



**Minnesota Manual
on
Uniform Traffic
Control Devices**

MN

MUTCD

September 2020

**MINNESOTA
MANUAL
ON
UNIFORM
TRAFFIC
CONTROL
DEVICES**



**MN
MUTCD
September 2020**



Office of Traffic Engineering
1500 West County Road B2 – MS 725
Roseville, MN 55113

September 15, 2020

To: Holders of the 2011 Minnesota Manual on Uniform Traffic Control Devices

Transmitted herewith is Revision Number 8 (September 3, 2020) to the “2011 Minnesota Manual on Uniform Traffic Control Devices” (2011 MN MUTCD) as adopted by the Commissioner of the Minnesota Department of Transportation (MnDOT). The attached pages to the 2011 MN MUTCD incorporate changes or corrections brought about by changes in the FHWA MUTCD and Minnesota practices or procedures.

All revised pages are attached herewith and shall replace corresponding pages in this manual. The attached Commissioner’s Order No. 98764 amends Commissioner’s Orders 93167, 93799, 94040, 94687, 97233, 97267 and 98253. It is important to retain all Orders because they amend but do not replace previous Orders.

The 2011 MN MUTCD, including Revision Numbers 1, 2, 3, 4, 5, 6, 7 and 8, is available on the MnDOT website at <http://www.dot.state.mn.us/trafficeng/publ/mutcd/index.html>. The latest version will be available on the website after it has been adopted by the Commissioner of Transportation.

MnDOT no longer maintains a mailing list for printed updates to this manual. Users of the manual must fill out the “Subscribe to Traffic Engineering resource updates” form found on the website above under “Publications.” When an update/revision is made to the manual, an email will be sent out advising users to visit the website. The user must then download and print the revised pages and insert them into the printed version of their 2011 MN MUTCD.

To purchase additional copies of this manual or other State of Minnesota manuals, call the MnDOT Map & Manual Sales Unit at 651-366-3017 for current costs and ordering information. They are located at the following address:

MnDOT Map & Manual Sales Unit
395 John Ireland Blvd. - MS 260
St. Paul, Minnesota 55155-1899

Comments regarding the content of the 2011 MN MUTCD should be referred to:

Tiffany Kautz, Traffic Standards Engineer
Office of Traffic Engineering
Phone: (651) 234-7388
Email: tiffany.kautz@state.mn.us

Sincerely,

Brian Sorenson  Digitally signed by Brian Sorenson
Date: 2020.09.15 14:14:13 -05'00'

Brian K. Sorenson, PE
State Traffic Engineer

**REVISIONS TO THE
2011 MINNESOTA UNIFORM TRAFFIC CONTROL DEVICES MANUAL
ORDER NO. 98764**

This is the eighth order revising the 2011 Minnesota Manual on Uniform Traffic Control Devices (2011 MN MUTCD).

By Order number 92452 dated December 15, 2011 and published in the State Register of December 26, 2011, the Commissioner of Transportation (Commissioner) has adopted the 2011 MN MUTCD establishing a uniform system of traffic control devices for streets and highways of the State of Minnesota as required by Minnesota Statutes, Section 169.06, Subdivision 1 (2011). The 2011 MN MUTCD correlates with and so far as possible conforms to the current system as approved by the American Association of State Highway Officials and the national Manual on Uniform Traffic Control Devices (Federal MUTCD). (Minn. Stat. § 169.06, subd. 1 (2011); Federal Highway Administration, 23 C.F.R. § 655.603 (2011).)

The Commissioner adopted revisions and changes to the 2011 MN MUTCD by Order numbers:

- 1) 93167 dated July 12, 2012 published in the State Register of July 23, 2012;
- 2) 93799 dated July 8, 2013 published in the State Register of August 5, 2013;
- 3) 94040 dated December 11, 2013 published in the State Register of December 16, 2013;
- 4) 94687 dated February 10, 2015 published in the State Register of February 17, 2015, 94687 revised April 1, 2015 published in the State Register of April 13, 2015;
- 5) 97233 dated January 30, 2018 published in the State Register of February, 12, 2018;
- 6) 97267 dated February 21, 2018 published in the State Register of March 12, 2018.
- 7) 98253 dated December 4, 2019 published in the State Register of December 9, 2019.

A multi-agency committee has reviewed the changes in the 2009 Federal MUTCD and recommended further revisions and additions.

Pursuant to Minnesota Statutes, Section 169.06, subd. 1 (2011), and 169.215, subd. 2 (2011), the Commissioner hereby adopts the revisions listed below:

Record of Revisions or Additions to the MN MUTCD

<u>Revision Number</u>	<u>Date Issued</u>	<u>Pages Revised or Added</u>
8	9-3 2020	1A-i, 1A-13, 1A-14, 2B-i, 2B-17, 2I-i, 2I-3, 2I-4, 2I-9, 2I-10, 2I-13, 2M-i, 2M-4, 2M-11, 2M-12, 3A-ii, 3F-3, 6A-ii, 6A-iii, 6A-iv, 6A-v, 6A-vi, 6E-1, 6F-3, 6F-4, 6F-5, 6F-7, 6F-9, 6F-12, 6F-13, 6F-14, 6F-15, 6F-26, 6F-28, 6F-30, 6F-38, 6F-50, 6G-1, 6G-4, 6G-6, 6G-7, 6G-8, 6G-14, 6H-1, 6H-8, 6J-ii, 6J-4, 6J-10

This Order revises Commissioner's Order number 92452, dated December 15, 2011 as revised by Commissioner's Orders numbers 93167 dated July 12, 2012, 93799 dated July 8, 2013, 94040 dated December 11, 2013, 94687 dated February 10, 2015, 94687 revised dated April 1, 2015, 97233 dated January 30, 2018, 97267 dated February 21, 2018 and 98253 dated December 4, 2019.

Signed this 8 day of September 2020.



Margaret Anderson Kelliher
Commissioner of Transportation

**REVISIONS TO THE
2011 MINNESOTA UNIFORM TRAFFIC CONTROL DEVICES MANUAL
ORDER NO. 98253**

This is the seventh order revising the 2011 Minnesota Manual on Uniform Traffic Control Devices (2011 MN MUTCD).

By Order number 92452 dated December 15, 2011 and published in the State Register of December 26, 2011, the Commissioner of Transportation (Commissioner) has adopted the 2011 MN MUTCD establishing a uniform system of traffic control devices for streets and highways of the State of Minnesota as required by Minnesota Statutes, Section 169.06, Subdivision 1 (2011). The 2011 MN MUTCD correlates with and so far as possible conforms to the current system as approved by the American Association of State Highway Officials and the national Manual on Uniform Traffic Control Devices (Federal MUTCD). (Minn. Stat. § 169.06, subd. 1 (2011); Federal Highway Administration, 23 C.F.R. § 655.603 (2011).)

The Commissioner adopted revisions and changes to the 2011 MN MUTCD by Order numbers:

- 1) 93167 dated July 12, 2012 published in the State Register of July 23, 2012;
- 2) 93799 dated July 8, 2013 published in the State Register of August 5, 2013;
- 3) 94040 dated December 11, 2013 published in the State Register of December 16, 2013;
- 4) 94687 dated February 10, 2015 published in the State Register of February 17, 2015, 94687 revised April 1, 2015 published in the State Register of April 13, 2015;
- 5) 97233 dated January 30, 2018 published in the State Register of February, 12, 2018;
- 6) 97267 dated February 21, 2018 published in the State Register of March 12, 2018.

A multi-agency committee has reviewed the changes in the 2009 Federal MUTCD and recommended further revisions and additions.

Pursuant to Minnesota Statutes, Section 169.06, subd. 1 (2011), and 169.215, subd. 2 (2011), the Commissioner hereby adopts the revisions listed below:

Record of Revisions or Additions to the MN MUTCD

<u>Revision Number</u>	<u>Date Issued</u>	<u>Pages Revised or Added</u>
7	<u>12/4/19</u>	2B-i, 2B-ii, 2B-6, 2B-15, 2B-31, 2B-56, 2H-1, 2H-3, 2H-4, 2H-5, 2H-6, 2H-8, 2H-i, 2M-5, 2M-16, 6A-i, 6A-ii, 6A-iv, 6A-v, 6A-vi, 6C-2, 6D-1, 6D-2, 6D-4, 6E-1, 6E-4, 6E-8, 6E-10, 6F-1, 6F-7, 6F-12, 6F-19, 6F-27, 6F-32, 6F-33, 6G-7, 6G-9, 6G-12, 6G-14, 6J-19.

This Order revises Commissioner's Order number 92452, dated December 15, 2011 as revised by Commissioner's Orders numbers 93167 dated July 12, 2012, 93799 dated July 8, 2013, 94040 dated December 11, 2013, 94687 dated February 10, 2015, 94687 revised dated April 1, 2015, 97233 dated January 30, 2018 and 97267 dated February 21, 2018.

Signed this 4 day of December 2018.⁹



Margaret Anderson Kelliher
Commissioner of Transportation

**REVISIONS TO THE
2011 MINNESOTA UNIFORM TRAFFIC CONTROL DEVICES MANUAL
ORDER NO. 97267**

This is the sixth order revising the 2011 Minnesota Manual on Uniform Traffic Control Devices (2011 MN MUTCD).

By Order number 92452 dated December 15, 2011 and published in the State Register of December 26, 2011, the Commissioner of Transportation (Commissioner) has adopted the 2011 MN MUTCD establishing a uniform system of traffic control devices for streets and highways of the State of Minnesota as required by Minnesota Statutes, Section 169.06, Subdivision 1 (2011). The 2011 MN MUTCD correlates with and so far as possible conforms to the current system as approved by the American Association of State Highway Officials and the national Manual on Uniform Traffic Control Devices (Federal MUTCD). (Minn. Stat. § 169.06, subd. 1 (2011); Federal Highway Administration, 23 C.F.R. § 655.603 (2011).)

The Commissioner adopted revisions and changes to the 2011 MN MUTCD by Order numbers:

- 1) 93167 dated July 12, 2012 published in the State Register of July 23, 2012;
- 2) 93799 dated July 8, 2013 published in the State Register of August 5, 2013;
- 3) 94040 dated December 11, 2013 published in the State Register December 16, 2013;
- 4) 94687 dated February 10, 2015 published in the State Register of February 17, 2015, 94687 revised April 1, 2015 published in the State Register of April 13, 2015;
- 5) 97233 dated January 30, 2018 published in the State Register of February 12, 2018.

A multi-agency committee has reviewed the changes in the 2009 Federal MUTCD and recommended further revisions and additions.

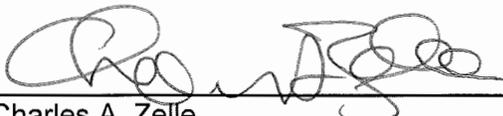
Pursuant to Minnesota Statutes, Section 169.06, subd. 1 (2011), and 169.215, subd. 2 (2011), the Commissioner hereby adopts the revisions listed below:

Record of Revisions or Additions to the MN MUTCD

<u>Revision Number</u>	<u>Date Issued</u>	<u>Pages Revised or Added</u>
6	<u>2/21/18</u>	1A-i, 1A-18, 2B-i, 2B-ii, 2B-iii, 2B-6, 2B-14, 2B-16, 2B-57, 2B-58, 2C-i, 2C-19, 2C-20, 2D-ii, 2D-37, 2D-38, 2M-i, 2M-13, 2M-14, 3A-i, 3A-ii, 3B-32, 3F-3, 3F-4, 4A-i, 4A-iii, 4D-1, 4I-1, 5A-ii, 5G-1, 7A-i, 7D-1, 7F-1, 8A-i, 8A-ii, 8A-iii, 8A-1, 8B-9, 8B-20, 8C-11, 8C-13, 8C-14, 8C-15, 8C-16, 8C-17, 8D-2.

This Order revises Commissioner's Order number 92452, dated December 15, 2011 as revised by Commissioner's Orders numbers 93167 dated July 12, 2012, 93799 dated July 8, 2013, 94040 dated December 11, 2013, 94687 dated February 10, 2015, 94687 revised dated April 1, 2015, and 97233 dated January 30, 2018.

Signed this 21 day of February 2018.



Charles A. Zelle
Commissioner of Transportation

**REVISIONS TO THE
2011 MINNESOTA UNIFORM TRAFFIC CONTROL DEVICES MANUAL
ORDER NO. 97233**

This is the fifth order revising the 2011 Minnesota Manual on Uniform Traffic Control Devices (2011 MN MUTCD).

By Order number 92452 dated December 15, 2011 and published in the State Register of December 26, 2011, the Commissioner of Transportation (Commissioner) has adopted the 2011 MN MUTCD establishing a uniform system of traffic control devices for streets and highways of the State of Minnesota as required by Minnesota Statutes, Section 169.06, Subdivision 1 (2011). The 2011 MN MUTCD correlates with and so far as possible conforms to the current system as approved by the American Association of State Highway Officials and the national Manual on Uniform Traffic Control Devices (Federal MUTCD). (Minn. Stat. § 169.06, subd. 1 (2011); Federal Highway Administration, 23 C.F.R. § 655.603 (2011).)

The Commissioner adopted revisions and changes to the 2011 MN MUTCD by Order numbers:

- 1) 93167 dated July 12, 2012 published in the State Register of July 23, 2012;
- 2) 93799 dated July 8, 2013 published in the State Register of August 5, 2013;
- 3) 94040 dated December 11, 2013 published in the State Register of December 16, 2013;
- 4) 94687 dated February 10, 2015 published in the State Register of February 17, 2015, 94687 revised April 1, 2015 published in the State Register of April 13, 2015.

A multi-agency committee has reviewed the changes in the 2009 Federal MUTCD and recommended further revisions and additions.

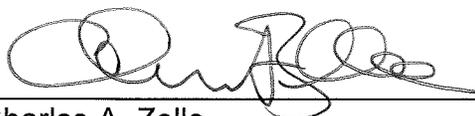
Pursuant to Minnesota Statutes, Section 169.06, subd. 1 (2011), and 169.215, subd. 2 (2011), the Commissioner hereby adopts the revisions listed below:

Record of Revisions or Additions to the MN MUTCD

<u>Revision Number</u>	<u>Date Issued</u>	<u>Pages Revised or Added</u>
5	<u>1-30-18</u>	Chapter 6K (the Field Manual) in its entirety.

This Order revises Commissioner's Order number 92452, dated December 15, 2011 as revised by Commissioner's Orders numbers 93167 dated July 12, 2012, 93799 dated July 8, 2013, 94040 dated December 11, 2013, 94687 dated February 10, 2015, and 94687 revised dated April 1, 2015.

Signed this 30 day of January 2018.



Charles A. Zelle
Commissioner of Transportation

**REVISIONS TO THE
2011 MINNESOTA UNIFORM TRAFFIC CONTROL DEVICES MANUAL
ORDER NO. 94687**

**(This is a republication of the Commissioner's Order dated February 10, 2015
revising the record of revisions and additions)**

This is the fourth order revising the 2011 Minnesota Manual on Uniform Traffic Control Devices (2011 MN MUTCD).

By Order number 92452 dated December 15, 2011 and published in the State Register of December 26, 2011, the Commissioner of Transportation (Commissioner) has adopted the 2011 MN MUTCD establishing a uniform system of traffic control devices for streets and highways of the State of Minnesota as required by Minnesota Statutes, Section 169.06, Subdivision 1 (2011). The 2011 MN MUTCD correlates with and so far as possible conforms to the current system as approved by the American Association of State Highway Officials and the national Manual on Uniform Traffic Control Devices (Federal MUTCD). (Minn. Stat. § 169.06, subd. 1 (2011); Federal Highway Administration, 23 C.F.R. § 655.603 (2011).)

The Commissioner adopted revisions and changes to the 2011 MN MUTCD by Order numbers:

93167 dated July 12, 2012 published in the State Register of July 23, 2012,
93799 dated July 8, 2013 published in the State Register of August 5, 2013, and
94040 dated December 11, 2013 published in the State Register December 16, 2013.

A multi-agency committee has reviewed the changes in the 2009 Federal MUTCD and recommended further revisions and additions.

Pursuant to Minnesota Statutes, Section 169.06, subd. 1 (2011), and 169.215, subd. 2 (2011), the Commissioner hereby adopts the revisions listed below:

Record of Revisions or Additions to the MN MUTCD

<u>Revision Number</u>	<u>Date Issued</u>	<u>Pages Revised or Added</u>
4	4/1/2015	v, ix, 2C-i, 2C-iii, 2C-5, 2C-23, 3A-i, 3A-iii, 3B-8, 3B-10, 3B-11, 3B-14, 3B-36, 6A-iii, 6A-v, 6A-vi, 6C-6, 6F-20, Chapter 6H (Speed Limits in Temporary Traffic Control Zones) in its entirety.

This Order revises Commissioner's Order number 92452, dated December 15, 2011 as revised by Commissioner's Orders numbers 93167 dated July 12, 2012, 93799 dated July 8, 2013, and 94040 dated December 11, 2013.

Signed this 1st day of April, 2015.

A handwritten signature in black ink, appearing to read "Charles A. Zelle". The signature is fluid and cursive, with the first name "Charles" being the most prominent part.

Charles A. Zelle
Commissioner of Transportation

**REVISIONS TO THE
2011 MINNESOTA UNIFORM TRAFFIC CONTROL DEVICES MANUAL**

ORDER NO. 94687

This is the fourth order revising the 2011 Minnesota Manual on Uniform Traffic Control Devices (2011 MN MUTCD).

By Order number 92452 dated December 15, 2011 and published in the State Register of December 26, 2011, the Commissioner of Transportation (Commissioner) adopted the 2011 MN MUTCD establishing a uniform system of traffic control devices for streets and highways of the State of Minnesota as required by Minnesota Statutes, Section 169.06, Subdivision 1 (2011). The 2011 MN MUTCD correlates with and so far as possible conforms to the current system as approved by the American Association of State Highway Officials and the national Manual on Uniform Traffic Control Devices (Federal MUTCD). (Minn. Stat. § 169.06, subd. 1 (2014); Federal Highway Administration, 23 C.F.R. § 655.603 (2014).)

The Commissioner adopted revisions and changes to the 2011 MN MUTCD by Order numbers:

93167 dated July 12, 2012 published in the State Register of July 23, 2012,
93799 dated July 8, 2013 published in the State Register of August 5, 2013, and
94040 dated December 11, 2013 published in the State Register of December 16, 2013.

A multi-agency committee has reviewed the changes in the 2009 Federal MUTCD and recommended further revisions and additions.

Pursuant to Minnesota Statutes, Section 169.06, subd. 1 (2014), and 169.215, subd. 2 (2014), the Commissioner hereby adopts the revisions listed below:

Record of Revisions or Additions to the MN MUTCD

<u>Revision Number</u>	<u>Date Issued</u>	<u>Pages Revised or Added</u>
4	02/10/15	2C-5, 2C-23, 3B-8, 3-10, 3B-11, 3B-14, 3-36, 6C-6, 6F-20, Chapter 6H (Speed Limits in Temporary Traffic Control Zones) in its entirety.

This Order revises Commissioner's Order number 92452, dated December 15, 2011 as revised by Commissioner's Orders numbers 93167 dated July 12, 2012, 93799 dated July 8, 2013, and 94040 dated December 11, 2013.

Signed this 10th day of February 2015.



Charles A. Zelle
Commissioner of Transportation

**REVISIONS TO THE
2011 MINNESOTA UNIFORM TRAFFIC CONTROL DEVICES MANUAL
ORDER NO. 94040**

This is the third order revising the 2011 Minnesota Uniform Traffic Control Devices Manual (2011 MN MUTCD).

By Order number 92452 dated December 15, 2011 and published in the State Register of December 26, 2011, the Commissioner of Transportation (Commissioner) has adopted the 2011 MN MUTCD establishing a uniform system of traffic control devices for streets and highways of the State of Minnesota as required by Minnesota Statutes, Section 169.06, Subdivision 1 (2011). The 2011 MN MUTCD correlates with and so far as possible conforms to the current system as approved by the American Association of State Highway Officials and the national Manual on Uniform Traffic Control Devices (Federal MUTCD). (Minn. Stat. § 169.06, subd. 1 (2011); Federal Highway Administration, 23 C.F.R. § 655.603 (2011).)

The Commissioner adopted revisions and changes to the 2011 MN MUTCD by Order numbers:

93167 dated July 12, 2012 published in the State Register of July 23, 2012, and
93799 dated July 18, 2013 published in the State Register of August 5, 2013.

A multi-agency committee has reviewed the changes in the 2009 Federal MUTCD and recommended further revisions and additions.

Pursuant to Minnesota Statutes, Section 169.06, subd. 1 (2011), the Commissioner hereby adopts the recommended revisions and additions listed below:

Record of Revisions or Additions to the MN MUTCD

Revision Number	Date Issued	Pages Revised or Added
3	12/11/13	v, ix, 2B-i, 2B-17, 2B-55, 2C-ii, 2C-23, 2C-26 thru 2C-36, 2D-28, 2E-11, 3B-14, 3C-1, 4G-3, 4L-1, 6A-iii thru 6A-vi, 6F-3 thru 6F-5, 6F-14, 6F-17, 6F-19, 6F-20, 6F-40 thru 6F-53, 6G-7, 6J-iii, 6J-2, 6J-4, 6J-5, 6J-7, 6J-8, 6J-10, 6J-11, 6J-14 thru 6J-21, 6J-24a thru 6J-25b, Chapter 6K (<i>the Field Manual</i>) in its entirety, 7B-2, 8B-2, 9B-6, C-3, C-19, C-38, C-39, C-46, C-56 thru C-58, remove Appendix B in its entirety.

This Order revises Commissioner's Order number 92452, dated December 19, 2011 as revised by Commissioner's Order number 93167 dated July 12, 2012 and 93799 dated July 8, 2013.

Signed this 11th day of December 2013.

A handwritten signature in blue ink, appearing to read "Charles A. Zelle". The signature is fluid and cursive, with the first name "Charles" being the most prominent.

Charles A. Zelle
Commissioner of Transportation

**REVISIONS TO THE
2011 MINNESOTA UNIFORM TRAFFIC CONTROL DEVICES MANUAL
ORDER NO. 93799**

The Commissioner of Transportation (Commissioner) has adopted the Minnesota Manual on Uniform Traffic Control Devices (MN MUTCD), dated December 15, 2011 establishing a uniform system of traffic control devices for streets and highways of the State of Minnesota as required by Minnesota Statutes, Section 169.06, Subdivision 1 (2011). Such uniform system shall correlate with and so far as possible conform to the current system as approved by the American Association of State Highway Officials and the national Manual on Uniform Traffic Control Devices (Federal MUTCD). (Minn. Stat. § 169.06, subd. 1 (2011); Federal Highway Administration, 23 C.F.R. § 655.603 (2011).)

A multi-agency committee has recommended the revisions and additions after reviewing changes in the 2009 Federal MUTCD.

Pursuant to Minnesota Statutes, Section 169.06, subd. 1 (2011), the Commissioner hereby adopts the revisions listed below as Record of Revisions or Additions to the MN MUTCD.

This Order revises Commissioner's Order 92452, dated December 15, 2011 as revised by Commissioner's Order 93167 dated July 12, 2012.

Record of Revisions or Additions to the MN MUTCD

Revision Number	Date Issued	Pages Revised or Added
2	6/28/13	ii, v, vii, 2A-4, 2A-18, 2A-19, 2B-2 thru 2B-6, 2B-11, 2B-12, 2B-18, 2B-21, 2B-22, 2B-37, 2B-40, 2B-47, 2B-48, 2B-51, 2B-56, 2B-59, 2C-4, 2C-5, 2C-7, 2C-10, 2C-26, 2C-32, 2D-1, 2D-9, 2D-27, 2D-39, 2E-18, 2E-47, 2E-48, 2E-51, 2G-3, 2G-4, 2H-i, 2H-2, 2H-7 thru 2H-9, 2I-2 thru 2I-4, 2I-7, 2I-10, 2J-1, 2J-4, 2J-6, 2K-1, 2K-5, 2M-i, 2M-1, 2M-2, 2M-9, 2M-12 thru 2M-14, 3B-9, 4D-2, 4D-31, 4D-33, 6F-5, 6J-4, 6J-17, 7A-i, 7B-2, 7B-10, 9B-9, 9B-16, 9B-18, C-1, C-2, C-5, C-13, C-14, C-16 thru C-21, C-24, C-26 thru C-39, C-41 thru C-57, C-59 thru C-61, C-63 thru C-66, C-82 thru C-95, INDEX-9 thru INDEX-16.

This Order revises Commissioner's Order number 92452, dated December 19, 2011 as revised by Commissioner's Order number 93167 dated July 12, 2012.

Signed this 8th day of July 2013.

A handwritten signature in blue ink, appearing to read "Charlie Zelle". The signature is stylized and cursive.

Charlie Zelle
Commissioner of Transportation

**REVISIONS TO THE
2011 MINNESOTA UNIFORM TRAFFIC CONTROL DEVICES MANUAL
ORDER NO. 93167**

The Commissioner of Transportation (Commissioner) has adopted the Minnesota Manual on Uniform Traffic Control Devices (MN MUTCD), dated December 15, 2011 establishing a uniform system of traffic control devices for streets and highways of the State of Minnesota as required by Minnesota Statutes, Section 169.06, Subdivision 1 (2011). Such uniform system shall correlate with and so far as possible conform to the current system as approved by the American Association of State Highway Officials and the national Manual on Uniform Traffic Control Devices (Federal MUTCD). (Minn. Stat. § 169.06, subd. 1 (2011); Federal Highway Administration, 23 C.F.R. § 655.603 (2011).)

A multi-agency committee has recommended the revisions and additions after reviewing changes in the 2009 Federal MUTCD.

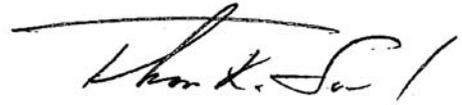
Pursuant to Minnesota Statutes, Section 169.06, subd. 1 (2011), the Commissioner hereby adopts the revisions listed below as Record of Revisions or Additions to the MN MUTCD.

This Order revises Commissioner's Order 92452, dated December 15, 2011.

Record of Revisions or Additions to the MN MUTCD

Revision Number	Date Issued	Pages Revised or Added
1	7/15/12	v, viii, ix, 1A-4, 1A-28, 1A-29, 2A-i, 2A-5, 2A-18, 2B-1 thru 2B-6, 2B-8, 2B-11, 2B-15, 2B-34, 2B-35, 2B-38, 2B-41, 2B-45, 2B-46, 2B-51, 2B-53, 2B-56, 2B-57, 2C-3 thru 2C-5, 2C-11, 2C-13, 2C-17, 2C-18, 2C-20, 2C-21, 2C-24 thru 2C-28, 2C-30, 2C-34, 2D-23, 2D-27 thru 2D-29, 2E-6, 2E-33, 2E-37, 2E-41, 2E-51, 2F-6, 2G-2, 2G-11, 2G-16, 2I-2, 2I-5, 2I-9 thru 2I-11, 2I-13, 2J-5, 2M-1, 2M-2, 2M-9, 2M-15, 2N-2, 3B-27, 3B-35, 4D-1, 4D-39, 4D-46, 4E-3, 4E-5, 4E-6, 4F-3, 5B-2, 5C-2, 5C-3, 6D-1, 6D-2, 6D-4, 6E-1, 6F-3 thru 6F-5, 6F-7, 6F-16, 6F-18, 6F-20, 6F-21, 6F-29, 6F-37, 6F-41, 6F-52, 6G-1, 7A-i, 7B-1, 7B-5, 7B-6, 7B-9, 7B-11, 7C-1, 7D-1, 7E-a thru 7E-21, 8B-1 thru 8B-4, 8B-7 thru 8B-10, 8B-14, 8B-18, 8C-4, 8C-8, 8C-9, 9A-i, 9A-ii, 9B-2 thru 9B4, 9B-6, 9B-9, 9B-18, 9C-1, A2-1, C-1 thru C-10, C-13 thru C-70, C-73 thru C-86.

Dated at St. Paul, Minnesota, this 12th day of June, 2012.

A handwritten signature in black ink, appearing to read "Thomas K. Sorel". The signature is written in a cursive style with a prominent horizontal stroke at the beginning.

Thomas K. Sorel
Commissioner of Transportation

2011 MINNESOTA UNIFORM TRAFFIC CONTROL DEVICES MANUAL ORDER NO. 92452

The Commissioner of Transportation (Commissioner) shall adopt a manual and specifications establishing a uniform system of traffic control devices for streets and highways of the State of Minnesota. Such uniform system shall correlate with and so far as possible conform to the current system as approved by the American Association of State Highway Officials and the national Manual on Uniform Traffic Control Devices (Federal MUTCD). (Minn. Stat. § 169.06, subd. 1 (2008); Federal Highway Administration, 23 C.F.R. § 655.603 (2008).)

A multi-agency committee has reviewed the 2009 Federal MUTCD, FHWA Guidelines on Retroreflective Sheeting Identification, and the 2005 Minnesota Manual on Uniform Traffic Control Devices as revised by Commissioner's Order No. 89453, dated January 2, 2007, 90038 dated February 15, 2008 and 90627 dated March 27, 2009 and recommended adding Appendices and revising or adding text and figures to make provisions for Minnesota Statutes and departmental procedures.

Pursuant to Minnesota Statutes, Section 169.06, subd. 1 (2008), the Commissioner hereby adopts the following as the 2011 Minnesota Manual on Uniform Traffic Control Devices.

- I. Federal MUTCD, 2009 edition (dated January 15, 2010), and List of Known Errors (dated August 17, 2011).
- II. Minnesota Department of Transportation Appendices:
 - A. APPENDIX A1 - Congressional Legislation
 - B. APPENDIX A2 - Metric Conversions
 - C. APPENDIX A3 - Retroreflective Sheeting Identification Guidelines
 - C. APPENDIX B - Warrants, Standards, and Guidelines for Traffic Control Devices used at Senior Citizen and Handicapped Pedestrian Crossings
 - D. APPENDIX C - Sign Listings & Recommended Sizes
- III. State of Minnesota, Department of Transportation, additional sections, revisions, and corrections to the 2009 Federal MUTCD.

It is further ordered that the provisions of the 2011 MN MUTCD shall be implemented and applied to all traffic control devices installed on or after January 1, 2012 upon highways within the State except for those traffic control devices which conform to the 2005 edition of the MN MUTCD with its 3 revisions and are on order or under contract prior to January 1, 2012. All existing traffic control devices or installations not in conformance with standards in the 2011 MN MUTCD shall be changed to conform to the new standards herein when replacement occurs.

This Order supersedes Commissioner's Order No. 88522, dated May 5, 2005 which adopted and prescribed the 2005 Minnesota Manual on Uniform Traffic Control Devices along with Commissioner's Order 89453 dated January 2, 2007, Commissioner's Order 90038 dated February 15, 2008, and as further revised by Commissioner's Order 90627 dated March 26, 2009.

Dated at St. Paul, Minnesota, this 15th day of December, 2011.

A handwritten signature in black ink, appearing to read "Thomas K. Sorel", with a long horizontal flourish above the name.

Thomas K. Sorel
Commissioner of Transportation

Minnesota Manual on Uniform Traffic Control Devices

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Year	Name	Commissioner's Order Number	Month/Day/Year of Adoption
1939	Manual on Uniform Traffic Control Devices for Streets and Highways of the State of Minnesota	12328	4/21/39
1949	Manual on Uniform Traffic Control Devices for Streets and Highways of the State of Minnesota	19270	3/22/49
1956	Manual on Uniform Traffic Control Devices for Streets and Highways of the State of Minnesota	25729	5/23/56
1962	Manual on Uniform Traffic Control Devices for Streets and Highways of the State of Minnesota	32517 49894 50987	2/16/62 9/15/71 4/21/72
1974	Minnesota Manual on Uniform Traffic Control Devices for Streets and Highways	54014	12/20/73
1986	Minnesota Manual on Uniform Traffic Control Devices for Streets and Highways (MN MUTCD)	70797 71787	4/15/86 12/19/86
1991	Minnesota Manual on Uniform Traffic Control Devices for Streets and Highways (MN MUTCD)	77588 78988 79901 80748 80878 81551 82232 82843 83387 84240 85045	10/3/91 1/4/93 2/4/94 1/6/95 4/3/95 3/15/96 1/10/97 1/2/98 11/17/99 1/26/00 12/20/00
2001	Minnesota Manual on Uniform Traffic Control Devices (MN MUTCD)	86252 87127 87570	4/15/02 5/22/03 1/2/04
2005	Minnesota Manual on Uniform Traffic Control Devices (MN MUTCD)	88522 89453 90038 90627	5/5/05 1/2/07 2/15/08 3/26/09
2011	Minnesota Manual on Uniform Traffic Control Devices (MN MUTCD)	92952 93167 93799 94040 94687 97233 97267 98253 98764	12/15/11 7/15/12 7/29/13 12/11/13 2/10/15 1/31/18 2/21/18 9/30/19 9/3/2020

Rev. 1
Rev. 2
Rev. 3
Rev. 4
Rev. 5
Rev. 6
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Rev. 8

Table I-1a. Evolution of the Minnesota MUTCD

GUIDANCE:

The States should adopt Section 15-116 of the UVC, which states that "No person shall install or maintain in any area of private property used by the public any sign, signal, marking, or other device intended to regulate, warn, or guide traffic unless it conforms with the State manual and specifications adopted under Section 15-104."

SUPPORT:

The Standard, Guidance, Option, and Support material described in this edition of the MUTCD provide the transportation professional with the information needed to make appropriate decisions regarding the use of traffic control devices on streets, highways, bikeways, and private roads open to public travel (see definition in Section 1A.13).

Throughout this Manual the headings Standard, Guidance, Option, and Support are used to classify the nature of the text that follows. Figures and tables, including the notes contained therein, supplement the text and might constitute a Standard, Guidance, Option, or Support. The user needs to refer to the appropriate text to classify the nature of the figure, table, or note contained therein.

STANDARD:

When used in this Manual, the text headings of Standard, Guidance, Option, and Support shall be as defined in the first paragraph of Section 1A.13.

SUPPORT:

Throughout this Manual all dimensions and distances are provided in English units. Appendix A2 contains tables for converting each of the English unit numerical values that are used in this Manual to the equivalent Metric (International System of Units) values.

GUIDANCE:

If Metric units are to be used in laying out distances or determining sizes of devices, such units should be specified on plan drawings and made known to those responsible for designing, installing, or maintaining traffic control devices.

Except when a specific numeral is required or recommended by the text of a Section of the Manual, numerals displayed on the images of devices in the figures that specify quantities such as times, distances, speed limits, and weights should be regarded as examples only. When installing any of these devices, the numerals should be appropriately altered to fit the specific situation.

SUPPORT:

The following information will be useful when reference is being made to a specific portion of text in this Manual.

There are nine Parts in this Manual and each Part is

comprised of one or more Chapters. Each Chapter is comprised of one or more Sections. Parts are given a numerical identification, such as Part 2-Signs. Chapters are identified by the Part number and a letter, such as Chapter 2B-Regulatory Signs, Barricades and Gates. Sections are identified by the Chapter number and letter followed by a decimal point and a number, such as Section 2B.3-Size of Regulatory Signs.

Each Section is comprised of one or more paragraphs. The paragraphs are indented but are not identified by a number. Paragraphs are counted from the beginning of each Section without regard to the intervening text headings (Standard, Guidance, Option, or Support). Some paragraphs have lettered or numbered items. As an example of how to cite this Manual, the phrase "Not less than 40 feet beyond the stop line" that appears in Section 4D-14 of this Manual would be referenced in writing as "Section 4D.14, P7, D1, A.1," and would be verbally referenced as "Item A.1 of Paragraph 1 of Section 4D.14."

STANDARD:

In accordance with 23 CFR 655.603(b)(3), Minnesota shall revise the MN MUTCD to be in substantial conformance with changes to the National MUTCD within 2 years of the effective date of the Final Rule for the changes. Substantial conformance of such State or other Federal agency MUTCDs or Supplements shall be as defined in 23 CFR 655.603(b)(1).

After the adoption and issuance of a new edition of the MN MUTCD or a revision thereto, new or reconstructed devices installed shall be in compliance with the new edition or revision.

In cases involving Federal-aid projects for new street, highway or bicycle trail construction or reconstruction, the traffic control devices installed (temporary or permanent) shall be in conformance with the most recent edition of the MN MUTCD before that highway is opened or re-opened to the public for unrestricted travel [23 CFR 655.603(d)(2) and (d)(3)].

Unless a particular device is no longer serviceable, non-compliant devices on existing highways and bikeways shall be brought into compliance with the current edition of the MN MUTCD as part of the systematic upgrading of substandard traffic control devices (and installation of new required traffic control devices) required pursuant to the Highway Safety Program, 23 U.S.C. § 402(a). The FHWA and the State of Minnesota have the authority to establish other target compliance dates for implementation of particular changes to the MN MUTCD [23 CFR 655.603(d)(1)]. These target compliance dates established by the FHWA shall be as shown in Table I-2.

RECORD OF REVISIONS OR ADDITIONS		
Revision Number	Date Issued	Pages Revised or Added
	12/15/2011	Issued as a new manual
1	6/15/2012	v, viii, ix, 1A-4, 1A-28, 1A-29, 2A-5, 2A-18, 2B-1 thru 2B-6, 2B-11, 2B-15, 2B-34, 2B-35, 2B-38, 2B-41, 2B-53, 2B-56, 2B-57, 2C-3, 2C-4, 2C-11, 2C-13, 2C-17, 2C-18, 2C-20, 2C-24 thru 2C-28, 2C-30, 2C-34, 2D-23, 2D-27 thru 2D-29, 2E-6, 2E-33, 2E-37, 2E-41, 2E-51, 2F-6, 2G-11, 2G-16, 2I-2, 2I-5, 2I-10, 2I-11, 2I-13, 2J-5, 2M-1, 2M-2, 2N-2, 3B-27, 3B-35, 4D-1, 4D-39, 4D-46, 4E-3, 4E-6, 4F-3, 5C-2, 6D-1, 6D-2, 6D-4, 6E-1, 6F-3, 6F-7, 6F-20, 6F-29, 6F-37, 6F-52, 6G-1, 7B-1, 7B-5, 7B-6, 7B-9, 7B-11, 7C-1, 7D-1, 7E-a thru 7E-21, 8B-1, 8B-3, 8B-4, 8B-7 thru 8B-10, 8B-14, 8B-18, 8C-4, 8C-8, 8C-9, 9A-i, 9A-ii, 9B-2 thru 9B-4, 9B-6, 9B-9, 9B-18, 9C-1, A2-1, C-1 thru C-8, C-15 thru C-24, C-26, C-28 thru C-31, C-33 thru C-40, C-42, C-43, C-47, C-52 thru C-60, C-62 thru C-70, C-75 thru C-77, C-79 thru C-83
2	6/29/2013	ii, vi, 2A-4, 2A-18, 2A-19, 2B-2 thru 2B-6, 2B-11, 2B-12, 2B-18, 2B-21, 2B-22, 2B-37, 2B-40, 2B-47, 2B-48, 2B-51, 2B-56, 2B-59, 2C-4, 2C-5, 2C-7, 2C-10, 2C-26, 2C-32, 2D-1, 2D-9, 2D-27, 2D-39, 2E-18, 2E-47, 2E-48, 2E-51, 2G-3, 2G-4, 2H-i, 2H-2, 2H-7 thru 2H-9, 2I-2 thru 2I-4, 2I-7, 2I-10, 2J-4, 2J-6, 2K-1, 2K-5, 2M-i, 2M-1, 2M-2, 2M-9, 2M-12 thru 2M-14, 3B-9, 4D-2, 4D-31, 4D-33, 6F-5, 6J-4, 6J-17, 7A-i, 7B-2, 7B-10, 9B-9, 9B-16, 9B-18, C-1, C-2, C-5, C-13, C-14, C-16 thru C-21, C-24, C-26 thru C-39, C-41 thru C-57, C-59 thru C-61, C-63 thru C-66, C-82 thru C-95, INDEX-9 thru INDEX-16.
3	12/11/2013	v, ix, 2B-i, 2B-17, 2B-55, 2C-ii, 2C-23, 2C-26 thru 2C-36, 2D-28, 2E-11, 3B-14, 3C-1, 4G-3, 4L-1, 6A-iii thru 6A-vi, 6F-3 thru 6F-5, 6F-14, 6F-17, 6F-19, 6F-20, 6F-40 thru 6F-53, 6G-7, 6J-iii, 6J-2, 6J-4, 6J-5, 6J-7, 6J-8, 6J-10, 6J-11, 6J-14 thru 6J-21, 6J-24a thru 6J-25b, Chapter 6K (the Field Manual) in its entirety, 7B-2, 8B-2, 9B-6, C-3, C-19, C-38, C-39, C-46, C-56 thru C-58, remove Appendix B in its entirety.
4	2/10/2015	v, ix, 2C-i, 2C-iii, 2C-5, 2C-23, 3A-i, 3A-iii, 3B-8, 3B-10, 3B-11, 3B-14, 3B-36, 6A-iii, 6A-v, 6A-vi, 6C-6, 6F-20, Chapter 6H (Speed Limits in Temporary Traffic Control Zones) in its entirety.
5	1/31/2018	Chapter 6K - Minnesota Temporary Traffic Control Field Manual (the Field Manual) in its entirety.
6	2/21/2018	1A-i, 1A-18, 2B-i, 2B-ii, 2B-iii, 2B-6, 2B-14, 2B-16, 2B-57, 2B-58, 2C-i, 2C-19, 2C-20, 2D-ii, 2D-37, 2D-38, 2M-i, 2M-13, 2M-14, 3A-i, 3A-ii, 3B-32, 3F-3, 3F-4, 4A-i, 4A-iii, 4D-1, 4I-1, 5A-ii, 5G-1, 7A-i, 7D-1, 7F-1, 8A-i, 8A-ii, 8A-iii, 8A-1, 8B-9, 8B-20, 8C-11, 8C-13, 8C-14, 8C-15, 8C-16, 8C-17, 8D-2
7	9/30/2019	v, ix, 2B-i, 2B-ii, 2B-6, 2B-15, 2B-31, 2B-56, 2H-i, 2H-1, 2H-3, 2H-4, 2H-5, 2H-6, 2H-8, 2M-i, 2M-16, 6A-i, 6A-ii, 6A-iv, 6A-v, 6A-vi, 6C-2, 6D-1, 6D-2, 6D-4, 6E-1, 6E-4, 6E-8, 6E-10, 6F-1, 6F-7, 6F-18, 6F-19, 6F-27, 6F-32, 6F-33, 6G-7, 6G-9, 6G-10, 6G-12, 6G-14, 6J-19
8	9/3/2020	1A-i, 1A-13, 1A-14, 2B-i, 2B-17, 2I-i, 2I-3, 2I-4, 2I-9, 2I-10, 2I-13, 2M-i, 2M-4, 2M-11, 2M-12, 3A-ii, 3F-3, 6A-ii, 6A-iii, 6A-iv, 6A-v, 6A-vi, 6E-1, 6F-3, 6F-4, 6F-5, 6F-7, 6F-9, 6F-12, 6F-13, 6F-14, 6F-15, 6F-26, 6F-28, 6F-30, 6F-38, 6F-50, 6G-1, 6G-4, 6G-6, 6G-7, 6G-8, 6G-14, 6H-1, 6H-8, 6J-ii, 6J-4, 6J-10

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Mn Rev. 2
Mn Rev. 8
Mn Rev. 1
Mn Rev. 1
Mn Rev. 2

30. "Traffic Detector Handbook," 1991 Edition (ITE)
31. "Traffic Engineering Handbook," 2009 Edition (ITE)
32. "Traffic Signal Lamps," 1980 Edition (ITE)
33. "Vehicle Traffic Control Signal Heads," Part 1- 1985 Edition; Part 2-2005 Edition ; Part 3 (LED Vehicular Arrow Traffic Signal Supplement)-2004 Edition (ITE)
34. "Uniform Vehicle Code (UVC) and Model Traffic Ordinance," 2000 Edition (National Committee on Uniform Traffic Laws and Ordinances--NCUTLO)
35. "NEMA Standards Publication TS 4-2005 Hardware Standards for Dynamic Message Signs (DMS) With NTCIP Requirements," 2005 Edition (National Electrical Manufacturers Association-NEMA)
36. "Occupational Safety and Health Administration Regulations (Standards - 29 CFR), General Safety and Health Provisions - 1926.20," amended June 30, 1993 (Occupational Safety and Health Administration-- OSHA)
37. "Accessible Pedestrian Signals-A Guide to Best Practices (NCHRP Web-Only Document 117A)," 2008 Edition (Transportation Research Board-TRB)
38. "Guidelines for Accessible Pedestrian Signals (NCHRP Web-Only Document 117B)," 2008 Edition (TRB)
39. "Highway Capacity Manual," 2000 Edition (TRB)
40. "Recommended Procedures for the Safety Performance Evaluation of Highway Features," (NCHRP Report 350), 1993 Edition (TRB)
41. "The Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)," July 1998 Edition (The U.S. Access Board)

1A.11.1 Other Publications Not Listed in the Federal MUTCD

Other publications not listed in the FHWA MUTCD that are useful sources of information with respect to the use of this Manual are listed below.

1. "Minnesota Traffic Engineering Manual (MnDOT)," 2006 Edition
2. "Desktop Reference for Crash Reduction Factors (FHWA-SA-07-015)," 2007 edition
3. "Minnesota Traffic Engineering Manual (MnDOT)," 2006 Edition
4. "A Guide for Reducing Collisions Involving Pedestrians (NCHRP Report 500, vol. 10)," 2004 Edition
5. "Deer-Vehicle Crash Countermeasure Toolbox: A Decision and Choice Resource (WisDOT Report DVCIC-02)," 2004 Edition
6. "Effectiveness of 'Children at Play' Warning Signs (WisDOT Synthesis Report)," 2007 Edition
7. "A Guide to Establishing Speed Limits in School Zones (MnDOT)," 2012 Edition.

1A.12 Color Code

Support

The following color code establishes general meanings for 10 colors of a total of 13 colors that have been identified as being appropriate for use in conveying traffic control information. Central values and tolerance limits for each color are available from the Federal Highway Administration, 400 Seventh Street, SW, HOTO, Washington, DC 20590, and at FHWA's MUTCD website at <http://mutcd.fhwa.dot.gov>.

The three colors for which general meanings have not yet been assigned are being reserved for future applications that will be determined only by FHWA after consultation with the States, the engineering community, and the general public. The meanings described in this Section are of a general nature. More specific assignments of colors are given in the individual Parts of this Manual relating to each class of devices.

Standard

The general meaning of the 13 colors shall be as follows:

- A. Black - regulation
- B. Blue - road user services guidance, tourist information, and evacuation route
- C. Brown-recreational and cultural interest area guidance
- D. Coral-unassigned
- E. Fluorescent Pink-incident management
- F. Fluorescent Yellow-Green-pedestrian warning, bicycle warning, playground warning, school bus and school warning
- G. Green-indicated movements permitted, direction guidance
- H. Light Blue-unassigned
- I. Orange-temporary traffic control,
- J. Purple-lanes restricted to use only by vehicles with registered electronic toll collection (ETC) accounts
- K. Red-stop or prohibition
- L. White-regulation
- M. Yellow-warning

1A.13 Definitions of Headings, Words and Phrases in This Manual

Standard

When used in this Manual, the text headings of Standard, Guidance, Option, and Support shall be defined as follows:

- A. **Standard** - a statement of required, mandatory, or specifically prohibitive practice regarding a traffic control device. All Standard statements are labeled with a box containing white letters on a red background. The verb “shall” is typically used. The verbs “should” and “may” are not used in Standard statements. Standard statements are sometimes modified by Options.
- B. **Guidance** - a statement of recommended, but not mandatory, practice in typical situations, with deviations allowed if engineering judgment or engineering study indicates the deviation to be appropriate. All Guidance statements are labeled with a box containing black letters on a yellow background. The verb “should” is typically used. The verbs “shall” and “may” are not used in Guidance statements. Guidance statements are sometimes modified by Options.
- C. **Option** - a statement of practice that is a permissive condition and carries no requirement or recommendation. Option statements sometime contain allowable modifications to a Standard or Guidance statement. Option statements are labeled in two ways: (1) A box containing green letters on a white background, or (2) A box containing black letters on a green background. The verb “may” is typically used. The verbs “shall” and “should” are not used in Option statements.
- I. **Support** - an informational statement that does not convey any degree of mandate, recommendation, authorization, prohibition, or enforceable condition. Support statements are labeled in two ways: (1) A box containing blue letters on a white background, or (2) A box containing black letters on a blue background. The verbs “shall,” “should,” and “may” are not used in Support statements.

Unless otherwise defined in this Section, or in other Parts of this Manual, words or phrases shall have the meaning(s) as defined in the most recent editions of the “Uniform Vehicle Code,” “AASHTO Transportation Glossary (Highway Definitions),” and other publications mentioned in Section 1A.11.

The following words and phrases, when used in this Manual, shall have the following meanings:

1. **Accessible Pedestrian Signal** - a device that communicates information about pedestrian signal timing in non-visual format such as audible tones, speech messages, and/or vibrating surfaces.
2. **Accessible Pedestrian Signal Detector** - a device designated to assist the pedestrian who has visual or

- physical disabilities in activating the pedestrian phase.
3. **Active Grade Crossing Warning System** - the flashing-light signals, with or without warning gates, together with the necessary control equipment used to inform road users of the approach or presence of rail traffic at grade crossings.
4. **Actuated Operation** - a type of traffic control signal operation in which some or all signal phases are operated on the basis of actuation.
5. **Action** - initiation of a change in or extension of a traffic signal phase through the operation of any type of detector.
6. **Advance Preemption** - the notification of approaching rail traffic that is forwarded to the highway traffic signal controller unit or assembly by the railroad or light rail transit equipment in advance of the activation of the railroad or light rail transit warning devices.
7. **Advance Preemption Time** - the period of time that is the difference between the required maximum highway traffic signal preemption time and the activation of the railroad or light rail transit warning devices.
8. **Advisory Speed** - a recommended speed for all vehicles operating on a section of highway and based on the highway design, operating characteristics, and conditions.
9. **Alley** - a street or highway intended to provide access to the rear or side of lots or buildings in urban areas and not intended for the purpose of through vehicular traffic.
10. **Altered Speed Zone** - a speed limit, other than a statutory speed limit, that is based upon an engineering study.
11. **Approach** - all lanes of traffic moving towards an intersection or a midblock location from one direction, including any adjacent parking lane(s).
12. **Arterial Highway (Street)** - a general term denoting a highway primarily used by through traffic, usually on a continuous route or a highway designated as part of an arterial system.
13. **Attended Lane (Manual Lane)** - a toll lane adjacent to a toll booth occupied by a human toll collector who makes change, issues receipts, and perform other toll related functions. Attended lanes at toll plazas typically require vehicles to stop to pay the toll.
14. **Automatic Lane** - see Exact Change Lane.
15. **Average Annual Daily Traffic (AADT)** - the total volume of traffic passing a point or segment of a highway facility in both directions for one year divided by the number of days in the year. Normally, periodic daily traffic volumes are adjusted for hours of the day counted, days of the week, and seasons of the year to arrive at average annual daily traffic.

Chapter 2B. REGULATORY SIGNS

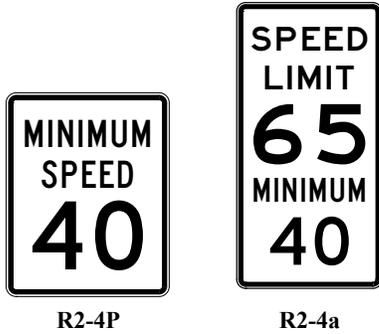
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2B.16 Minimum Speed Limit Sign (R2-4P)

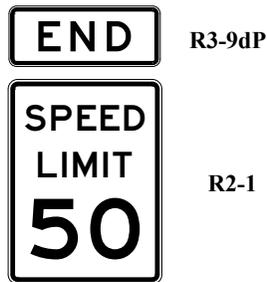


Standard

A Minimum Speed Limit (R2-4P) plaque shall be displayed only in combination with a Speed Limit sign.

Option

Where engineering judgment determines that slow speeds on a highway might impede the normal and reasonable movement of traffic, the Minimum Speed Limit plaque may be installed below a Speed Limit (R2-1) sign to indicate the minimum legal speed. If desired, the Speed Limit sign and the Minimum Speed Limit plaque may be combined on the R2-4a sign.



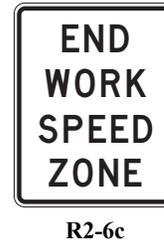
Support

There are many secondary roads (county, township and municipal) which have had speed zones established. These zones are in and on the fringes of urban or rural residential districts (as defined in Minnesota Statute, section 169.011) where the rural speed limit remains at that provided in the statutes and continuous speed zoning has not been warranted. In many instances, the posting of the statutory speed limit in order to terminate the reduced speed zone would be inappropriate because the statutory speed limit would be misleading and encourage drivers to travel too fast for conditions. Sound engineering judgment would dictate that no numerical value should be posted and that the basic rule (Minnesota Statute, section 169.14, subd. 1) should apply.

Option

In order to provide for the termination of the reduced speed zone, either a Speed Limit (R2-1) sign with the ending speed limit and an END plaque (R3-9dP) or a Speed Limit (R2-1) sign with the new speed limit may be used.

2B.16.2 End Work Speed Zone Sign (R2-6c)



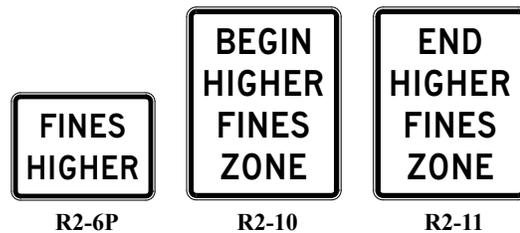
Support

Certain street and highway construction and maintenance operations may justify the erection of regulatory signs with a recommended speed as determined by the appropriate road authority. It is necessary to install a regulatory sign to inform the motorists of the end of the regulatory speed zone.

Standard

The sign shall be installed on its own structure at the end of the zone in accordance with standard signing practices for construction zone signs.

2B.17 Higher Fines Signs and Plaque (R2-6P, R2-10, and R2-11)



Standard

If increased fines are imposed for traffic violations within a designated zone of a roadway, a BEGIN HIGHER FINES ZONE (R2-10) sign or a FINES HIGHER (R2-6P) plaque shall be used to provide notice to road users. If used, the FINES HIGHER plaque shall be mounted below an applicable regulatory or warning sign in a temporary traffic control zone, a school zone, or other applicable designated zone.

If an R2-10 sign or an R2-6P plaque is posted to provide notice of increased fines for traffic violations, an END

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PART 2. SIGNS

Chapter 2I. General Service Signs

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Figure 2I-6	This figure has been eliminated	
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**2I.2 General Service Signs for
Conventional Roads (D9 Series)**



D9-1
Telephone



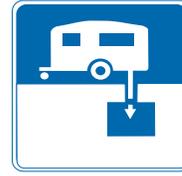
D9-2
Hospital



D9-3
Camping



D9-11c
Alternative
Fuel
Ethanol



D9-12
RV Sanitary
Station



D9-13
Emergency
Medical
Services



D9-3a
Trailer
Camping



D9-4
Litter
Container



D9-6
Disabled



D9-13a
Hospital



D9-13bP
Ambulance
Station



D9-13cP
Emergency
Medical
Care



D9-6P
Van Accessible



D9-7
Gas



D9-8
Food



D9-14
Police



D9-15
Propane Gas



D9-16
Truck Parking



D9-9
Lodging



D9-10
Tourist Info



D9-11
Diesel Fuel



D9-20
Pharmacy



D9-20aP
24 Hour



D9-11a
Alternative
Fuel
Compressed
Natural Gas



D9-11b
Electric Vehicle
Charging



D9-11bP
Electric Vehicle
Charging



D9-21 (old D9-1P)
Telecommunication
Device for the Deaf

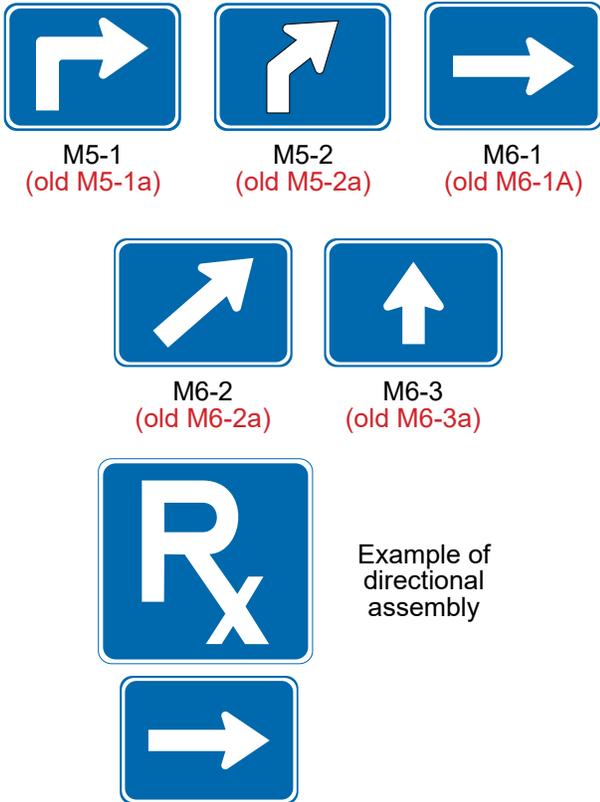


D9-22
Wireless
Internet

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Advance Turn and Directional Arrow Auxiliary Signs for use with General Service Signs



Mn Rev. 8

Support

On conventional roads, commercial services such as gas, food, and lodging generally are within sight and are available to the road user at reasonably frequent intervals along the route. Consequently, on this class of road there usually is no need for special signs calling attention to these services. Moreover, General Service signing is usually not required in urban areas except for hospitals, law enforcement assistance, tourist information centers, and camping.

Option

General Service signs may be used where such services are infrequent and are found only on an intersecting highway or crossroad.

Standard

All General Service signs and supplemental sign panels shall have white letters, symbols, arrows, and borders on a blue background.

Guidance

General Service signs should be installed at a suitable distance in advance of the turn-off point or intersecting highway.

States that elect to provide General Service signing should establish a statewide policy or warrant for its use, and criteria for the availability of services. Local jurisdictions electing to use such signing should follow State policy for the sake of uniformity.

Option

Individual States may sign for whatever alternative fuels are available at appropriate locations.

Standard

General Service signs, if used at intersections, shall carry a legend for one or more of the following services: Food, Gas, Diesel, LP-Gas, Lodging, Camping, Phone, Hospital, Tourist Information, Police, Electric Vehicle Charging, or Truck Parking along with a directional message.

Option

The Advance Turn (M5 series) or Directional Arrow (M6 series) auxiliary signs with white arrows on blue backgrounds may be used with General Service symbol signs to create a General Service Directional Assembly.

The General Service sign legends may be either symbols or word messages.

Standard

Symbols and word message General Service legends shall not be intermixed on the same sign.

Guidance

If used, the word message TRUCK PARKING (D8-16) should be placed on a separate panel below the other general motorist services.

Support

Formats for displaying different combinations of these services are described in Section 2I.3.

Option

If the distance to the next point at which services are available is 10 miles or more, a NEXT SERVICES XX MILES (D9-17P) plaque may be installed below the General Service sign.



D9-17P

The International Symbol of Accessibility for the Disabled (D9-6) sign may be used beneath General Service signs where paved ramps and rest room facilities accessible to, and usable by, the physically disabled are provided.

Mn Rev. 2

- A. If adequate sign spacing allows, a separate Interstate Oasis (D5-12) sign should be installed in an effective location with spacing of at least 800 feet from other adjacent guide signs, including any Specific Service signs. This Interstate Oasis sign should be located upstream from the Advance Guide sign or between the Advance Guide sign and the Exit Direction sign for the exit leading to the Interstate Oasis. The Interstate Oasis sign should have a white legend with a letter height of at least 10 inches and a white border on a blue background and should contain the words INTERSTATE OASIS and the exit number or, for an unnumbered interchange, an action message such as NEXT RIGHT. The names or logos of the businesses designated as Interstate Oases should not be included on this sign.
- B. If the spacing of the other guide signs precludes the use of a separate sign as described in Item A, an INTERSTATE OASIS (D5-12P) supplemental plaque with a letter height of at least 10 inches and with a white legend and border on a blue background should be appended above or below an existing D9-18 series General Service sign for the interchange.

If a separate Interstate Oasis (D5-12) sign is installed, an Interstate Oasis sign panel should be incorporated into the design of the sign (see Figure 2I-4).

Standard

The Interstate Oasis sign panel shall only be used on the separate Interstate Oasis sign where it is accompanied by the words INTERSTATE OASIS and shall not be used independently without the words.

Option

If Specific Service signing is provided at the interchange, a business designated as an Interstate Oasis and having a business logo sign panel on the Food and/or Gas Specific Service signs may use the bottom portion of the business logo sign panel to display the word OASIS.

Standard

If Specific Services signs containing the OASIS legend as a part of the business logo(s) are not used on the ramp and if the Interstate Oasis is not clearly visible and identifiable from the exit ramp, a sign with a white INTERSTATE OASIS legend with a letter height of at least 6 inches and a white border on a blue background shall be provided on the exit ramp to indicate the direction and distance to the Interstate Oasis.

If needed, additional trailblazer guide signs shall be used along the crossroad to guide road users to an Interstate Oasis.

2I.5 Rest Area and Other Roadside Area Signs



D5-1



D5-1a



D5-1M (old D5-1c)



D5-2a



D5-6

Standard

Rest Area signs shall have a retroreflective white legend and border on a blue background.

Signs that include the legend REST AREA shall be used only where parking and restroom facilities are available.

Guidance

A roadside area that does not contain restroom facilities should be signed to indicate the major road user service that is provided. For example, the sign legends for an area with only parking should use the words PARKING AREA instead of REST AREA. The sign legends for an area with only picnic tables and parking should use words such as PICNIC AREA, ROADSIDE TABLE, or ROADSIDE PARK instead of REST AREA.

Rest areas that have tourist information and welcome centers should be signed as discussed in Section 2I.8.

Scenic area signing should be consistent with that provided for rest areas, except that the legends should use words such as SCENIC AREA, SCENIC VIEW, or SCENIC OVERLOOK instead of REST AREA.

Standard

When rest areas or other roadside areas located on certain non-freeway highways are closed during the non-tourist season, a CLOSED plaque or other plaque indicating the periods of operation shall be mounted on the face of the sign(s).

Guidance

If a rest area or other roadside area is provided on a conventional road, a D5-1 and/or D5-1a sign should be installed in advance of the rest area or other roadside area to permit the driver to reduce speed in preparation for leaving the highway. A D5-5 sign (or a D5-2 sign if an exit ramp is provided) should be installed at the turnoff point where the driver needs to leave the highway to access the rest area or other roadside area.

If a rest area or other roadside area is provided on a freeway or expressway, a D5-1 sign should be placed 1 mile and/or 2 miles in advance of the rest area.

Standard

A D5-2a sign shall be placed at the rest area or other roadside area exit gore.

Option

A D5-1a sign may be placed between the D5-1 sign and the exit gore on a freeway or expressway. A second D5-1 sign may be used in place of the D5-1a sign with a distance to the nearest 1/2 or 1/4 mile displayed as a fraction rather than a decimal for distances of less than 1 mile.

To provide the road user with information on the location of succeeding rest areas, a NEXT REST AREA XX MILES (D5-6) sign may be installed independently or as a supplemental sign mounted below one of the REST AREA advance guide signs.

Standard

All signs on freeways and expressways for rest and other roadside areas shall have letter and numeral sizes that comply with the minimum requirements of Tables 2E-2 through 2E-5. The sizes for General Service signs that have standardized designs shall be as shown in Table 2I-1.

Option

If the rest area has facilities for the physically impaired (see Section 2I.2), the International Symbol of Accessibility for the Disabled (D9-6) sign may be placed with or beneath the REST AREA advance guide sign.

If telecommunication devices for the deaf (TDD) are available at the rest area, the TDD (D9-21) symbol sign may be used to supplement the advance guide signs for the rest area.

If wireless Internet services are available at the rest area, the Wi-Fi (D9-22) symbol sign may be used to supplement the advance guide signs for the rest area.

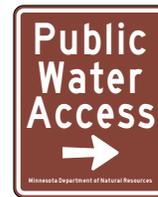
2I.5.1 Public Water Access Signs (D7-X10 (old D7-X7), D7-X10a (old D7-X7a), and DNR sign)



D7-X10 (old D7-X7)



D7-X10a (old D7-X7a)



DNR Sign

Option

The Public Water Access signs may be used to provide direction to a location on a lake, stream or river where a motorist may launch a licensed water craft.

Standard

Public Water Access signs shall have a retroreflective white legend and border on a brown background.

Public Water Access signs shall not be installed unless the necessary Trailblazing signs are in place to provide guidance along the route to the site.

Trailblazing signing on local roads shall be the responsibility of the facility and the local road authority.

Mn Rev. 1

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Mn Rev. 8



D12-3



D12-4

Mn Rev. 1

Option

A Channel 9 Monitored (D12-3) sign may be installed as needed. Official public agencies or their designees may be displayed as the monitoring agency on the sign.

Standard

Only official public agencies or their designee shall be displayed as the monitoring agency on the Channel 9 Monitored sign.

Option

An Emergency CALL XX (D12-4) sign, along with the appropriate number to call, may be used for cellular phone communications.

2I.10 TRAVEL INFO CALL 511 Signs (D12-5 and D12-5a (old D12-X5))

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D12-5



D12-5a
(old D12-X5)

Mn Rev. 8

Option

A TRAVEL INFO CALL 511 (D12-5) sign may be installed if a 511 travel information services telephone number is available to road users for obtaining traffic, public transportation, weather, construction, or road condition information.

The pictograph of the transportation agency or the travel information service or program that is providing the travel information may be incorporated within the D12-5 sign either above or below the TRAVEL INFO CALL 511 legend.

Standard

The logo of a commercial entity shall not be incorporated within the TRAVEL INFO CALL 511 sign.

The TRAVEL INFO CALL 511 sign shall have a white legend and border on a blue background.

Guidance

If the pictograph of the transportation agency or the travel information service or program is used, the pictograph's maximum height should not exceed two times the letter height used in the legend of the sign.

2I.11 Carpool and Ridesharing Signing (D12-2a, and D12-2b)

Mn Rev. 1



D12-2a



D12-2b

Option

In areas having carpool matching services, Carpool Information (D12-2a and D12-2b) signs may be provided adjacent to highways with preferential lanes or along any other highway.

Carpool Information signs may include an Internet domain name or telephone number of more than four characters within the legend.

Guidance

Because this is an information sign related to road user services, the Carpool Information sign should have a white legend and border on a blue background.

Standard

If a local transit pictograph or carpool symbol is incorporated into the Carpool Information sign, the maximum vertical dimension of the logo or symbol shall not exceed 18 inches.

PART 2. SIGNS

Chapter 2M. Recreational and Cultural Interest Area Signs

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2M.10	Memorial or Dedication Signing	2M-12	Mn Rev. 8
2M.10.1	Recreational or Cultural Interest Guide Signs and Symbol Signs on One Structure.....	Section Deleted	Mn Rev. 6
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TABLES

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2M.7 Use of Prohibitive Circle and Diagonal Slash for Non-Road Applications

Standard

Where it is necessary to indicate a prohibition of an activity or an item within a recreational or cultural interest area for non-road use and a standard regulatory sign for such a prohibition is not provided in Chapter 2B, the appropriate recreational and cultural interest area symbol shall be used in combination with a red prohibitive circle and red diagonal slash. The recreational and cultural interest area symbol and the sign border shall be black and the sign background shall be white. The symbol shall be scaled proportionally to fit completely within the circle and the diagonal slash shall be oriented from the upper left to the lower right portions of the circle as shown in Figure 2M-1.

Requirements for retroreflection of the red circle and red diagonal slash shall be the same as those requirements for backgrounds, legends, symbols, arrows, and borders.

2M.8 Placement of Recreational and Cultural Interest Area Symbol Signs

Standard

If used, recreational and cultural interest area symbol signs shall be placed in accordance with the general requirements contained in Chapter 2A. The symbol(s) shall be placed as sign panels in the uppermost part of the sign and the directional information shall be placed below the symbol(s).

Except as provided in the following Option, if the name of the recreational or cultural interest area facility or activity is displayed on a destination guide sign (see Section 2M.09) and a symbol is used, the symbol shall be placed below the name (see Figure 2M-2).

Symbol signs shall not be installed on freeways.

Option

When the legend Wildlife Viewing Area is displayed with the RS-076 symbol on a destination guide sign, the symbol may be placed to the left or right of the legend and the arrow may be placed below the symbol (see Figure 2M-2).

The symbols displayed with the facility or activity name may be placed below the destination guide sign as illustrated in Figure 2M-2 instead of as sign panels placed with the destination guide sign.

Secondary symbols of a smaller size (18 x 18 inches) may be placed beneath the primary symbols (see Drawing A in Figure 2M-1), where needed.

Standard

Recreational and cultural interest area symbols installed for non-road use shall be placed in accordance with the general sign position requirements of the authority having jurisdiction.

Support

Figure 2M-3 illustrates typical height and lateral mounting positions. Figure 2M-4 illustrates some examples of the placement of symbol signs within a recreational or cultural interest area. Figures 2M-5 through 2M-10 illustrate some of the symbols that can be used. Illustrations of all of the recreational and cultural interest area symbols that can be used are found in Appendix C of this Manual.

Guidance

The number of symbols used in a single sign assembly should not exceed four.

For structural and aesthetic reasons, the cumulative overall length of these symbol sign panels should not exceed the length of the recreational or cultural interest area sign.

Option

The Advance Turn (M5 series) or Directional Arrow (M6 series) auxiliary signs with white arrows on brown backgrounds shown in Figure 2D-5 may be used with Recreational and Cultural Area Interest symbol guide signs to create a Recreational and Cultural Interest Area Directional Assembly. The symbols may be used singularly, or in groups of two, three, or four on a single sign assembly (see Figures 2M-1, 2M-3, and 2M-4).

2M.9 Destination Guide Signs

Guidance

When recreational or cultural interest area destinations are displayed on supplemental guide signs, the sign should be rectangular or trapezoidal in shape. The order of preference for use of shapes and colors should be as follows: (1) rectangular with a white legend and border on a green background; (2) rectangular with a white legend and border on a brown background; or (3) trapezoidal with a white legend and border on a brown background.

Standard

Whenever the trapezoidal shape is used, the color combination shall be a white legend and border on a brown background.

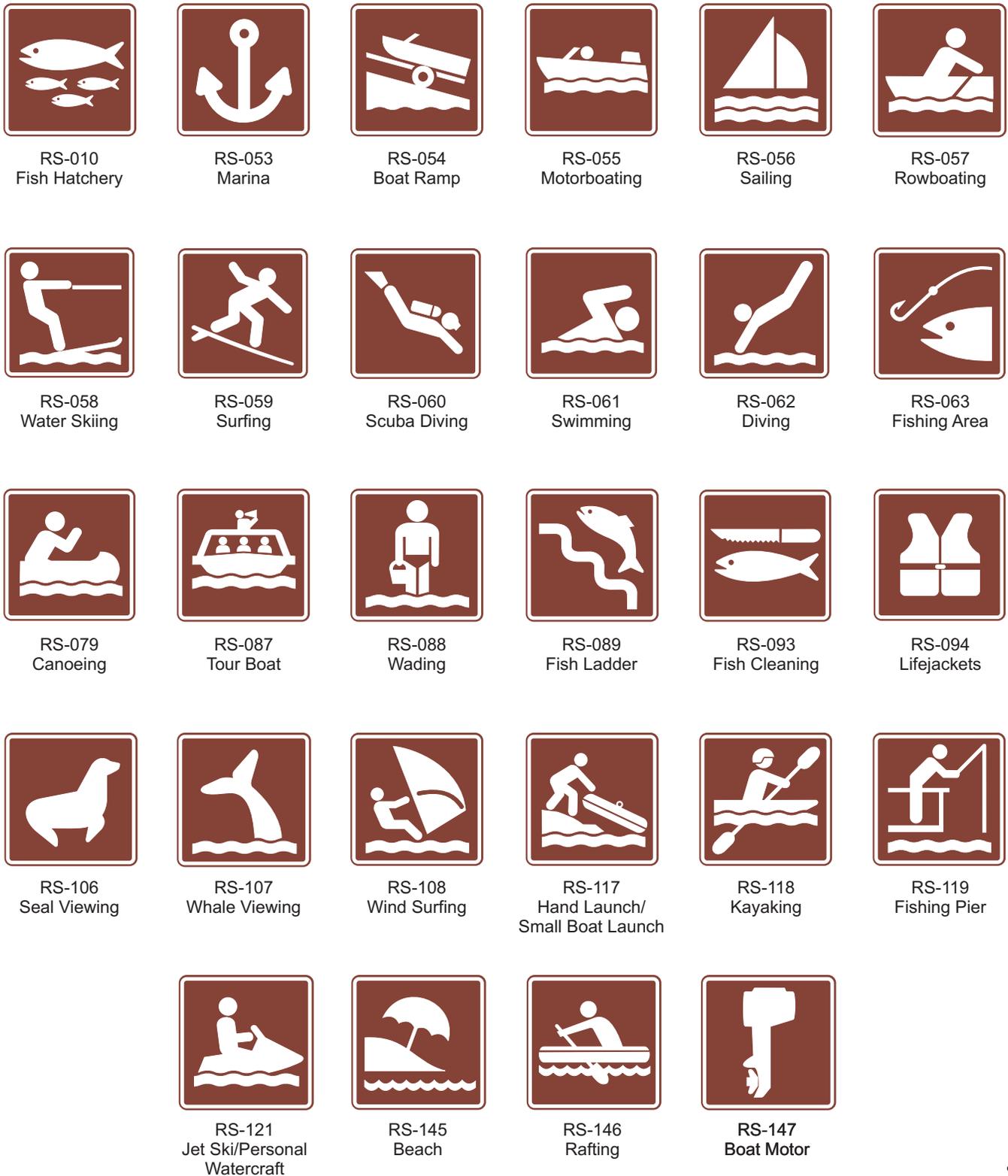


Figure 2M-9 Recreational and Cultural Interest Area Symbol Signs for Water Recreation



Figure 2M-10 Recreational and Cultural Interest Area Symbol Signs for Winter Recreation

2M.10 Memorial or Dedication Signing



M1-X315 old M1-X5x



M1-X311 old M1-X5r

Support

Legislative bodies will occasionally adopt an act or resolution memorializing or dedicating a highway, bridge, or other component of the highway.

Guidance

Such memorial or dedication names should not appear on or along a highway, or be placed on bridges or other highway components. If a route, bridge, or highway component is officially designated as a memorial or dedication, and if notification of the memorial or dedication is to be made on the highway right-of-way, such notification should consist of installing a memorial or dedication marker in a rest area, scenic overlook, recreational area, or other appropriate location where parking is provided with the signing inconspicuously located relative to vehicle operations along the highway.

Option

If the installation of a memorial or dedication marker off the main roadway is not practical, memorial or dedication signs may be installed on the mainline.

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Guidance

When used for lane reduction transitions, the delineators should be used adjacent to the lane or lanes reduced for the full length of the transition and should be so placed and spaced to show the reduction (see Figure 3B-14).

Support

Delineators are not necessary for traffic moving in the direction of a wider pavement or on the side of the roadway where the alignment is not affected by the lane reduction transition.

Guidance

On a highway with continuous delineation on either or both sides, delineators should be carried through transitions.

Option

On a highway with continuous delineation on either or both sides, the spacing between a series of delineators may be closer.

Standard

When used on a truck escape ramp, delineators shall be red.

Guidance

Red delineators should be placed on both sides of truck escape ramps. The delineators should be spaced at 50-foot intervals for a distance sufficient to identify the ramp entrance. Delineator spacing beyond the ramp entrance should be adequate for guidance according to the length and design of the escape ramp.

3F.4 Delineator Placement and Spacing

Guidance

Delineators should be mounted on suitable supports at a mounting height, measured vertically from the bottom of the lowest retroreflective device to the elevation of the near edge of the roadway, of approximately 4 feet.

Option

When mounted on the face of or on top of guardrails or other longitudinal barriers, delineators may be mounted at a lower elevation than the normal delineator height recommended in the previous Guidance paragraph.

Guidance

Delineators should be placed 2 to 12 feet outside the outer edge of the shoulder, or if appropriate, in line with the roadside barrier that is 12 feet or less outside the outer edge of the shoulder. Delineators should be placed at a constant distance from the edge of the roadway, except that where an obstruction intrudes into the space between the pavement

edge and the extension of the line of the delineators, the delineators should be transitioned to be in line with or inside the innermost edge of the obstruction. If the obstruction is a guardrail, the delineators should be transitioned to be either just behind, directly above (in line with), or on the innermost edge of the guardrail or longitudinal barrier.

Delineators should be spaced 200 to 530 feet apart on mainline tangent sections. Delineators should be spaced 100 feet apart on ramp tangent sections.

Support

Examples of delineator installations are shown in Figure 3F-1.

Option

When uniform spacing is interrupted by such features as driveways and intersections, delineators which would ordinarily be located within the features may be relocated in either direction for a distance not exceeding one quarter of the uniform spacing. Delineators still falling within such features may be eliminated.

Delineators may be transitioned in advance of a lane transition or obstruction as a guide for oncoming traffic.

Guidance

The spacing of delineators should be adjusted on approaches to and throughout horizontal curves so that several delineators are always simultaneously visible to the road user. The approximate spacing shown in Table 3F-1 should be used.

Option

When needed for special conditions, delineators of the appropriate color may be mounted in a closely-spaced manner on the face of or on top of guardrails or other longitudinal barriers to form a continuous or nearly continuous “ribbon” of delineation.

3F.4.1 Intersection Delineator

Option

Delineators may be used to guide motorists through unlit or poorly lit intersections.

Standard

If used, delineators shall be of the same color as the corresponding edge line.

Support

Several methods of delineating intersections have been used. One which provides guidance to all motorists regardless of their direction of approach to an intersection is a cylindrical or near cylindrical design.

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PART 6. TEMPORARY TRAFFIC CONTROL

Chapter 6E. Flagger Control

6E.1 Qualifications for Flaggers

Support

Minnesota Statute 169.06, subd. 4(e), allows a flagger to stop and hold traffic as necessary to ensure the safety of highway workers and the motoring public.

Minnesota Statute 169.06, subd. 4(a) requires the driver of any vehicle to obey the instructions of any official traffic-control device placed in accordance with the provisions of Chapter 169, unless otherwise directed by a traffic or police officer. (Rev. 7, 2019)

Guidance

Because flaggers are responsible for public safety and make the greatest number of contacts with the public of all highway workers, they should be trained in safe traffic control practices and public contact techniques. Flaggers should be able to satisfactorily demonstrate the following abilities:

- A. Ability to receive and communicate specific instructions clearly, firmly, and courteously;
- B. Ability to move and maneuver quickly in order to avoid danger from errant vehicles;
- C. Ability to control signaling devices (such as paddles and flags) in order to provide clear and positive guidance to drivers approaching a TTC zone in frequently changing situations;
- D. Ability to understand and apply safe traffic control practices, sometimes in stressful or emergency situations; and
- E. Ability to recognize dangerous traffic situations and warn workers in sufficient time to avoid injury.

6E.2 High-Visibility Safety Apparel

Standard

High visibility apparel shall comply with current Minnesota OSHA Rules 5207.0100 and 5207.1000 and your agency's policies.

Flaggers shall wear high-visibility clothing meeting ANSI/ISEA 107-2004 (or ANSI/ISEA 107-2010) Performance Class 3 requirements. ANSI/ISEA 107-2015 Type R, Performance Class 3 is also acceptable. The Class 3 requirements shall be met by wearing a Class 2 or Class 3 vest, shirt, or jacket; as well as Class E pants. Clothing shall have an attached original label indicating the Performance Class.

- Clothing background color shall be fluorescent orange-red, fluorescent yellow-green, or a combination of the two.
- Retroreflective material on the clothing shall be orange, yellow, white, silver, yellow-green, or a fluorescent version of these colors. The material shall be visible at a minimum distance of 1000 feet.
- The vest, shirt, or jacket shall be worn such that 360 degree visibility in a horizontal plane of the clothing is maintained.
- A neat appearance and clean clothing shall be maintained in order to help command respect of the drivers.

Guidance

A retroreflective hat in the above colors should be worn.

Option

A retroreflective wrist band in the above colors may be used. The wrist band helps differentiate the flagger from work zone devices.

6E.3 Hand-Signaling Devices

Guidance

The STOP/SLOW paddle should be the primary and preferred hand-signaling device because the STOP/SLOW paddle gives road users more positive guidance than red flags. Use of flags should be limited to emergency situations.

Standard

The STOP/SLOW paddle shall have an octagonal shape on a rigid handle. STOP/SLOW paddles shall be at least 18 inches wide with letters at least 6 inches high. The STOP (R1-1) face shall have white letters and a white border on a red background. The SLOW (W20-8M) face shall have black letters and a black border on an orange background. When used at night, the STOP/SLOW paddle shall be retroreflectorized.

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Sign or Plaque	Sign Designation	Section	Conventional Road	Freeway or Expressway	Minimum
Stop	R1-1	6F.6	30 x 30 *	---	---
Stop (on Stop/Slow Paddle)	R1-1	6E.3	18 x 18	---	---
Yield	R1-2	6F.6	36 x 36 x 36	48 x 48 x 48	30 x 30 x 30
To Oncoming Traffic	R1-2aP	6F.6	36 x 30	48 x 36	24 x 18
Speed Limit	R2-1	6F.12	24 x 30 *	36 x 48	---
Fines Higher (plaque)	R2-6P	6F.6	24 x 18	36 x 24	---
Fines Double (plaque)	R2-6aP	6F.12	24 x 18	36 x 24	---
\$XX Fine (plaque)	R2-6bP	6F.12	24 x 18	36 x 24	---
Begin Higher Fines Zone	R2-10	6F.12	24 x 30	36 x 48	---
End Higher Fines Zone	R2-11	6F.12	24 x 30	36 x 48	---
End Work Zone Speed Limit	R2-12	6F.12	24 x 36	36 x 54	---
Movement Prohibition	R3-1,2,3,4,18,27	6F.12	24 x 24 *	36 x 36	---
Mandatory Movement (1 lane)	R3-5	6F.6	30 x 36	---	---
Optional Movement (1 lane)	R3-6	6F.6	30 x 36	---	---
Right (Left) Lane Must Turn Right (Left)	R3-7M (old R3-7)	6F.6	30 x 30 *	---	---
Advance Intersection Lane Control	R3-30	6F.6	Varies x 30	---	---
Do Not Pass	R4-1	6F.6	24 x 30	36 x 48	---
Pass With Care	R4-2	6F.6	24 x 30	36 x 48	---
Keep Right	R4-7	6F.6	24 x 30	36 x 48	---
Narrow Keep Right	R4-7c	6F.6	18 x 30	---	---
Stay in Lane	R4-9	6F.11	24 x 30	36 x 48	---
Do Not Enter	R5-1	6F.6	30 x 30 *	36 x 36	---
Wrong Way	R5-1a	6F.6	36 x 24 *	42 x 30	---
One Way	R6-1	6F.6	36 x 12 *	54 x 18	---
One Way	R6-2	6F.6	24 x 30 *	36 x 48	---
No Parking (symbol)	R8-3	6F.6	24 x 24	36 x 36	---
Pedestrian Crosswalk	R9-8	6F.13	36 x 18	---	---
Sidewalk Closed	R9-9	6F.14	24 x 12	---	---
Sidewalk Closed, Use Other Side	R9-10M (old R9-10)	6F.14	24 x 12	---	---
Sidewalk Closed Ahead, Cross Here	R9-11	6F.14	24 x 18	---	---
Sidewalk Closed, Cross Here	R9-11a	6F.14	24 x 12	---	---
Wait on Stop/Go on Slow	R10-X1	6E.5	24 x 30	24 x 30	---
Road Closed	R11-2	6F.8	48 x 30	---	---
Road Closed, Local Traffic Only	R11-3a,3b,4	6F.9	60 x 30	---	---
Weight Limit	R12-1,2	6F.10	24 x 30	36 x 48	---
Weight Limit (with symbols)	R12-5	6F.10	24 x 36	36 x 48	---
Turn and Curve Signs	W1-1,2,3	6F.16	36 x 36	48 x 48	30 x 30
Reverse Curve	W1-4	6F.48	36 x 36	48 x 48	30 x 30
Reverse Curve (2 or more lanes)	W1-4b,4c	6F.49	36 x 36	48 x 48	30 x 30
One-Direction Large Arrow	W1-6	6F.16	48 x 24	60 x 30	---
Chevron Alignment	W1-8	6F.16	18 x 24	30 x 36	---
Stop Ahead	W3-1	6F.16	36 x 36	48 x 48	30 x 30
Yield Ahead	W3-2	6F.16	36 x 36	48 x 48	30 x 30
Signal Ahead	W3-3	6F.16	36 x 36	48 x 48	30 x 30
Be Prepared to Stop	W3-4	6F.16	36 x 36	48 x 48	30 x 30
Reduced Speed Ahead	W3-5	6F.16	36 x 36	48 x 48	30 x 30
XX MPH Speed Zone Ahead	W3-5b	6F.16	36 x 36	48 x 48	30 x 30
Traffic Control Change Ahead	W3-X5	6F.30	36 x 36	48 x 48	30 x 30

Notes:

* See Table 2B-1 for minimum size required for signs facing traffic on multi-lane conventional roads.

1. Larger signs may be used wherever necessary for greater legibility or emphasis
2. Dimensions are shown in inches and are shown as width x height.

Table 6F-1 Temporary Traffic Control Zone Sign and Plaque Sizes (Sheet 1 of 3)

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Sign or Plaque	Sign Designation	Section	Conventional Road	Freeway or Expressway	Minimum
Merging traffic	W4-1,1a-5	6F.16	36 x 36	48 x 48	36 x 36
Lane Ends	W4-2	6F.24	36 x 36	48 x 48	30 x 30
Added Lane	W4-3,6	6F.16	36 x 36	48 x 48	30 x 30
No Merge Area (plaque)	W4-5P	6F.16	18 x 24	24 x 30	---
Road Narrows	W5-1	6F.16	36 x 36	48 x 48	30 x 30
Narrow Bridge	W5-2	6F.16	36 x 36	48 x 48	30 x 30
One Lane Bridge	W5-3	6F.16	36 x 36	48 x 48	30 x 30
Ramp Narrows	W5-4	6F.26	36 x 36	48 x 48	30 x 30
Divided Highway	W6-1	6F.16	36 x 36	48 x 48	30 x 30
Divided highway Ends	W6-2	6F.16	36 x 36	48 x 48	30 x 30
Two-Way Traffic	W6-3	6F.32	36 x 36	48 x 48	30 x 30
Two-Way Traffic	W6-4	6F.76	12 x 18	12 x 18	---
Hill (symbol)	W7-1	6F.16	36 x 36	48 x 48	30 x 30
Next XX Miles (plaque)	W7-3aP	6F.53	24 x 18	36 x 30	---
Bump	W8-1, W8-1M (old W8-1a)	6F.16	36 x 36	48 x 48	30 x 30
Dip	W8-2	6F.16	36 x 36	48 x 48	30 x 30
Pavement Ends	W8-3	6F.16	36 x 36	48 x 48	30 x 30
Soft Shoulder	W8-4	6F.44	36 x 36	48 x 48	30 x 30
Slippery When Wet	W8-5	6F.16	36 x 36	48 x 48	30 x 30
Truck Crossing	W8-6	6F.36	36 x 36	48 x 48	30 x 30
Loose Gravel	W8-7	6F.16	36 x 36	48 x 48	30 x 30
Rough Road	W8-8	6F.16	36 x 36	48 x 48	30 x 30
Low Shoulder	W8-9	6F.44	36 x 36	48 x 48	30 x 30
Shoulder Drop-Off	W8-9a	6F.44.1	36 x 36	48 x 48	30 x 30
Uneven Lanes	W8-11	6F.45	36 x 36	48 x 48	30 x 30
No Center Stripe	W8-12a	6F.47	36 x 36	48 x 48	30 x 30
Fallen Rocks	W8-14	6F.16	36 x 36	48 x 48	30 x 30
Grooved Pavement	W8-15	6F.16	36 x 36	48 x 48	30 x 30
Motorcycle (plaque)	W8-15P	6F.54	24 x 18	30 x 24	---
Road May Flood	W8-18	6F.16	36 x 36	48 x 48	24 x 24
No Shoulder	W8-23	6F.44.3	36 x 36	48 x 48	30 x 30
Steel Plate Ahead	W8-24	6F.46	36 x 36	48 x 48	30 x 30
Shoulder Ends	W8-25	6F.16	36 x 36	48 x 48	30 x 30
Lane Ends	W9-1,2	6F.16	36 x 36	48 x 48	30 x 30
Grade Crossing Advance Warning	W10-1	6F.16	36 Diameter	---	---
Truck	W11-10	6F.36	36 x 36	48 x 48	30 x 30
Double Arrow	W12-1	6F.16	30 x 30	---	---
Low Clearance	W12-2	6F.16	36 x 36	48 x 48	30 x 30
Advisory Speed (plaque)	W13-1P	6F.52	24 x 24	30 x 30	18 x 18
On Ramp (plaque)	W13-4P	6F.25	36 x 36	36 x 36	---
No Passing Zone (pennant)	W14-3	6F.16	48 x 48 x 36	64 x 64 x 48	40 x 40 x 30
Emergency Scene Ahead	W14-X15	6I.1	36 x 36	48 x 48	---
XX Feet (plaque)	W16-2P	6F.16	24 x 18	30 x 24	---
Road Work Ahead	W20-1	6F.18	36 x 36	48 x 48	30 x 30
Detour Ahead	W20-2	6F.19	36 x 36	48 x 48	30 x 30
Road (Street) Closed Ahead	W20-3	6F.20	36 x 36	48 x 48	30 x 30
Trail Closed Ahead	W20-3M (old W20-3a)	6F.20.1		---	---

* See Table 2B-1 for minimum size required for signs facing traffic on multi-lane conventional roads.

Notes:

1. Larger signs may be used wherever necessary for greater legibility or emphasis
2. Dimensions are shown in inches and are shown as width x height.

Table 6F-1 Temporary Traffic Control Zone Sign and Plaque Sizes (Sheet 2 of 3)

Sign or Plaque	Sign Designation	Section	Conventional Road	Freeway or Expressway	Minimum
One Lane Road Ahead	W20-4	6F.21	36 x 36	48 x 48	30 x 30
Flagger (symbol)	W20-7	6F.31	36 x 36	48 x 48	30 x 30
Slow (on Stop/Slow Paddle)	W20-8M (old W21-X7)	6E.3	18 x 18	---	---
Merge	W20-X3	6F.24.1	36 x 36	48 x 48	30 x 30
Bypass Ahead	W20-X6	6F.50	36 x 36	48 x 48	30 x 30
Narrow Lane (width shown)	W20-X11	6F.50	36 x 36	48 x 48	30 x 30
Right Two Lanes Closed	W20-X13	6F.22	36 x 36	48 x 48	30 x 30
Lanes Narrow	W20-X17	6F.50	36 x 36	48 x 48	30 x 30
Workers	W21-1	6F.33	36 x 36	48 x 48	30 x 30
Fresh Oil (Tar)	W21-2	6F.34	36 x 36	48 x 48	30 x 30
Road Machinery Ahead	W21-3	6F.35	36 x 36	48 x 48	30 x 30
Slow Moving Vehicle	W21-4	6G.6	36 x 18	---	---
Shoulder Work	W21-5	6F.37	36 x 36	48 x 48	30 x 30
Shoulder Closed	W21-5a	6F.37	36 x 36	48 x 48	30 x 30
Survey Crew	W21-6	6F.38	36 x 36	48 x 48	30 x 30
Survey Crew Ahead	W21-6M (old W21-6a)	6F.38	36 x 36	48 x 48	30 x 30
Utility Work Ahead	W21-7	6F.39	36 x 36	48 x 48	30 x 30
Mowing Ahead	W21-8	6G.6	36 x 36	48 x 48	30 x 30
Right (Left) Lane Closed	W20-X5 (old W21-X5)	6F.22	36 x 36	48 x 48	30 x 30
Center Lane Closed	W21-X5c	6F.23	36 x 36	48 x 48	30 x 30
Crew Working Ahead	W21-X6	6F.38.1	36 x 36	48 x 48	30 x 30
High Shoulder	W8-9M (old W21-X9)	6F.44.2	36 x 36	48 x 48	30 x 30
Blasting Zone Ahead	W22-1	6F.41	36 x 36	48 x 48	30 x 30
Turn Off 2-Way Radio and Cell Phone	W22-2	6F.42	42 x 36	42 x 36	---
End Blasting Zone	W22-3	6F.43	42 x 36	42 x 36	36 x 30
Slow Traffic Ahead	W23-1	6F.27	48 x 24	48 x 24	---
New Traffic Pattern Ahead	W23-2	6F.30	36 x 36	48 x 48	30 x 30
Double Reverse Curve (1 lane)	W24-1	6F.49	36 x 36	48 x 48	30 x 30
Double Reverse Curve (2 lanes)	W24-1a	6F.49	36 x 36	48 x 48	30 x 30
Double Reverse Curve (3 lanes)	W24-1b	6F.49	36 x 36	48 x 48	30 x 30
All Lanes (plaque)	W24-1cP	6F.49	24 x 18	30 x 24	---
Road Work Next XX Miles	G20-1	6F.56	36 x 18	48 x 24	---
End Road Work	G20-2 (old W20-2a)	6F.57	36 x 18	48 x 24	---
Pilot Car Follow Me	G20-4	6F.58	36 x 18	---	---
Work Zone (plaque)	G20-5aP	6F.12	24 x 18	36 x 24	---
Road Closed Beginning XXXX XX	G20-X1	6F.56.1	72 x 60	90 x 78	---
Exit Open	E5-2	6F.28	48 x 36	48 x 36	---
Exit Closed	E5-2a	6F.28	48 x 36	48 x 36	---
Exit Only	E5-3	6F.29	48 x 36	48 x 36	---
Detour	M4-8	6F.59	24 x 12	30 x 15	---
End Detour	M4-8a	6F.59	24 x 18	24 x 18	---
End	M4-8b	6F.59	24 x 12	24 x 12	---
Detour	M4-9M	6F.59	30 x 24	48 x 36	---
Bike/Pedestrian	M4-9aM (old M4-9ma)	6F.59	30 x 24	---	---
Pedestrian Detour	M4-9bM (old M4-9mb)	6F.59	30 x 24	---	---
Bike Detour	M4-9cM (old M4-9mc)	6F.59	30 x 24	---	---
Detour	M4-10	6F.59	48 x 18	---	---

Notes:

* See Table 2B-1 for minimum size required for signs facing traffic on multi-lane conventional roads.

1. Larger signs may be used wherever necessary for greater legibility or emphasis
2. Dimensions are shown in inches and are shown as width x height.

Table 6F-1 Temporary Traffic Control Zone Sign and Plaque Sizes (Sheet 3 of 3)

Guidance

Neither portable nor permanent sign supports should be located on sidewalks, bicycle facilities, or areas designated for pedestrian or bicycle traffic. If the bottom of a secondary sign that is mounted below another sign is mounted lower than 7 feet above a pedestrian sidewalk or pathway (see Section 6D.2), the secondary sign should not project more than 4 inches into the pedestrian facility. If it is unavoidable to place a portable sign support into a pedestrian walkway, a detectable edge should be installed between the portable sign support and the pedestrian walkway.

Standard

Where it has been determined that the accommodation of pedestrians with disabilities is necessary, signs shall be mounted and placed in accordance with Section 4.4 of the “Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)” (see Section 1A.11)

Signs mounted on barricades, barricade/sign combinations shall be crashworthy.

Guidance

Except as provided in the following Option, signs anticipated to be in one place for more than 30 days should not be mounted on portable supports. Whenever this anticipated time period changes, signs mounted on portable supports should be re-evaluated.

Option

Signs, whose location on a paved surfaces is necessary, may be mounted on portable supports for more than 30 days.

Support

Methods of mounting signs other than on posts are illustrated in Figure 6F-2.

Guidance

Signs mounted on Type III barricades should not cover more than 50 percent of the top two rails or 33 percent of the total area of the three rails.

Standard

All sign supports shall be crashworthy.

Where large signs having an area exceeding 50 square feet are installed on multiple breakaway posts, the clearance from the ground to the bottom of the sign shall be at least 7 feet.

The bottom of a sign mounted on a barricade, or other portable support, shall be at least 1 foot above the traveled way.

In addition, regulatory signs installed on barricades or other portable supports shall be installed so that the center of the sign or sign assembly is at least 4 ft above the traveled way.

Option

For mobile operations, a sign may be mounted on a work vehicle, a shadow vehicle, or a trailer stationed in advance of the TTC zone or moving along with it. The work vehicle, the shadow vehicle, or the trailer may or may not have an impact attenuator.

Support

If alterations are made to specific traffic control device supports that have been successfully crash tested in accordance with NCHRP Report 350, or the American Association of State Highway and Transportation Officials (AASHTO) “Manual for Assessing Safety Hardware (MASH)”, the altered supports might not be considered to be crashworthy.

6F.4 Sign Maintenance

Guidance

Signs shall be properly maintained for cleanliness, visibility, and correct positioning.

Standard

Signs that have lost significant legibility shall be promptly replaced as soon as possible after notification.

Support

Section 2A.8 contains information regarding the retroreflectivity of signs, including the signs that are used in TTC zones.

6F.5 Regulatory Sign Authority

Support

Regulatory signs inform road users of traffic laws or regulations and indicate the applicability of legal requirements that would not otherwise be apparent.

Standard

Regulatory signs shall be authorized by the public agency or official having jurisdiction and shall conform with Chapter 2B.

6F.6 Regulatory Sign Design

Standard

TTC regulatory signs shall comply with the Standards for regulatory signs presented in Part 2 and in the MnDOT Standard Signs and Markings Manual and the FHWA “Standard Highway Signs and Markings” book (see Section 1A.11).

Support

Regulatory signs are generally rectangular with a black legend and border on a white background. Exceptions include the STOP, YIELD, DO NOT ENTER, WRONG WAY, and ONE WAY signs.

Option

The ONE WAY sign may be either a horizontal or vertical rectangular sign.

6F.7 Regulatory Sign Applications

Standard

If a TTC zone requires regulatory measures different from those existing, the existing permanent regulatory devices shall be removed or covered and superseded by the appropriate temporary regulatory signs. This change shall be made in compliance with applicable ordinances or statutes of the jurisdiction.

6F.8 ROAD (STREET) CLOSED Sign (R11-2)



R11-2

Guidance

The ROAD (STREET) CLOSED (R11-2) sign should be used when the roadway is closed to all road users except contractors' equipment or officially authorized vehicles. The R11-2 sign should be accompanied by appropriate warning and detour signing.

Option

The words BRIDGE OUT (or BRIDGE CLOSED) may be substituted for ROAD (STREET) CLOSED where applicable.

Guidance

The ROAD (STREET) CLOSED sign should be installed at or near the center of the roadway on or above a Type III barricade that closes the roadway (see Section 6F.68).

Standard

The ROAD (STREET) CLOSED sign shall not be used where road user flow is maintained through the TTC zone with a reduced number of lanes on the existing roadway or where the actual closure is some distance beyond the sign.

6F.9 Local Traffic Only Signs (R11-3a, R11-4)



R11-3a



R11-4

Guidance

The Local Traffic Only signs should be used where road user flow detours to avoid a closure some distance beyond the sign, but where local road users can use the roadway to the point of closure. These signs should be accompanied by appropriate warning and detour signing.

The Local Traffic Only sign should have the legend ROAD CLOSED XX MILES AHEAD, LOCAL TRAFFIC ONLY (R11-3a).

Option

In urban areas, the legend ROAD (STREET) (RAMP) CLOSED TO THRU TRAFFIC (R11-4) or ROAD CLOSED, LOCAL TRAFFIC ONLY may be used.

In urban areas, a word message that includes the name of an intersecting street name or well-known destination may be substituted for the words XX MILES AHEAD on the R11-3a sign where applicable.

The words BRIDGE OUT (or BRIDGE CLOSED) may be substituted for the words ROAD (STREET) (RAMP) CLOSED on the R11-3a or R11-4 sign where applicable.

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Option

Warning signs used for TTC incident management situations may have a black legend and border on a fluorescent pink background.

Mounting or space considerations may justify a change from the standard diamond shape.

In emergencies, available warning signs having yellow backgrounds may be used if signs with orange backgrounds signs are not at hand.

Guidance

Where roadway or road user conditions require greater emphasis, larger than standard size warning signs should be used, with the symbol or legend enlarged approximately in proportion to the outside dimensions.

Where any part of the roadway is obstructed or closed by work activities or incidents, advance warning signs should be installed to alert road users well in advance of these obstructions or restrictions.

Where road users include pedestrians, the provision of supplemental audible information or detectable barriers or barricades should be considered for people with visual disabilities.

Support

Detectable barriers or barricades communicate very clearly to pedestrians who have visual disabilities that they can no longer proceed in the direction that they are traveling.

Option

Advance warning signs may be used singly or in combination.

Where distances are not shown on warning signs as part of the message, a supplemental plaque with the distance legend may be mounted immediately below the sign on the same support.

6F.16.1 Roll-Up Warning Signs

Option

Roll-up warning signs may be used to provide advance warning signing for TTC zones.

Standard

Roll-up warning signs shall have a black legend on a reflectorized orange or reflectorized fluorescent orange background. They may be used for daytime or nighttime only when workers are present to monitor the signs.

The mounting height of roll-up signs shall conform to the standards as shown in Section 6F.3.

Guidance

A 1 foot minimum height will be allowed for roll-up warning signs, but the signs should be mounted higher in order to improve their visibility.

6F.17 Position of Advance Warning Signs

Guidance

Where highway conditions permit, warning signs should be placed in advance of the TTC zone at varying distances depending on roadway type, condition, and posted speed. Table 6C-1 contains information regarding the spacing of advance warning signs. Where a series of two or more advance warning signs is used, the closest sign to the TTC zone should be placed approximately 100 feet for low-speed urban streets to 1,000 feet or more for freeways and expressways.

Where multiple advance warning signs are needed on the approach to a TTC zone, the ROAD WORK AHEAD (W20-1) sign should be the first advance warning sign encountered by road users

Option

Other similar signs such as BRIDGE WORK AHEAD (W20-1M (old W20-X9)) or SURVEY CREW AHEAD (W21-6a) may be used as a substitute for the ROAD WORK AHEAD (W20-1) sign.

Support

Various conditions, such as limited sight distance or obstructions that might require a driver to reduce speed or stop, might require additional advance warning signs.

Option

As an alternative to a specific distance on advance warning signs, the word AHEAD may be used.

Support

At TTC zones on lightly-traveled roads, all of the advance warning signs prescribed for major construction might not be needed.

Option

Utility work, maintenance, or minor construction can occur within the TTC zone limits of a major construction project, and additional warning signs may be needed.

Guidance

Utility, maintenance, and minor construction signing and TTC should be coordinated with the governing road authority so that road users are not confused or misled by the TTC devices.

6F.18 ROAD (STREET) WORK AHEAD Sign (W20-1)



W20-1

Guidance

The ROAD (STREET) WORK AHEAD (W20-1) sign which serves as a general warning of obstructions or restrictions, should be located in advance of the work space or any detour, on the road where the work is taking place, and on all intersecting roadways.

Where traffic can enter a TTC zone from a crossroad or a major (high-volume) driveway, an advance warning sign should be used on the crossroad or major driveway.

Standard

The ROAD (STREET) WORK (W20-1) sign shall have the legend ROAD (STREET) WORK, XX FT, XX MILES, or AHEAD.

6F.19 DETOUR AHEAD Sign (W20-2)



W20-2

Guidance

The DETOUR AHEAD (W20-2) sign should be used in advance of a road user detour over a different roadway or route.

Standard

The DETOUR sign shall have the legend DETOUR, XX FEET, XX MILES, or AHEAD.

6F.20 ROAD (STREET) CLOSED AHEAD Sign (W20-3)

Guidance

The ROAD (STREET) CLOSED AHEAD (W20-3) sign should be used in advance of the point where a highway is closed to all road users, or to all but local road users with speed limits of 30 mph or less.

Standard

The ROAD (STREET) CLOSED sign shall have the legend ROAD (STREET) CLOSED, XX FEET, XX MILES, or AHEAD.



W20-3



W20-3M (old W20-3a)

6F.20.1 TRAIL CLOSED AHEAD Sign (W20-3M (old W20-3a))

Guidance

The TRAIL CLOSED AHEAD (W20-3M (old W20-3a)) sign should be used in advance of the point where a recreational trail is closed to all users.

6F.21 ONE LANE ROAD AHEAD Sign (W20-4)



W20-4

Standard

The ONE LANE ROAD AHEAD (W20-4) sign shall be used only in advance of that point where motor vehicle traffic in both directions must use a common single lane (see Section 6C.10). It shall have the legend ONE LANE ROAD, XX FEET, XX MILES, or AHEAD.

Guidance

If the affected one lane roadway is not visible from one end to the other, or if the traffic is such that simultaneous arrivals at both ends occur frequently, flagging procedures, stop sign or signal control should be used to control alternate traffic flows.

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6F.22 Lane(s) Closed Signs (W21-X5, W20-X13)



W21-X5



W20-X13

Standard

Lane closed signs shall be used in advance of that point where one or more through lanes of a multiple-lane roadway are closed.

For a single lane closure, the RIGHT (LEFT) LANE CLOSED (W21-X5) sign shall be used. Where two adjacent lanes are closed, the RIGHT (LEFT) 2 LANES CLOSED (W20-X13) shall be used.

6F.23 CENTER LANE CLOSED Sign (W21-X5c)

Standard

The CENTER LANE CLOSED (W21-X5c) sign shall only be used on roadways where the posted speed limit is 30 MPH or less.

Guidance

The CENTER LANE CLOSED (W21-X5c) sign should be used in advance of that point where work occupies the center lane(s) and approaching motor vehicle traffic is directed to the right or left of the work zone in the center lane.



W21-X5c



W4-1a

6F.23.1 THRU TRAFFIC MERGE RIGHT (LEFT) Sign (W4-1a)

Guidance

The THRU TRAFFIC MERGE RIGHT (LEFT) (W4-1a) sign should be used in advance of an intersection where one or more lane closures on the far side of a multi-lane intersection require through motor vehicle traffic on the approach to the intersection to use the right (left) lane to proceed through the intersection.

6F.24 Lane Ends Sign (W4-2)



W4-2R



W4-2L

Option

The Lane Reduction (W4-2) symbol sign may be used to warn drivers of the reduction in the number of motor vehicle traffic lanes in the direction of travel on a multi-lane roadway.

6F.24.1 MERGE Sign (W20-X3)



W20-X3

Guidance

The MERGE sign (W20-X3) with a demountable arrow should be placed at the beginning of a merging taper.

Option

The MERGE sign (W20-X3) may be used in conjunction with the LANE REDUCTION Sign (W4-2).

6F.24.2 BIKE LANE CLOSED (W20-X5) and BIKES MERGE (W20-X21) Sign



W20-X5



W20-X21

Support

The BIKE LANE CLOSED (W20-X5) sign and BIKES MERGE (W20-X21) sign is used to notify approaching vehicular traffic and bicycle traffic that a bike lane is ending and that bicycles will be merging into the through traffic lanes. This may be caused by work in the bike lane or if traffic will be diverted into the bike lane downstream due to work in the roadway.

Guidance

The BIKE LANE CLOSED (W20-X5) sign and the BIKES MERGE (W20-X21) sign should be placed in advance of the shoulder taper preceding the closed bike lane.

6F.25 ON RAMP Plaque (W13-4P)



W13-4P

Option

When work is being done on a ramp, but the ramp remains open, the ON RAMP (W13-4P) plaque may be used to supplement the advance ROAD WORK sign.

6F.26 RAMP NARROWS Sign (W5-4)

Option

The RAMP NARROWS (W5-4) sign may be used in advance of the point where work on a ramp reduces the normal width of the ramp along a part or all of the ramp.



W5-4



W23-1

6F.27 SLOW TRAFFIC AHEAD Sign (W23-1)

Option

The SLOW TRAFFIC AHEAD (W23-1) sign may be used on a shadow vehicle, usually mounted on the rear of the most upstream shadow vehicle, along with other appropriate signs for mobile operations to warn of slow moving work vehicles. A ROAD WORK (W20-1) sign may also be used with the SLOW TRAFFIC AHEAD sign.

6F.28 EXIT OPEN, EXIT CLOSED Signs (E5-2, E5-2a)



E5-2



E5-2a

Option

An EXIT OPEN (E5-2) or EXIT CLOSED (E5-2a) sign may be used to supplement other warning signs where work is being conducted in the vicinity of an exit ramp and where the exit maneuver for motor vehicle traffic using the ramp is different from the normal condition.

Guidance

When an exit ramp is closed, an EXIT CLOSED panel with a black legend and border on an orange background should be placed diagonally across the interchange/intersection guide signs.

6F.29 EXIT ONLY Sign (E5-3)



E5-3

Option

An EXIT ONLY (E5-3) sign may be used to supplement other warning signs where work is being conducted in the vicinity of an exit ramp and where the exit maneuver for vehicular traffic using the ramp is different from the normal condition.

6F.30 NEW TRAFFIC PATTERN AHEAD, TRAFFIC CHANGE AHEAD Signs (W23-2, W3-X5)



W23-2



W3-X5

Option

A NEW TRAFFIC PATTERN AHEAD (W23-2) or TRAFFIC CONTROL CHANGE AHEAD sign (W3-X5) may be used on the approach to an intersection or along a section of roadway to provide advance warning of a change in traffic patterns, such as revised lane usage, roadway geometry, or signal phasing.

Guidance

To retain its effectiveness, the W23-2 or W3-X5 sign should be displayed for up to 2 weeks, and then it should be covered or removed until it is needed again.

The primary purpose of portable changeable message signs in TTC zones is to advise the road user of unexpected situations. Portable changeable message signs are particularly useful as they are capable of:

- A. Conveying complex messages,
- B. Displaying real time information about conditions ahead, and
- C. Providing information to assist road users in making decisions prior to the point where actions must be taken.

Some typical applications include the following:

- A. Where the speed of vehicular traffic is expected to drop substantially;
- B. Where significant queuing and delays are expected;
- C. Where adverse environmental conditions are present;
- D. Where there are changes in alignment or surface conditions;
- E. Where advance notice of ramp, lane, or roadway closures is needed;
- F. Where crash or incident management is needed; and/or
- G. Where changes in the road user pattern occur.

Guidance

The components of a portable changeable message sign should include: a message sign, control systems, a power source, and mounting and transporting equipment. The front face of the sign should be covered with a protective material.

Standard

Portable changeable message signs shall comply with the applicable design and application principles established in Chapter 2A. Portable changeable message signs shall display only traffic operational, regulatory, warning, and guidance information, and shall not be used for advertising messages.

Support

Section 2L.2 contains information regarding overly simplistic or vague messages that is also applicable to portable changeable message signs.

Standard

The colors used for legends on portable changeable message signs shall comply with those shown in Table 2A-5.

Support

Section 2L.4 contains information regarding the luminance, luminance contrast, and contrast orientation that is also applicable to portable changeable message signs.

Standard

The Portable Changeable Message Sign shall display reliable information. An accurate description of the work or incident location is critical.

Guidance

Portable changeable message signs should be visible from 1/2 mile under both day and night conditions.

Support

Section 2B.13 contains information regarding the design of portable changeable message signs that are used to display speed limits that change based on operational conditions, or are used to display the speed at which approaching drivers are traveling.

Guidance

A portable changeable message sign should be limited to three lines of eight characters per line or should consist of a full matrix display.

Except as provided in the following Option, the letter height used for portable changeable message sign messages should be a minimum of 18 inches on high speed roadways and 14 inches on low speed roadways.

Option

For portable changeable message signs mounted on service patrol trucks or other incident response vehicles, a letter height as short as 10 inches may be used. Shorter letter sizes may also be used on a portable changeable message sign used on low speed facilities provided that the message is legible from at least 650 feet.

The portable changeable message sign may vary in size.

Guidance

Messages on a portable changeable message sign should consist of no more than two phases, and a phase should consist of no more than three lines of text. Each phase should be capable of being understood by itself, regardless of the order in which it is read. Messages should be centered within each line of legend. If more than one portable changeable message sign is simultaneously legible to road users, then only one of the signs should display a sequential message at any given time.

Support

Road users have difficulties in reading messages displayed in more than two phases on a typical three-line portable changeable message sign.

Standard

When the word messages shown in Tables 1A-1 or 1A-2 need to be abbreviated on a portable changeable message sign, the provisions described in Section 1A.15 shall be followed.

In order to maintain legibility, portable changeable message signs shall automatically adjust their brightness under varying light conditions.

The control system shall include a display screen upon which messages can be reviewed before being displayed on the message sign. The control system shall be capable of maintaining memory when power is unavailable.

Portable changeable message signs shall be equipped with a power source and a battery back-up to provide continuous operation when failure of the primary power source occurs.

The mounting of portable changeable message signs on a trailer, a large truck, or a service patrol truck shall be such that the bottom of the message sign shall be a minimum of 7 feet above the roadway in urban areas and 5 feet above the roadway in rural areas when it is in the operating mode.

Guidance

Portable changeable message signs should be used as a supplement to and not as a substitute for conventional signs and pavement markings.

When portable changeable message signs are used for route diversion, they should be placed far enough in advance of the diversion to allow road users ample opportunity to perform necessary lane changes, to adjust their speed, or to exit the affected highway.

Portable changeable message signs should be sited and aligned to provide maximum legibility and to allow time for road users to respond appropriately to the portable changeable message sign message.

Portable changeable message signs should be placed off the shoulder.

Standard

If a Portable Changeable Message sign is placed on the shoulder of the roadway, it shall be placed a minimum of 4 feet from the edge of the traveled lane, and it shall be delineated with a partial shoulder closure taper. If the 4 foot clearance cannot be met, then a full shoulder closure shall be provided.

Guidance

When portable changeable message signs are not being used to display TTC messages, they should be relocated such that they are outside of the clear zone or shielded behind a traffic barrier and turned away from traffic. If relocation or shielding is not practical, they should be delineated with retroreflective TTC devices.

Portable changeable message sign trailers should be delineated on a permanent basis by affixing retroreflective material, known as conspicuity material, in a continuous line on the face of the trailer as seen by oncoming road users.

Standard

If a Portable Changeable Message Sign is used as an arrow board, it shall meet all the requirements of an arrow board and shall be used solely as an arrow board.

6F.61 Arrow Boards

Standard

An arrow board shall be a sign with a matrix of elements capable of either flashing or sequential displays. This sign shall provide additional warning and directional information to assist in merging and controlling road users through or around a TTC zone.

Guidance

An arrow board in the arrow or chevron mode should be used to advise approaching traffic of a lane closure along major multi-lane arterial roadways in situations involving heavy traffic volumes, high speeds, and/or limited sight distances, or at other locations and under other conditions where road users are less likely to expect such lane closures.

If used, an arrow board should be used in combination with appropriate signs, channelizing devices, or other TTC devices.

Arrow boards should be placed off the shoulder whenever possible.

Standard

If an arrow board is placed on the shoulder of the roadway, it shall be placed a minimum of 4 feet from the edge of the traveled lane, and it shall be delineated with an appropriate shoulder closure taper.

Arrow boards shall meet the minimum size, legibility distance, number of elements, and other specifications shown in Figure 6F-6.

Support

Type A arrow boards are appropriate for use on low-speed urban streets. Type B arrow boards are appropriate for intermediate-speed facilities and for maintenance or mobile operations on high-speed roadways. Type C arrow boards are intended to be used on high-speed, high-volume motor vehicle traffic control projects. Type D arrow boards are intended for use on vehicles authorized by the State or local agency.

Standard

Type A, B, and C arrow boards shall have solid rectangular appearances. A Type D arrow board shall conform to the shape of the arrow.

All arrow boards shall be finished in non-reflective black. The arrow board shall be mounted on a vehicle, a trailer, or other suitable support.

Guidance

The minimum mounting height, measured vertically from the bottom of the board to the roadway below it or to the elevation of the near edge of the roadway, of an arrow board should be 7 feet, except on vehicle-mounted arrow boards, which should be no lower than 3 feet.

A vehicle-mounted arrow board should be provided with remote controls.

Standard

Arrow board elements shall be capable of at least a 50 percent dimming from full brilliance. The dimmed mode shall be used for nighttime operation of arrow boards.

Guidance

Full brilliance should be used for daytime operation of arrow boards.

Standard

The arrow board shall have suitable elements capable of the various operating modes. The color presented by the elements shall be yellow.

Guidance

If an arrow board consisting of a bulb matrix is used, the elements should be recess-mounted or equipped with an upper hood of not less than 180 degrees.

Standard

The minimum element on-time shall be 50 percent for the flashing mode, with equal intervals of 25 percent for each sequential phase. The flashing rate shall be not less than 25 or more than 40 flashes per minute.

An arrow board shall have the following three mode selections:

- A. A Flashing Arrow, Sequential Arrow, or Sequential Chevron mode;
- B. A flashing Double Arrow mode; and
- C. A flashing Caution or Alternating Diamond mode.

An arrow board in the arrow or chevron mode shall be used only for stationary or moving lane closures on multi-lane roadways.

For shoulder work, blocking the shoulder, for roadside work near the shoulder, or for temporarily closing one lane on a two-lane, two-way roadway, an arrow board shall be used only in the caution mode.

Guidance

For a stationary lane closure, the arrow board should be located on the shoulder at the beginning of the merging taper.

Where the shoulder is narrow, the arrow board should be located in the closed lane at the end of the taper.

Standard

When arrow boards are used to close multiple lanes, a separate arrow board shall be used for each closed lane.

Guidance

When arrow boards are used to close multiple lanes, if the first arrow board is placed on the shoulder, the second arrow board should be placed in the first closed lane at the upstream end of the second merging taper (see Figure 6H-37). When the first arrow board is placed in the first closed lane, the second arrow board should be placed in the second closed lane at the downstream end of the second merging taper.

For mobile operations where a lane is closed, the arrow board should be located to provide adequate separation from the work operation to allow for appropriate reaction by approaching drivers.

Standard

A vehicle displaying an arrow board shall be equipped with high-intensity rotating, flashing, oscillating, or strobe lights.

Arrow boards shall only be used to indicate a lane closure. Arrow boards shall not be used to indicate a lane shift.

Option

A portable changeable message sign may be used to simulate an arrow board display.

6F.62 High-Level Warning Devices (Flag Trees)

Option

A high-level warning device (flag tree) may supplement other TTC devices in TTC zones.

Support

A high-level warning device is designed to be seen over the top of typical passenger cars. A typical high-level warning device is shown in Figure 6F-2.

Guidance

Type II or Type III Barricades should be used on freeways and expressways or other high-speed roadways. Type III Barricades should be used to close or partially close a road.

Type III Barricades used at a road closure should be placed completely across a roadway or from curb to curb.

Guidance

Where provision is made for access of authorized equipment and vehicles, the responsibility for Type III Barricades should be assigned to a person to ensure proper closure at the end of each work day.

Support

When a highway is legally closed but access must still be allowed for local road users, barricades usually are not extended completely across the roadway.

Standard

When a highway is legally closed but access must still be allowed for local traffic, a sign shall be installed with the appropriate legend concerning permissible use by local road users (see Section 6F.09). Adequate visibility of the barricades from both directions shall be provided by;

1. installing retroreflective sheeting on both sides of the barricade boards; or
2. by installing barricade boards back-to-back on the barricade.

Option

Signs may be installed on barricades (see Section 6F.3).

6F.69 Direction Indicator Barricades**Standard**

The Direction Indicator Barricade shall consist of a retroreflective One-Direction Large Arrow (W1-6) sign mounted above a diagonal striped, horizontally aligned, retroreflective rail (see Figure 6F-7).

The One-Direction Large Arrow (W1-6) sign shall be black on an orange background. The stripes on the bottom rail shall be alternating orange and white retroreflective stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. The stripes shall be 4 inches wide. The One-Direction Large Arrow (W1-6) sign shall be 24 x 12 inches. The bottom rail shall have a length of 24 inches and a height of 8 inches.

Option

The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.

Guidance

If used, Direction Indicator Barricades should be used in series to direct the driver through the transition and into the intended travel lane.

6F.70 Temporary Traffic Barriers as Channelizing Devices**Support**

Temporary traffic barriers are not TTC devices in themselves; however, when placed in a position identical to a line of channelizing devices and marked and/or equipped with appropriate channelization features to provide guidance and warning both day and night, they serve as TTC devices.

Standard

Temporary traffic barriers serving as TTC devices shall comply with requirements for such devices as set forth throughout Part 6.

Temporary traffic barriers (see Section 6F.85) shall not be used solely to channelize road users, but also to protect the work space. If used to channelize vehicular traffic, the temporary traffic barrier shall be supplemented with delineation, pavement markings, or channelizing devices for improved daytime and nighttime visibility.

Guidance

Temporary traffic barriers should not be used for a merging taper except in low-speed urban areas. Temporary traffic barriers should not be used for a constricted/restricted TTC zone.

When it is necessary to use a temporary traffic barrier for a merging taper in low-speed urban areas or for a constricted/restricted TTC zone, the taper length should be designed to optimize road user operations considering the available geometric conditions.

Standard

When it is necessary to use a temporary traffic barrier for a merging taper in low-speed urban areas or for a constricted/restricted TTC zone, the taper shall be delineated.

Guidance

When used for channelization, temporary traffic barriers should be of a light color for increased visibility.

Standard

Normal vertical curbing shall not be used as a substitute for temporary traffic barriers when temporary traffic barriers are clearly needed.

Option

Warning lights or steady-burn lamps may be mounted on temporary traffic barrier installations. When in transition/taper areas or close to traffic lanes, retroreflective barrier markers or tape may be placed on barriers.

Depending on roadway geometrics, temporary speed reduction may be used in barrier areas.

Guidance

When serving the additional function of channelizing motor vehicle traffic, temporary traffic barriers should be a light color for increased visibility.

Support

Temporary traffic barrier is subjected to considerable abuse. The placement process itself can cause damage to the base and ends. Connection loops can be bent and deformed when being placed. Temporary traffic barrier can also degrade over the long term. Barrier is often in place for long periods and is subject to winter road salt spray and snow plows. Over a period, delamination can result, often to the point of section loss. Also, the repeated process of transport and handling causes a good deal of longitudinal flexure, which can cause cracking.

Guidance

Barrier sections and connections should be routinely inspected for damage.

Support

Movable barriers are capable of being repositioned laterally using a transfer vehicle that travels along the barrier. Movable barriers enable short-term closures to be installed and removed on long-term projects. Providing a barrier-protected work space for short-term closures and providing unbalanced flow to accommodate changes in the direction of peak-period traffic flows are two of the advantages of using movable barriers.

Min Rev. 8 | When a moveable barrier is used to close an exterior lane, it can be positioned to close the lane during the off-peak periods and can be relocated to open the lane during peak periods to accommodate peak traffic flows. With one pass of the transfer vehicle, the barrier can be moved out of the lane and onto the shoulder. Furthermore, if so desired, with a second pass of the transfer vehicle, the barrier could be moved to the roadside beyond the shoulder.

More specific information on the use of temporary traffic barriers is contained in Chapters 8 and 9 of AASHTO's "Roadside Design Guide" (see Section 1A.11).

6F.86 Crash Cushions

Support

Crash cushions are systems that mitigate the effects of errant vehicles that strike obstacles, either by smoothly decelerating the vehicle to a stop when hit head-on, or by redirecting the errant vehicle. The two types of crash cushions that are used in TTC zones are stationary crash cushions and truck-mounted attenuators. Crash cushions in TTC zones help protect the drivers from the exposed ends of barriers, fixed objects, shadow vehicles, and other obstacles. Specific information on the use of crash cushions can be found in AASHTO's "Roadside Design Guide" (see Section 1A.11).

Standard

Crash cushions shall be crashworthy. They shall also be designed for each application to stop or redirect errant vehicles under prescribed conditions. Crash cushions shall be periodically inspected to verify that they have not been hit or damaged. Damaged crash cushions shall be promptly repaired or replaced to maintain their crashworthiness.

Support

Stationary crash cushions are used in the same manner as permanent highway installations to protect drivers from the exposed ends of barriers, fixed objects, and other obstacles. More detailed information on the use of portable barriers and crash cushions can be obtained from Figure 6F-9.

Standard

Stationary crash cushions shall be designed for the specific application intended.

Truck-mounted attenuators shall be energy-absorbing devices attached to the rear of shadow trailers or trucks. If used, the shadow vehicle with the attenuator shall be located in advance of the work area, workers, or equipment to reduce the severity of rear-end crashes from errant vehicles.

Support

Trucks or trailers are often used as shadow vehicles to protect workers or work equipment from errant vehicles. These shadow vehicles are normally equipped with flashing arrows, changeable message signs, and/or high-intensity

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PART 6. TEMPORARY TRAFFIC CONTROL

Chapter 6G. Type of Temporary Traffic Control Zone Activity

6G.a Introduction

Support

The purpose of temporary traffic control is to balance the need for safe and effective work spaces with the need to warn, control, protect, and expedite vehicular and pedestrian traffic. To accomplish this, the respect of the driver must be earned by appropriate and prudent use of traffic control devices. Proper engineering judgment is the key factor in making the temporary traffic control zone both safe and efficient.

Guidance

Advance planning is necessary for any successful temporary traffic control zone. Before setting up any zone, the appropriate layout and number of devices must be determined. Any major changes from the typical layouts should be documented. For major projects, emergency operation plans should be developed in the event of a total road closure.

Option

Important aspects of the planning stage include consideration of alternate routes and the use of public information.

Standard

It is essential to notify emergency services (i.e. police, fire, etc.) of any road closures and route changes.

Support

In this chapter, the factors which affect the selection of the typical temporary traffic control zone layouts are explained. The layouts are found in Chapter 6J, Traffic Control for Long Term Temporary Traffic Control Zones and in Chapter 6K, Minnesota Temporary Traffic Control Field Manual.

Standard

For most projects, especially long term projects, it will be necessary to prepare a project specific Traffic Control Plan (TCP). A TCP may range from a reference to Chapter 6K (the Field Manual) to a detailed set of plans and specifications.

Guidance

In developing any TCP the following items should be considered:

- A. Suitable detours
 - Weight, height, length and width restrictions
 - Capacity
 - Geometrics
 - Maintenance of the detour
- I. Access and signage to businesses
- J. Conflict with standard routes and accommodations for:
 - School buses
 - Public transit
 - Fire
 - Ambulance
 - Postal Service
- K. Restriction of capacity during peak hours
- L. Alternate routes and other construction and/or maintenance activities in the area that may affect alternate routes.
- M. Restrictions on overweight, overheight, overlength and overwidth permits
 - I. Inplace signing, lighting and signal modifications
 - J. Trail crossings, pedestrians, bicyclists
 - K. Utility work
 - L. Special events, holidays, etc.
 - M. Local ordinances
 - N. Hazardous cargo

6G.1 Typical Applications

Support

Each TTC zone is different. Many variables, such as location of work, highway type, geometrics, vertical and horizontal alignment, intersections, interchanges, road user volumes, road vehicle mix (buses, trucks, and cars), and road user speeds affect the needs of each zone. A TTC zone includes the section of roadway between the first advance warning sign through the last traffic control device, where traffic returns to its normal path and conditions. The goal of TTC in work zones is safety with minimum disruption to road users. The key factor in promoting TTC zone safety is proper judgment.

Typical layouts include a variety of temporary traffic control methods, but do not include a layout for every conceivable work situation.

Well-designed TTC plans for planned special events will likely be developed from a combination of treatments from several of the typical applications.

Guidance

Work that may require a complete closure for a short period of time (15 minutes or less) should be scheduled for non-peak hours. A portable changeable message sign should be considered to warn motorists approaching the closure. Care must be taken to ensure that advance warning signs extend beyond any possible queue. If the closure is done during nighttime hours, uniformed officers may be used for flagging.

6G.2.5 Mobile Temporary Traffic Control Zones

Support

Mobile operations are work activities that move along the road. Mobile operations often involve frequent short stops, each as much as 15 minutes long, for activities such as pothole patching, crack sealing or utility operations and are similar to short duration operations. Mobile operations also include work activities in which workers and equipment move along the road without stopping, usually at slow speeds.

As compared to stationary operations, mobile operations are activities that might involve different treatments. Devices having greater mobility might be necessary, such as signs mounted on trucks. Devices that are larger, more imposing, or more visible can be used effectively and economically. The mobility of the TTC zone is important.

Maintaining safe work and road user conditions is a paramount goal in carrying out mobile operations.

During mobile work, it often takes longer to set up and remove the traffic control than to perform the work. Workers face hazards in setting up and taking down the TTC zone. Also, since the work time is short, delays affecting road users are significantly increased when additional devices are installed and removed.

Guidance

If a mobile operation does not move at least the decision sight distance (See Table 6E-1) every 15 minutes it should be considered a stationary TTC zone and the appropriate stationary layout used. If sight distance is limited or volumes high, a stationary layout should also be considered.

Under high-volume conditions, consideration should be given to scheduling mobile operations work during off-peak hours and parking may be prohibited.

Option

Considering these factors, simplified control procedures may be warranted for mobile work. A reduction in the number of devices may be offset by the use of other more dominant devices, as detailed for mobile operations in Chapter 6K (the Field Manual), and may include rotating lights or strobe lights on work vehicles and vehicles augmented with signs or arrow panels.

Flaggers may be used for mobile operations that often involve frequent short stops.

Standard

Mobile operations on a high speed travel lane of a multilane divided highway shall use arrow boards.

Guidance

When the mobile operation is continually moving along the road, the traffic should be directed to pass safely. A shadow vehicle or protection vehicle equipped as a sign truck, with an appropriately used arrow board, should follow the work vehicle as detailed in the layouts.

Work and shadow vehicles should be equipped with such devices such as flags, rotating/strobe vehicle lights, truck-mounted attenuators, and appropriate signs. These devices may be required individually or in various combinations, or all of them, as determined necessary

Standard

Mobile operations shall have appropriate devices on the equipment (that is, high-intensity rotating, flashing, oscillating, or strobe lights, signs, or special lighting), or shall use a separate vehicle with appropriate warning devices.

Option

For mobile operations that move at speeds of less than 3 mph, mobile signs or stationary signing that is periodically retrieved and repositioned in the advance warning area to keep them near the work space may be used.

6G.5 Work Affecting Pedestrian and Bicycle Facilities

Support

It is not uncommon, particularly in urban areas, that road work and the associated TTC will affect existing pedestrian or bicycle facilities. It is essential that the needs of all road users, including pedestrians with disabilities, are considered in TTC zones.

In addition to specific provisions identified in Sections 6G.6 through 6G.14, there are a number of provisions that might be applicable for all of the types of activities identified in this Chapter.

Guidance

Where pedestrian or bicycle usage is high, the typical applications should be modified by giving particular attention to the provisions set forth in Chapter 6D, this Chapter, Section 6F.74, and in other Sections of Part 6 related to accessibility and detectability provisions in TTC zones.

Pedestrians should be separated from the worksite by appropriate devices that maintain the accessibility and detectability for pedestrians with disabilities.

Bicyclists and pedestrians should not be exposed to unprotected excavations, open utility access, overhanging equipment, dust, noise, or other such conditions.

Except for short duration and mobile operations, when a highway shoulder is occupied, a SHOULDER WORK (W21-5) sign should be placed in advance of the activity area. When work is performed on a paved shoulder 8 feet or more in width, channelizing devices should be placed on a taper having a length that conforms to the requirements of a shoulder taper. Signs should be placed such that they do not narrow any existing pedestrian passages to less than 48 inches.

Pedestrian detours should be avoided since pedestrians rarely observe them and the cost of providing accessibility and detectability might outweigh the cost of maintaining a continuous route. Whenever possible, work should be done in a manner that does not create a need to detour pedestrians from existing routes or crossings.

Standard

Where pedestrian routes are closed, alternate pedestrian routes shall be provided.

When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.

6G.6 Work Outside of the Shoulder

Support

When work is being performed off the roadway (beyond the shoulders, but within the right-of-way), little or no TTC might be needed. TTC generally is not needed where work is confined to an area 15 feet or more from the edge of the traveled way. However, TTC is appropriate where distracting situations exist, such as vehicles parked on the shoulder, vehicles accessing the worksite via the highway, and equipment traveling on or crossing the roadway to perform the work operations (for example, mowing). For work beyond the shoulder, see Figure 6K-8.

Guidance

Where the situations described in the previous Support exist, a single warning sign, such as ROAD WORK AHEAD (W20-1), should be used. If the equipment travels on the roadway, the equipment should be equipped with appropriate flags, high-intensity rotating, flashing, oscillating, or strobe lights, and/or a SLOW MOVING VEHICLE (W21-4) sign.

An advance warning sign should be used when any of the following conditions occur:

- A. Work will be performed on the shoulder at certain stages of the activity.
- B. Equipment may be moved along or across the highway.
- C. Motorists may be distracted by the work activity.

Option

A typical sign for this situation may be ROAD WORK AHEAD.

If work vehicles are on the shoulder, a SHOULDER WORK (W21-5) sign may be used. For mowing operations, the sign MOWING AHEAD (W21-8) may be used.

Guidance

Where the activity is spread out over a distance of more than 2 miles, the SHOULDER WORK (W21-5) sign should be repeated every 1 mile.

Option

A supplementary plaque with the message NEXT XX MILES (W7-3aP) may be used.

Guidance

A general warning sign like Workers Ahead sign (W21-1a) should be used if workers and equipment must occasionally move closer to the traveled way.

If the equipment travels on or crosses the roadway, it should be equipped with appropriate flags, flashing lights, and/or a SLOW MOVING VEHICLE symbol. If vehicles are using the shoulder, a ROAD WORK AHEAD (W20-1) or SHOULDER WORK (W21-5) sign is appropriate.

6G.7 Work on the Shoulder with No Encroachment

Support

The provisions of this Section apply to short-term through long-term stationary operations.

Guidance

Parking lanes should be treated the same as shoulders. They should be posted for any restrictions at least 24 hours prior to commencing work.

Standard

If the parking lane is normally open to vehicle travel during the time of day the closure will be in effect, the parking lane shall be considered a traveled lane.

When a highway shoulder is occupied, warning is needed to advise the driver and protect the workers. A single warning sign SHOULDER WORK or ROAD WORK AHEAD shall be used.

When paved shoulders having a width of 8 feet or more are closed, at least one advance warning sign shall be used. In addition, channelizing devices shall be used to close the shoulder in advance to delineate the beginning of the work space and direct motor vehicle traffic to remain within the traveled way.

Guidance

When paved shoulders having a width of 8 feet or more are closed on freeways and expressways, road users should be warned about potential disabled vehicles that cannot get off the traveled way. An initial general warning sign, such as ROAD WORK AHEAD (W20-1), should be used, followed by a RIGHT or LEFT SHOULDER CLOSED (W21-5a) sign. Where the downstream end of the shoulder closure extends beyond the distance that can be perceived by road users, a supplementary plaque bearing the message NEXT XX FEET (W16-4P) or NEXT XX MILES (W7-3aP) should be placed below the SHOULDER CLOSED (W21-5a) sign. On multi-lane, divided highways, signs advising of shoulder work or the condition of the shoulder should be placed only on the side of the affected shoulder.

When an improved shoulder is closed on a high-speed roadway, it should be treated as a closure of a portion of the

road system because road users expect to be able to use it in emergencies. Road users should be given ample advance warning that shoulders are closed for use as refuge areas throughout a specified length of the approaching TTC zone. The sign(s) should read SHOULDER CLOSED (W21-5a) with distances indicated. The work space on the shoulder should be closed off by a taper or channelizing devices with a length of 1/3 L using the formulas in Tables 6C-3 and 6C-4.

When the shoulder is not occupied but work has adversely affected its condition other warning signs and devices are appropriate. The LOW SHOULDER (W8-9), NO SHOULDER (W8-23), HIGH SHOULDER (W8-9M (old W21-X9)) or SOFT SHOULDER (W8-4) sign should be used. See Figures 6K-3, 4, and 5 in the Field Manual for longitudinal drop offs and Sections 6F-44.2 through 6F-44.4. In areas where the speed limit is greater than 30 mph and the condition extends over a distance in excess of one mile, the sign should be repeated at one mile intervals. In areas where the speed limit is 30 mph or less, the sign should be repeated at 1/4 mile increments.

Option

In addition, a supplementary plaque bearing the message NEXT XX MILES (W7-3aP) may be placed below and on the traffic side of the first such warning sign. Temporary traffic barriers may be needed to inhibit encroachment of errant vehicles into the work space and to protect workers.

Guidance

Signs advising of shoulder work or the condition of the shoulder should be placed only on the side of the affected shoulder.

Standard

When used for shoulder work, arrow boards shall operate only in the caution mode.

Option

If work is directly adjacent to the travel lane, workers need to be protected. In some instances, this may require the use of portable barriers.

6G.8 Work on the Shoulder with Minor Encroachment

Support

Chapter 6D and Sections 6F.74 and 6G.05 contain additional information regarding the steps to follow when pedestrian or bicycle facilities are affected by the worksite.

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Guidance

When work takes up part of a lane, vehicular traffic volumes, vehicle mix (buses, trucks, cars, and bicycles), speed, and capacity should be analyzed to determine whether the affected lane should be closed. Unless the lane encroachment permits a remaining lane width of 10 feet, the lane should be closed.

Truck off-tracking should be considered when determining whether the minimum lane width of 10 feet is adequate.

Traffic should not be directed onto a lane that is only partially paved.

Option

A lane width of 9 feet may be used for short-term stationary work on intermediate volume, low-speed roadways when vehicular traffic does not include longer and wider heavy commercial vehicles.

6G.9 Work Within the Median

Support

Chapter 6D and Sections 6F.74 and 6G.05 contain additional information regarding the steps to follow when pedestrian or bicycle facilities are affected by the worksite.

Option

If the work is in a narrow median of a divided highway, traffic control for both directions of travel may be necessary.

Guidance

If work in the median of a divided highway is within 15 feet from the edge of the traveled way for either direction of travel, TTC should be used through the use of advance warning signs and channelizing devices.

If the work is long term, the use of portable barriers should be considered.

6G.9.1 Detours and Diversions

Support

Detour signing is usually designed by the traffic engineer with authority over the closed roadway because it is considered a traffic routing problem. Detour signs are used to direct traffic onto another roadway. At diversions, road users are directed onto a temporary roadway or alignment placed within or adjacent to the right-of-way. Typical applications for detouring or diverting road users on two-lane highways are shown in Layouts 6J-16, 6J-17, and 6J-18. Layout 6J-15 illustrates the controls around an area where a section of roadway has been closed and a diversion has been constructed. Channelizing devices and pavement markings are used to indicate the transition to the temporary roadway.

Guidance

A diversion (bypass) should be designed the same as a crossover (see Section 6G.16).

Option

A diversion may carry either one direction or both directions of traffic.

Guidance

When the detour is long, Detour (M4-8, M4-9) signs should be installed periodically and at major intersections to remind and reassure drivers that they are still on a detour.

When a roadway is closed at some point beyond the detour, traffic should be advised as to what location the road is open. If local road users are allowed to use the roadway up to the closure, the ROAD CLOSED XX MILES AHEAD, LOCAL TRAFFIC ONLY (R11-3a) sign should be used. The portion of the road open to local road users should have adequate signing, marking, and delineation.

Detours should be signed so that traffic will be able to get through the entire detour area and back to the original roadway.

When an entire roadway is closed, as illustrated in Layout 6J-19, a detour should be provided and road users should be warned in advance of the closure, which in this example is a closure 16 km (10 mi) from the intersection.

6G.10 Work Within the Traveled Way of a Two-Lane Highway

Support

Chapter 6D and Sections 6F.74 and 6G.05 contain additional information regarding the steps to follow when pedestrian or bicycle facilities are affected by the worksite.

Techniques for one lane, two-way traffic control are described in Section 6C-10.

Standard

When one lane of a two lane road is closed, the remaining lane shall accommodate both lanes of travel. A minimum lane width of 10 feet shall be maintained at all times (see Section 6G-3).

Option

On intermediate volume residential streets, traffic may be self regulating.

Where conditions permit, parking may be prohibited and traffic shifted into the parking lanes..

6G.16 Crossovers

Guidance

The following are considered good guiding principles for the design of crossovers:

- A. Tapers for lane drops should be separated from the crossovers.
- B. Crossovers should be designed for speeds not less than 10 miles per hour below the posted speed prior to work starting. If unusual site conditions require that a lower design speed be used, the signing should reflect an advisory speed determined by engineering judgment or study.
- C. A good array of channelizing devices, delineators, and full-length, properly placed pavement markings should be used to provide drivers with a clearly defined travel path.
- D. The design of the crossover should accommodate all roadway traffic, including trucks and buses.
- E. A clear area should be provided adjacent to the crossover.
- F. The possibility of water ponding in the crossover should be considered.

Support

Temporary traffic barriers and the excessive use of TTC devices cannot compensate for poor geometric and roadway cross-section design of crossovers.

6G.17 Interchanges

Guidance

Access to interchange ramps on limited-access highways should be maintained even if the work space is in the lane adjacent to the ramps. Access to exit ramps should be clearly marked and delineated with channelizing devices. For long-term projects, conflicting pavement markings should be removed and new ones placed. Early coordination with officials having jurisdiction over the affected cross streets and providing emergency services should occur before ramp closings.

Option

If access is not possible, ramps may be closed by using signs and Type 3 Barricades. As the work space changes, the access area may be changed, as shown in Layout 6K-62. A TTC zone in the exit ramp may be handled as shown in Layout 6K-69.

When a work space interferes with an entrance ramp, a lane may need to be closed on the highway. Work in the entrance ramp may require shifting ramp vehicular traffic. TTC for both operations is shown in Layouts 6K-67 and 6K-68.

Guidance

Egress to exit ramps should be clearly marked and

outlined with channelizing devices. Advance warning sign spacing is dependent upon the length of the ramp and the exact location of signs is determined in the field. Spacing of the signs should be as long as practicable. A minimum lane width of 10 feet on exit ramps should be maintained.

6G.18 Work in the Vicinity of a Grade Crossing

Standard

When grade crossings exist either within or in the vicinity of a TTC zone, lane restrictions, flagging, or other operations shall not create conditions where vehicles can be queued across the tracks. If the queuing of vehicles across the tracks cannot be avoided, a uniformed law enforcement officer or flagger shall be provided at the crossing to prevent vehicles from stopping on the tracks, even if automatic warning devices are in place.

Support

Layout 6J-14 shows work in the vicinity of a highway-rail grade crossing.

Guidance

Early coordination with the railroad company or light rail transit agency should occur before work starts.

6G.19 Temporary Traffic Control During Nighttime Hours

Support

Chapter 6D and Sections 6F.74 and 6G.5 contain additional information regarding the steps to follow when pedestrian or bicycle facilities are affected by the worksite.

Conducting highway construction and maintenance activities during night hours could provide an advantage when traditional daytime traffic control strategies cannot achieve an acceptable balance between worker and public safety, traffic and community impact, and constructability. The two basic advantages of working at night are reduced traffic congestion and less involvement with business activities. However, the two basic conditions that must normally be met for night work to offer any advantage are reduced traffic volumes and easy set up and removal of the traffic control patterns on a nightly basis.

Shifting work activities to night hours, when traffic volumes are lower and normal business is less active, might offer an advantage in some cases, as long as the necessary work can be completed and the worksite restored to essentially normal operating conditions to carry the higher traffic volume during non-construction hours.

PART 6. TEMPORARY TRAFFIC CONTROL

Chapter 6H. Speed Limits in Temporary Traffic Control Zones

6H-1 General

Support

There are three different methods of signing available for speed control in temporary traffic control zones: advisory speeds, 24/7 Construction Speed Limits, and Workers Present Speed Limits.

Under certain conditions, a Workers Present Speed Limit is required by Minnesota Statutes 169.14, Subdivision 5d. Minnesota Statutes 169.14, Subdivision 6a sets a fine of \$300 for a violation of a regulatory speed limit in a Temporary Traffic Control Zone.

It must be noted that signing alone will not reduce the speed through a temporary traffic control zone. The driver must clearly perceive the need to reduce speed before a reduction in speed can be achieved. The worker should not feel a false sense of security with temporary traffic control zone speed limits in place. The speed limit in temporary traffic control zones must be used correctly and judiciously to obtain the maximum effectiveness, to earn drivers respect, and to gain compliance.

Option

Advisory speeds, 24/7 Construction Speed Limits, and Workers Present Speed Limits may be used in construction or maintenance temporary traffic control zones.

Support

The posted speed must be reasonable to the driver. In order to achieve maximum benefit, the speed zone must be correctly signed, installed, documented, maintained, and removed in a timely manner.

Research has demonstrated that large reductions in the regulatory speed limit, such as a 30 mph reduction, increase speed variance and the potential for crashes. Smaller reductions in the speed limit of up to 10 mph cause smaller changes in speed variance and lessen the potential for increased crashes. A reduction in the regulatory speed limit of only up to 10 mph from the normal speed limit has been shown to be more effective.

Just as with any type of temporary traffic control zone signing, leaving speed limit signs in place when they are clearly not needed causes driver disrespect and encourages non-compliance.

Standard

The temporary traffic control speed limit shall be carefully documented. This documentation shall include the location of the road, the reference point of the temporary traffic control zone, the date and time installed, direction of travel, the speed installed, and the date and time removed.

6H-2 Advisory Speeds

Support

The purpose of advisory speeds is to identify safe speeds for specific hazards. Warning signs with advisory speed plaques warn drivers of a particular hazard or a potentially hazardous condition and indicate the safe speed at which to navigate the hazard. Examples of situations where an advisory speed plaque may be used are horizontal curve locations (such as bypasses or lane shifts), low and no shoulder locations, and where there is reduced visibility due to work activities, environmental factors, or geometrics.

Option

Advisory speed plaques may be posted any time a hazard is present; an authorization from the Commissioner of Transportation is not necessary.

Guidance

Traffic engineering personnel should be consulted as to the reasonable speed to be posted.

Support

In some applications such as sharp curves, there are recommended maximum speeds established for a certain degree of curve. In situations other than horizontal curves, the proper advisory speed is determined by experience and engineering judgment.

Standard

When used, the Advisory Speed Plaque (W13-IP) (see Section 6F.52) shall be installed below and on the traffic side of the appropriate advance warning sign(s) or below the Worker Ahead sign (W21-1) (see Section 6F.33).

Inplace speed limits shall be reviewed to ensure that the advisory speed is not greater than the regulatory speed.

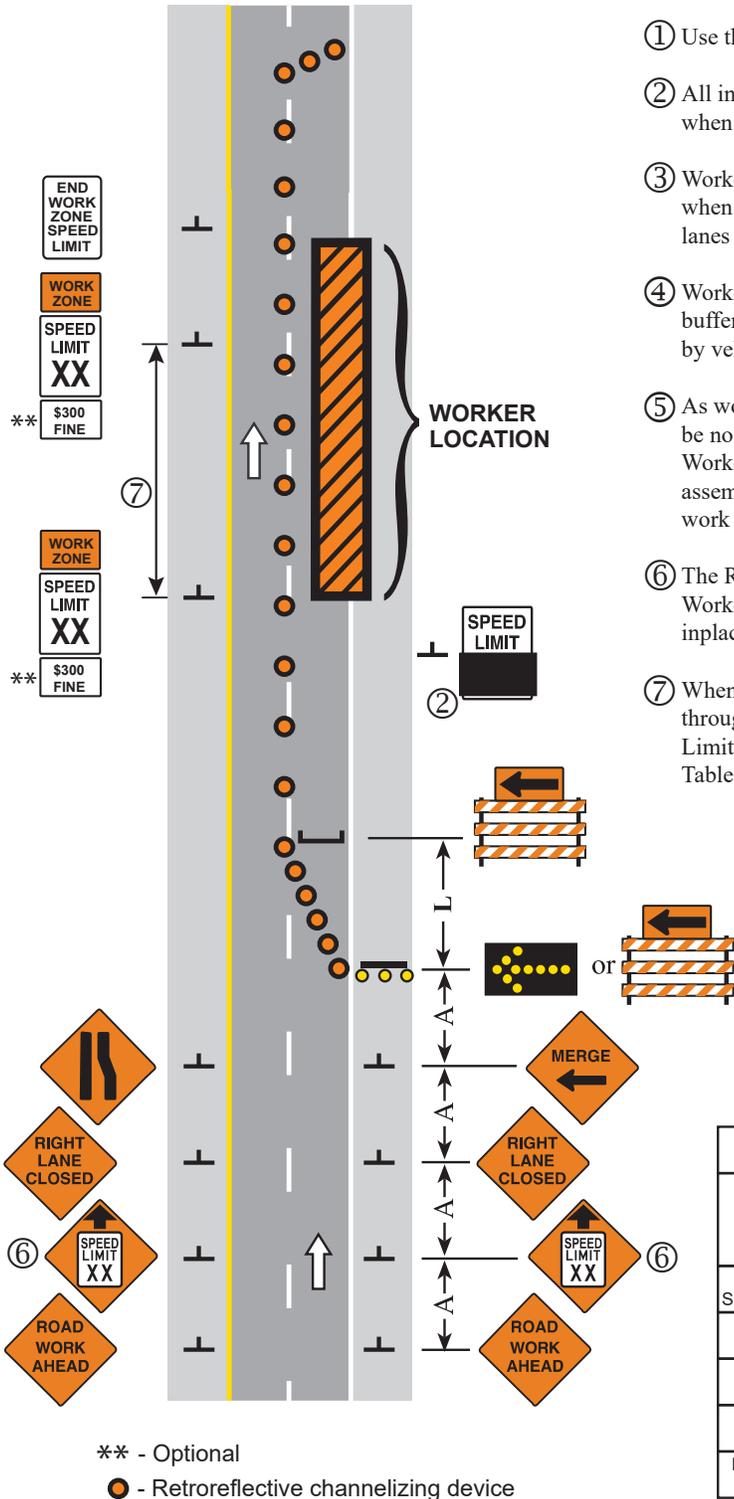
Guidance

Once installed, the advisory speed should be validated by driving through the work zone area necessitating the advisory speed.

Care should be taken when posting an advisory speed plaque so that it is not placed near a regulatory speed sign such that the motorist may confuse the two speeds.

NOTES:

- ① Use the appropriate layout for temporary traffic control.
- ② All inplace Speed Limit signs shall be removed or covered when the Workers Present Speed Limit is implemented.
- ③ Workers Present Speed Limit assemblies shall be removed when workers are not present directly adjacent to traveled lanes and inplace speed limit signs uncovered.
- ④ Workers Present Speed Limit assemblies may be placed in the buffer or work space as long as the assemblies are not blocked by vehicles or devices.
- ⑤ As workers proceed through the work area, the assembly shall be no greater than 1 mile in advance of the work crew. For Workers Present Speed Limits of less than 40 mph, the assembly should be no greater than 1/2 mile in advance of the work crew.
- ⑥ The Reduced Speed Ahead sign should be used when the Workers Present Speed Limit is more than 10 mph below the inplace speed limit.
- ⑦ When workers are present adjacent to traveled lanes throughout the work area, confirming Workers Present Speed Limit assemblies may be placed according to the Spacing Table below:



Workers Present Speed Limit (mph)	Assembly Spacing (mile)
< 40	1/2
≥ 40	1

Sign	Posted Speed Limit Prior to Work Starting	
	≤ 40 mph	> 40 mph
END WORK ZONE SPEED LIMIT (R2-12)	24" X 36"	36" X 54"
WORK ZONE (G20-5aP)	24" X 18"	36" X 24"
SPEED LIMIT (R2-1)	24" X 30"	36" X 48"
\$300 FINE (R2-6bP)	24" X 18"	36" X 24"
REDUCED SPEED AHEAD (W3-5)	36" X 36"	48" X 48"

WORKERS PRESENT SPEED LIMIT

LAYOUT 6H-4

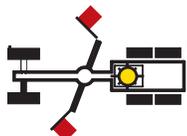
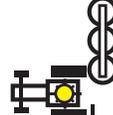
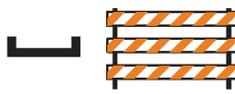
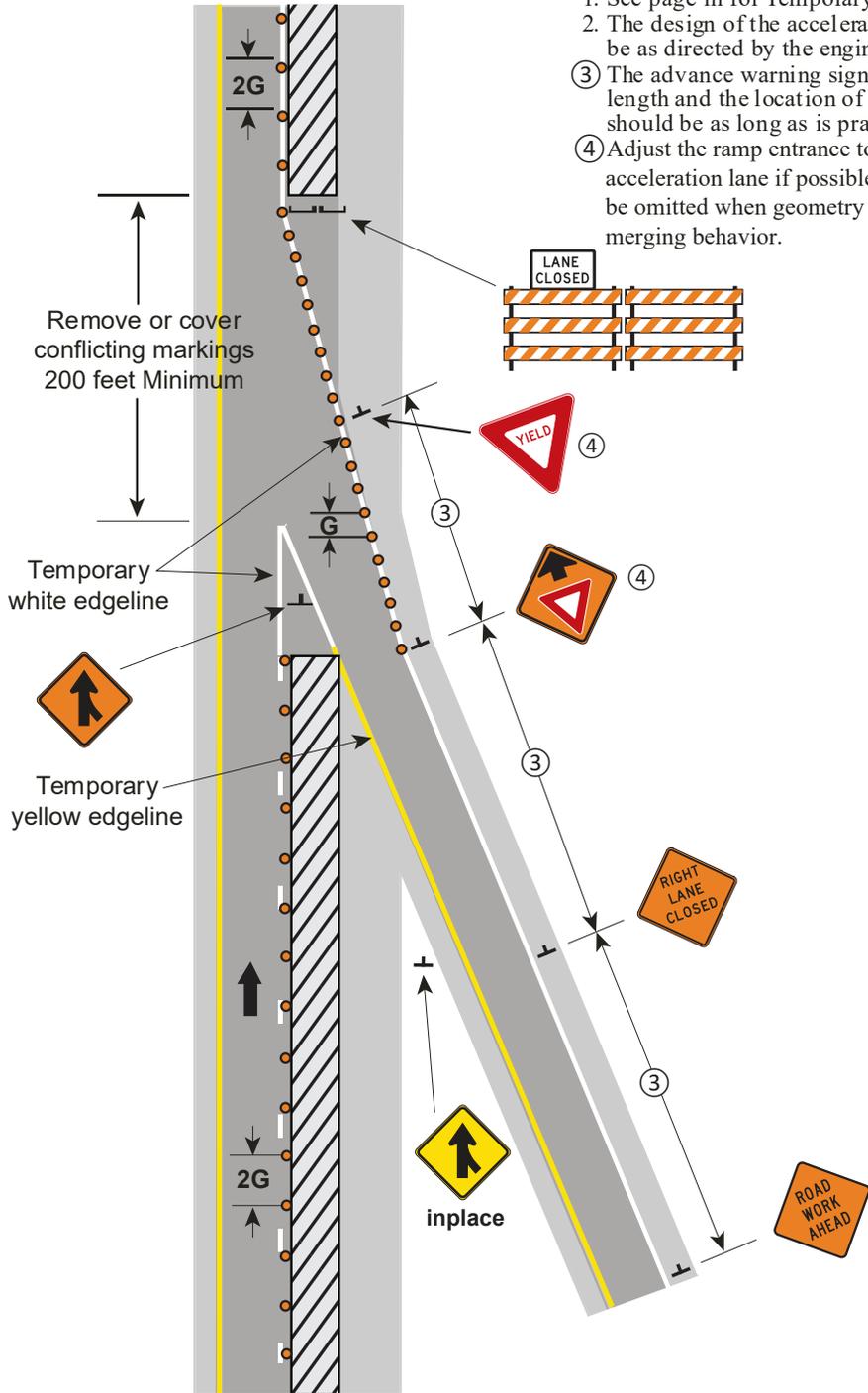
	Flagger or Operator of Automated Flagging Assistance Device
	AFAD Automated Flagging Assistance Device (AFAD)
	Flashing Arrow Board (FAB)
	Portable Changeable Message Sign (PCMS)
	Portable Equipment - Includes testing devices, detection, surveying, etc.
	Portable Traffic Signal
	360-Degree Yellow Flashing Vehicle Light(s)
	Work Vehicle
	Work Vehicle with Crash Attenuator (Truck or Trailer Mounted)
	Motor Grader
	Mower
	Type III Barricade
	Traffic Control Sign
	Type A Flashing Warning Light
	Channelizing Device
	Direction of Traffic
	See Note (i.e. See Note 6)
	Work Space

Figure 6J-1 Symbols Used in Typical Layouts

NOTES:

1. See page iii for Temporary Traffic Control Distance Charts.
2. The design of the acceleration lane and the entrance ramp shall be as directed by the engineer or as shown in the plans.
- ③ The advance warning sign spacing is dependent on the ramp length and the location of in-place signing. The spacing should be as long as is practical.
- ④ Adjust the ramp entrance to fit the conditions to allow a ramp acceleration lane if possible. YIELD and Yield Ahead signs may be omitted when geometry and traffic conditions allow for normal merging behavior.

Mn Rev. 3



Mn Rev. 8

Use the appropriate devices and spacing for a lane closure.

**MAINLINE RIGHT LANE CLOSED
ENTRANCE RAMP OPEN**

LONG TERM

LAYOUT 6J-10