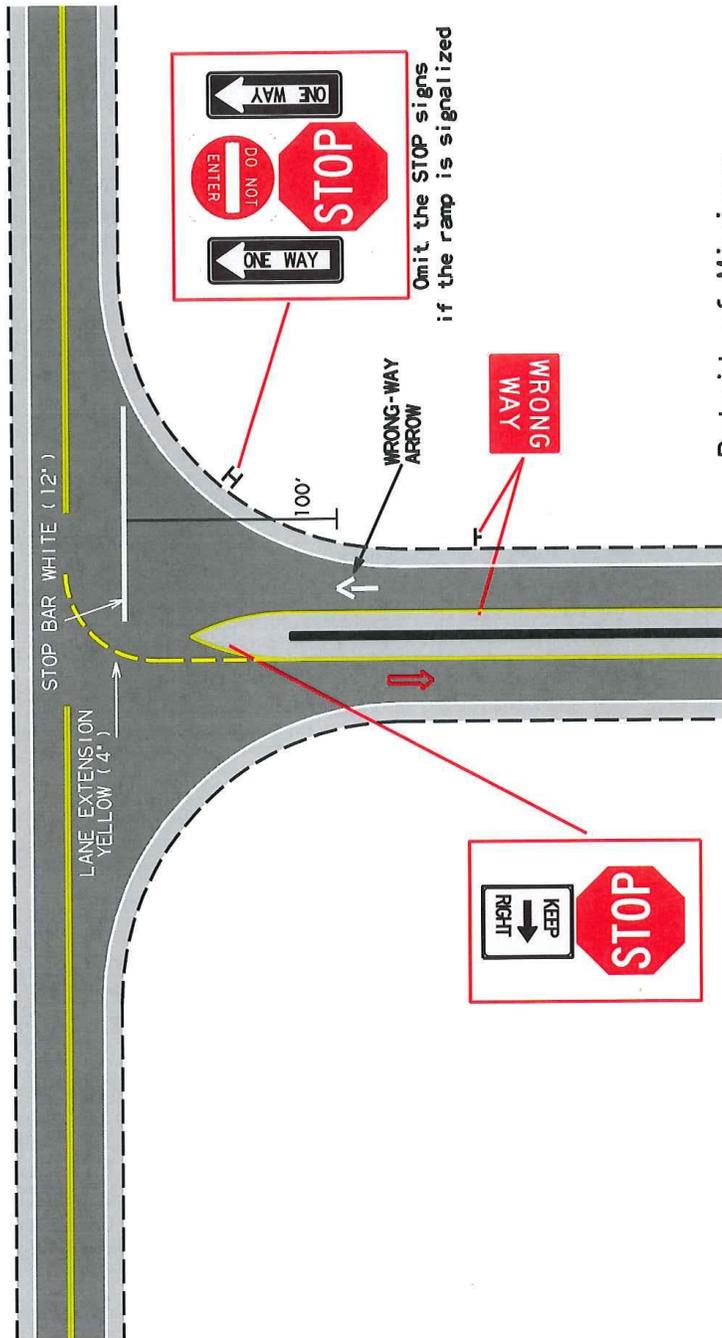
Detail of Minimum Signs Required at Typical Exit Ramps (Multilane - Stop Control)

Omit the STOP signs if the ramp is signalized

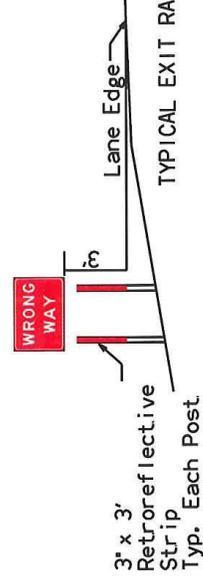
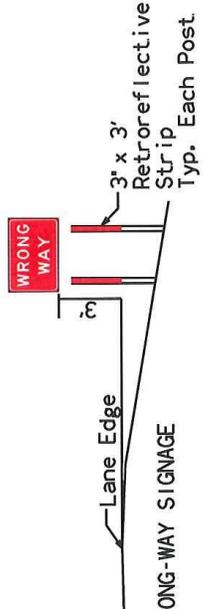


Detail of Minimum Signs Required at Typical Exit Ramps (2 Lane - Stop Control)

Sign	Legend	Size	Minimum Number Required
R1-1	STOP	48 x 48"	2
R4-7A	KEEP RIGHT	24 X 30"	1
R5-1	DO NOT ENTER	36 x 36"	1
R5-1A	WRONG WAY	42 x 30"	2
R6-1L	ONE WAY	54 x 18"	1
R6-1R	ONE WAY	54 x 18"	1

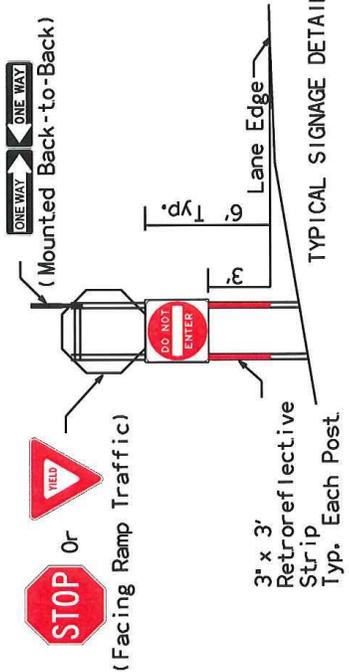
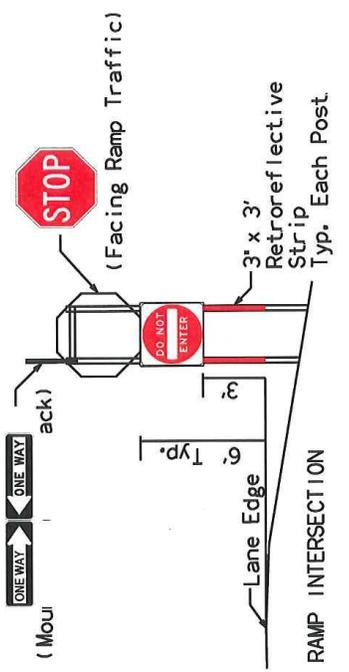


Detail of Minimum Signs Required at Typical Exit Ramps (Stop Control)



TYPICAL EXIT RAMP WRONG-WAY SIGNAGE

- NOTES**
1. Wrong-Way signs may be mounted on the back side of existing sign supports where possible.
 2. Wrong-Way signs are normally gated, but may be offset when barrier walls are present on the inside shoulder. In such cases, the sign on the inside shoulder side may be located past the end of the barrier wall. In rare cases where the barrier wall extends to or near the main lanes, both signs may be located on the outside shoulder side of the ramp, with approximately 300' spacing between the signs.



TYPICAL SIGNAGE DETAILS AT RAMP INTERSECTION