

CHAPTER 2C. WARNING SIGNS

Section 2C.01 Function of Warning Signs

Support:

Warning signs call attention to unexpected conditions on or adjacent to a highway or street and to situations that might not be readily apparent to road users. Warning signs alert road users to conditions that might call for a reduction of speed or an action in the interest of safety and efficient traffic operations.

Section 2C.02 Application of Warning Signs

Standard:

The use of warning signs shall be based on an engineering study or on engineering judgment.

Guidance:

The use of warning signs should be kept to a minimum as the unnecessary use of warning signs tends to breed disrespect for all signs. In situations where the condition or activity is seasonal or temporary, the warning sign should be removed or covered when the condition or activity does not exist.

Support:

The categories of warning signs are shown in Table 2C-1.

Warning signs specified herein cover most of the conditions that are likely to be encountered. Additional warning signs for low-volume roads (as defined in Section 5A.01), temporary traffic control zones, school areas, highway-rail grade crossings, bicycle facilities, and highway-light rail transit grade crossings are discussed in Parts 5 through 10, respectively.

Option:

Word message warning signs other than those specified in this Manual may be developed and installed by State and local highway agencies.

Section 2C.03 Design of Warning Signs

Standard:

All warning signs shall be diamond-shaped (square with one diagonal vertical) with a black legend and border on a yellow background unless specifically designated otherwise. Warning signs shall be designed in accordance with the sizes,

Table 2C-1. Categories of Warning Signs

Category	Group	Section	Signs	MUTCD Codes
Roadway Related	Changes in Horizontal Alignment	2C.06	Turn, Curve, Reverse Turn, Reverse Curve, Winding Road, Hairpin Curve, 270-Degree Curve	W1-1 through W1-5, W1-11, W1-15
		2C.07	Combination Horizontal Alignment/Advisory Speed	W1-1a through W1-5a, W1-11a, W1-15a
		2C.08	Combination Horizontal Alignment/Intersection	W1-10
		2C.09	Large Arrow (one direction)	W1-6
		2C.10	Chevron Alignment	W1-8
		2C.55	Truck Rollover	W1-13, W1-14
	Vertical Alignment	2C.11	Hill	W7-1, W7-1a, W7-1b
		2C.12	Truck Escape Ramp	W7-4, W7-4a
		2C.50	Hill Blocks View	W7-6
	Cross Section	2C.13	Road Narrows	W5-1, W5-1a
		2C.14-15	Narrow Bridge, One Lane Bridge	W5-2, W5-3
		2C.16-18	Divided Road, Divided Road Ends, Double Arrow	W6-1, W6-2, W12-1
		2C.19	Dead End, No Outlet	W14-1, W14-2
		2C.20	Low Clearance	W12-2, W12-2P
	Roadway Surface Condition	2C.21-22	Bump, Dip, Speed Hump	W8-1, W8-2, W17-1
		2C.23	Pavement Ends	W3-8
		2C.24	Shoulder	W8-4, W8-9, W8-9a, W8-11
		2C.25	Slippery When Wet	W8-5
		2C.53	Bridge Ices Before Road	W8-13
	Traffic Related	Advance Traffic Control	2C.26, 2C.52	Stop Ahead, Yield Ahead, Signal Ahead, Be Prepared To Stop, Speed Reduction
Traffic Flow		2C.28-32	Merge, Lane Ends, Added Lane, Two-Way Traffic, Right Lane Ends, Lane Ends Merge Left, No Passing Zone	W4-1, W4-1a, W4-2, W4-3, W4-3a, W6-3, W9-1, W9-2, W14-3
		2C.27	Cross Traffic Does Not Stop	W4-4
Change in Speed		2C.33	Advisory Speed	W13-2, W13-3, W13-5
Intersections		2C.34	Cross Road, Side Road, T, Y, and Circular Intersection	W2-1 through W2-6
		2C.35	Large Arrow (two directions)	W1-7
		2C.54	Oncoming Green Extended	W25-1, W25-2
Motorized Traffic		2C.36	Truck Crossing, Truck (symbol), Emergency Vehicle, Tractor	W8-6, W11-5, W11-5a, W11-8, W11-10
Nonvehicular	2C.37-38, 2C.51	Bicycle, Pedestrian, Deer, Cattle, Horse, Wheelchair, Playground, Diagonal Arrow, Golf Cart, Horse-Drawn Vehicle, Waterfowl	W11-1, W11-2, W11-3, W11-4, W11-7, W11-9, W11-11, W11-14, W11-15, W15-1, W16-7P	
Supplemental Plaques		2C.41	XX Feet, XX Miles, Next XX Feet, Next XX MI	W16-2, W16-3, W16-4, W7-3a
	Speed	2C.42	Advisory Speed	W13-1
	Arrow	2C.43	Advance Arrow, Directional Arrow, Diagonal Arrow	W16-5P, W16-6P, W16-7P
	Hill-Related	2C.44	Trucks Use Low Gear, X% Grade	W7-2, W7-3
	Street Name Plaque	2C.45	Advance Street Name	W16-8
	Dead End/No Outlet	2C.46	Dead End, No Outlet	W14-1P, W14-2P
	Share The Road	2C.47	Share The Road	W16-1
	Photo Enforced	2C.49	Photo Enforced	W16-10
HOV	2C.48	High-Occupancy Vehicle	W16-11	

shapes, colors, and legends contained in the "Standard Highway Signs" book.**Option:**

Warning signs regarding conditions associated with pedestrians, bicyclists, school buses, and schools may have a black legend and border on a yellow background or a black legend and border on a fluorescent yellow-green background.

Section 2C.04 Size of Warning Signs**Support:**

The "Standard Highway Signs" book prescribes design details for up to five different sizes depending on the type of traffic facility, including bikeways. Smaller sizes are designed to be used on bikeways and some other off-road applications. Larger sizes are designed for use on freeways and expressways, and can also be used to enhance road user safety and convenience on other facilities, especially on multilane divided highways and on undivided highways having five or more lanes of traffic and/or high speeds. The intermediate sizes are designed to be used on two-lane, three-lane, and four-lane highways that have low speeds and volumes.

Standard:

The sizes for warning signs shall be as shown in Table 2C-2.

Guidance:

The Conventional Road size should be used on conventional roads.

The Expressway and Freeway sizes should be used for higher-speed applications to provide larger signs for increased visibility and recognition.

Option:

The Minimum size may be used on low-speed roadways where the reduced legend size would be adequate for the warning or where physical conditions preclude the use of the other sizes.

Oversized signs and larger sizes may be used for those special applications where speed, volume, or other factors result in conditions where increased emphasis, improved recognition, or increased legibility would be desirable.

Standard:

The minimum size for supplemental warning plaques shall be as shown in Table 2C-3.

Table 2C-2. Warning Sign Sizes

Description		Conventional Roads	Expressways	Freeways	Minimum	Oversized
Shape	Sign Series					
Diamond	W1, W2, W7, W8, W9, W11, W14, W15-1, W17-1	750 x 750 (30 x 30)	900 x 900 (36 x 36)	1200 x 1200 (48 x 48)	600 x 600 (24 x 24)	—
	W3, W4, W5, W6, W8-3, W10, W12	900 x 900 (36 x 36)	1200 x 1200 (48 x 48)	1200 x 1200 (48 x 48)	750 x 750 (30 x 30)	—
Rectangular	W1 - Arrows	1200 x 600 (48 x 24)	—	—	900 x 450 (36 x 18)	1500 x 750 (60 x 30)
	W1 - Chevron	450 x 600 (18 x 24)	750 x 900 (30 x 36)	900 x 1200 (36 x 48)	300 x 450 (12 x 18)	—
	W7-4	1950 x 1200 (78 x 48)	1950 x 1200 (78 x 48)	1950 x 1200 (78 x 48)	—	—
	W7-4a, b, c	1950 x 1500 (78 x 60)	1950 x 1500 (78 x 60)	1950 x 1500 (78 x 60)	—	—
	W10-9, W10-10	750 x 225 (30 x 9)	—	—	—	—
	W12-2P	2100 x 600 (84 x 24)	2100 x 600 (84 x 24)	2100 x 600 (84 x 24)	—	—
	W13, W25	600 x 750 (24 x 30)	900 x 1200 (36 x 48)	1200 x 1500 (48 x 60)	600 x 750 (24 x 30)	1200 x 1500 (48 x 60)
Pennant	W14-3	900 x 1200 x 1200 (36 x 48 x 48)	—	—	750 x 1000 x 1000 (30 x 40 x 40)	1200 x 1600 x 1600 (48 x 64 x 64)
Circular	W10-1	900 (36) Dia.	1200 (48) Dia.	—	750 (30) Dia.	1200 (48) Dia.

Notes: 1. Larger signs may be used when appropriate

2. Dimensions are shown in millimeters followed by inches in parentheses and are shown as width x height

Table 2C-3. Minimum Size of Supplemental Warning Plaques

Size of Warning Sign	Size of Supplemental Plaque			
	Rectangular			Square
	1 Line	2 Lines	Arrow	
600 x 600 (24 x 24) 750 x 750 (30 x 30)	600 x 300 (24 x 12)	600 x 450 (24 x 18)	600 x 300 (24 x 12)	450 x 450 (18 x 18)
900 x 900 (36 x 36) 1200 x 1200 (48 x 48)	750 x 450 (30 x 18)	750 x 600 (30 x 24)	750 x 450 (30 x 18)	600 x 600 (24 x 24)

- Notes: 1. Larger supplemental plaques may be used when appropriate
2. Dimensions are shown in millimeters followed by inches in parentheses and are shown as width x height

Option:

Signs larger than those shown in Tables 2C-2 and 2C-3 may be used (see Section 2A.12).

Section 2C.05 Placement of Warning Signs

Standard:

Warning signs shall be installed in accordance with the general requirements for sign placement as described in Sections 2A.16 to 2A.22.

Support:

The total time needed to perceive and complete a reaction to a sign is the sum of the times necessary for Perception, Identification (understanding), Emotion (decision making), and Volition (execution of decision), and is called the PIEV time. The PIEV time can vary from several seconds for general warning signs to 6 seconds or more for warning signs requiring high road user judgment.

Table 2C-4 lists suggested sign placement distances for three conditions. This table is provided as an aid for determining warning sign location.

Guidance:

Warning signs should be placed so that they provide adequate PIEV time. The distances contained in Table 2C-4 are for guidance purposes and should be applied with

**Table 2C-4. Guidelines for Advance Placement of Warning Signs
(Metric Units)**

Posted or 85th-Percentile Speed (km/h)	Advance Placement Distance ¹												
	Condition A: Speed Reduction and Lane Changing in Heavy Traffic ²	Condition B: Deceleration to the listed advisory speed (km/h) for the condition ⁴											
		0 ³	10	20	30	40	50	60	70	80	90	100	110
30	60 m	N/A ⁵	N/A ⁵	N/A ⁵	—	—	—	—	—	—	—	—	—
40	100 m	N/A ⁵	N/A ⁵	N/A ⁵	N/A ⁵	—	—	—	—	—	—	—	—
50	150 m	N/A ⁵	N/A ⁵	N/A ⁵	N/A ⁵	N/A ⁵	—	—	—	—	—	—	—
60	180 m	30 m	N/A ⁵	N/A ⁵	N/A ⁵	N/A ⁵	N/A ⁵	—	—	—	—	—	—
70	220 m	50 m	40 m	30 m	N/A ⁵	N/A ⁵	N/A ⁵	N/A ⁵	—	—	—	—	—
80	260 m	80 m	60 m	55 m	50 m	40 m	30 m	N/A ⁵	N/A ⁵	—	—	—	—
90	310 m	110 m	90 m	80 m	70 m	60 m	40 m	N/A ⁵	N/A ⁵	N/A ⁵	—	—	—
100	350 m	130 m	120 m	115m	110 m	100 m	90 m	70m	60m	40m	N/A ⁵	—	—
110	380 m	170 m	160 m	150 m	140 m	130 m	120 m	110 m	90 m	70 m	50 m	N/A ⁵	—
120	420 m	200 m	190 m	185 m	180 m	170 m	160 m	140 m	130 m	110 m	90 m	60 m	40 m
130	460 m	230 m	230 m	230 m	220 m	210 m	200 m	180 m	170 m	150 m	120 m	100 m	70 m

Notes:

- ¹ The distances are adjusted for a sign legibility distance of 50 m (175 ft) for Condition A. The distances for Condition B have been adjusted for a sign legibility distance of 75 m (250 ft), which is appropriate for an alignment warning symbol sign.
- ² Typical conditions are locations where the road user must use extra time to adjust speed and change lanes in heavy traffic because of a complex driving situation. Typical signs are Merge, Right Lane Ends, etc. The distances are determined by providing the driver a PIEV time of 14.0 to 14.5 seconds for vehicle maneuvers (2001 AASHTO Policy, Exhibit 3-3, Decision Sight Distance, Avoidance Maneuver E) minus the legibility distance of 50 m (175 ft) for the appropriate sign.
- ³ Typical condition is the warning of a potential stop situation. Typical signs are Stop Ahead, Yield Ahead, Signal Ahead, and Intersection Advance Warning signs. The distances are based on the 2001 AASHTO Policy, Stopping Sight Distance, Exhibit 3-1, providing a PIEV time of 2.5 seconds, a deceleration rate of 3.4 m/second² (11.2 ft/second²), minus the sign legibility distance of 50 m (175 ft).
- ⁴ Typical conditions are locations where the road user must decrease speed to maneuver through the warned condition. Typical signs are Turn, Curve, Reverse Turn, or Reverse Curve. The distance is determined by providing a 2.5 second PIEV time, a vehicle deceleration rate of 3 m/second² (10 ft/second²), minus the sign legibility distance of 75 m (250 ft).
- ⁵ No suggested minimum distances are provided for these speeds, as the placement location is dependent on site conditions and other signing to provide an adequate advance warning for the driver.

**Table 2C-4. Guidelines for Advance Placement of Warning Signs
(English Units)**

Posted or 85th- Percentil e Speed	Advance Placement Distance ¹								
	Condition A: Speed reduc- tion and lane changing in heavy traffic ²	Condition B: Deceleration to the listed advisory speed (mph) for the condition ⁴							
		0 ³	10	20	30	40	50	60	70
20 mph	225 ft	N/A ⁵	N/A ⁵	—	—	—	—	—	—
25 mph	325 ft	N/A ⁵	N/A ⁵	N/A ⁵	—	—	—	—	—
30 mph	450 ft	N/A ⁵	N/A ⁵	N/A ⁵	—	—	—	—	—
35 mph	550 ft	N/A ⁵	N/A ⁵	N/A ⁵	N/A ⁵	—	—	—	—
40 mph	650 ft	125 ft	N/A ⁵	N/A ⁵	N/A ⁵	—	—	—	—
45 mph	750 ft	175 ft	125 ft	N/A ⁵	N/A ⁵	N/A ⁵	—	—	—
50 mph	850 ft	250 ft	200 ft	150 ft	100 ft	N/A ⁵	—	—	—
55 mph	950 ft	325 ft	275 ft	225 ft	175 ft	100 ft	N/A ⁵	—	—
60 mph	1100 ft	400 ft	350 ft	300 ft	250 ft	175 ft	N/A ⁵	—	—
65 mph	1200 ft	475 ft	425 ft	400 ft	350 ft	275 ft	175 ft	N/A ⁵	—
70 mph	1250 ft	550 ft	525 ft	500 ft	425 ft	350 ft	250 ft	150 ft	—
75 mph	1350 ft	650 ft	625 ft	600 ft	525 ft	450 ft	350 ft	250 ft	100 ft

Notes:

- ¹ The distances are adjusted for a sign legibility distance of 50 m (175 ft) for Condition A. The distances for Condition B have been adjusted for a sign legibility distance of 75 m (250 ft), which is appropriate for an alignment warning symbol sign.
- ² Typical conditions are locations where the road user must use extra time to adjust speed and change lanes in heavy traffic because of a complex driving situation. Typical signs are Merge, Right Lane Ends, etc. The distances are determined by providing the driver a PIEV time of 14.0 to 14.5 seconds for vehicle maneuvers (2001 AASHTO Policy, Exhibit 3-3, Decision Sight Distance, Avoidance Maneuver E) minus the legibility distance of 50 m (175 ft) for the appropriate sign.
- ³ Typical condition is the warning of a potential stop situation. Typical signs are Stop Ahead, Yield Ahead, Signal Ahead, and Intersection Advance Warning signs. The distances are based on the 2001 AASHTO Policy, Stopping Sight Distance, Exhibit 3-1, providing a PIEV time of 2.5 seconds, a deceleration rate of 3.4 m/second² (11.2 ft/second²), minus the sign legibility distance of 50 m (175 ft).
- ⁴ Typical conditions are locations where the road user must decrease speed to maneuver through the warned condition. Typical signs are Turn, Curve, Reverse Turn, or Reverse Curve. The distance is determined by providing a 2.5 second PIEV time, a vehicle deceleration rate of 3 m/second² (10 ft/second²), minus the sign legibility distance of 75 m (250 ft).
- ⁵ No suggested minimum distances are provided for these speeds, as the placement location is dependent on site conditions and other signing to provide an adequate advance warning for the driver.

engineering judgment. Warning signs should not be placed too far in advance of the condition, such that drivers might tend to forget the warning because of other driving distractions, especially in urban areas.

Minimum spacing between warning signs with different messages should be based on the estimated PIEV time for driver comprehension of and reaction to the second sign.

The effectiveness of the placement of warning signs should be periodically evaluated under both day and night conditions.

Option:

Warning signs that advise road users about conditions that are not related to a specific location, such as Deer Crossing or SOFT SHOULDER, may be installed in an appropriate location, based on engineering judgment, since they are not covered in Table 2C-4.

Sections 2C.06 Horizontal Alignment Signs (W1-1 through W1-5, W1-10, W1-11, W1-15)

Option:

The horizontal alignment Turn (W1-1), Curve (W1-2), Reverse Turn (W1-3), Reverse Curve (W1-4), or Winding Road (W1-5) signs (see Figure 2C-1) may be used in advance of situations where the horizontal roadway alignment changes. A One-Direction Large Arrow (W1-6) sign (see Figure 2C-1 and Section 2C.09) may be used on the outside of the turn or curve.

If the change in horizontal alignment is 135 degrees or more, the Hairpin Curve (W1-11) sign (see Figure 2C-1) may be used.

If the change in horizontal alignment is approximately 270 degrees, such as on a cloverleaf interchange ramp, the 270-degree Loop (W1-15) sign (see Figure 2C-1) may be used.

Guidance:

The application of these signs should conform to Table 2C-5.

When the Hairpin Curve sign or the 270-degree Loop sign is installed, either a One-Direction Large Arrow (W1-6) sign or Chevron Alignment (W1-8) signs should be installed on the outside of the turn or curve.

Option:

An Advisory Speed (W13-1) plaque (see Figure 2C-7 and Section 2C.42) may be used to indicate the speed for the change in horizontal alignment. The supplemental distance plaque NEXT XX KM (NEXT XX MILES) may be installed below the Winding Road sign where continuous roadway curves exist (see Section 2C.41). The combination Horizontal

Figure 2C-1. Horizontal Alignment Signs



W1-1



W1-2



W1-3



W1-4



W1-5



W1-6



W1-8



W1-1a

OR



W1-10



W1-11



W1-2a

OR



W1-15



W1-13



W1-13a

OR



Table 2C-5. Horizontal Alignment Sign Usage

Number of Alignment Changes	Advisory Speed	
	≤ 50 km/h (≤ 30 MPH)	> 50 km/h (> 30 MPH)
1	Turn (W1-1) ¹	Curve (W1-2) ¹
2 ²	Reverse Turn ³ (W1-3)	Reverse Curve ³ (W1-4)
3 or more ²	Winding Road ³ (W1-5)	

Notes:

¹ Engineering judgment should be used to determine whether the Turn or Curve sign should be used.

² Alignment changes are in opposite directions and are separated by a tangent distance of 180 m (600 ft) or less.

³ A Right Reverse Turn (W1-3R), Right Reverse Curve (W1-4R), or Right Winding Road (W1-5R) sign is used if the first change in alignment is to the right; a Left Reverse Turn (W1-3L), Left Reverse Curve (W1-4L), or Left Winding Road (W1-5L) sign is used if the first change in alignment is to the left.

Alignment/Advisory Speed sign (see Section 2C.07), combination Horizontal Alignment/Intersection sign (see Section 2C.08), or the Curve Speed sign (see Section 2C.33) may also be used.

Standard:

When engineering judgment determines the need for a horizontal alignment sign, one of the W1-1 through W1-5, W1-10, W1-11 or W1-15 signs shall be used.

Guidance:

The need for additional curve or turn warning and advisory speed reduction warning should be considered based on an engineering study or engineering judgment.

Option:

If the reduction in speed is 20 km/h (15 mph) or greater, a supplemental combination Horizontal Alignment/Advisory Speed sign or Curve Speed (W13-5) sign may be installed as near as practical to the point of curvature. If the reduction in speed is 40 km/h (25 mph) or greater, one or more additional Curve Speed signs may be installed along the curve.

Section 2C.07 Combination Horizontal Alignment/Advisory Speed Signs

Option:

The Turn (W1-1) sign may be combined with the Advisory Speed (W13-1) plaque (see Section 2C.42) to create a combination Turn/Advisory Speed (W1-1a) sign (see Figure 2C-1). Other Horizontal Alignment signs may also be combined with the Advisory Speed (W13-1) plaque to create a combination Horizontal Alignment/Advisory Speed sign.

Standard:

When used, the combination Horizontal Alignment/Advisory Speed sign shall be installed as near as practical to the beginning of the turn or curve (see Figure 2C-2). The minimum size of the combination sign shall be 1200 x 1200 mm (48 x 48 in) for high-speed facilities, and 900 x 900 mm (36 x 36 in) for low-speed facilities. If a Horizontal Alignment warning sign with an Advisory Speed plaque is installed in advance of the turn or curve, the speeds shown on the Advisory Speed plaque and the combination sign shall be identical.

When the recommended reduction in speed is 20 km/h (15 mph) or greater, the combination Horizontal Alignment/Advisory Speed sign shall supplement other advance warning signs.

Option:

When the recommended reduction in speed is less than 20 km/h (15 mph), instead of installing other advance warning signs, the combination Horizontal Alignment/Advisory Speed sign may be installed just before the point of curvature.

The Horizontal Alignment/Advisory Speed sign may also be used throughout the turn or curve.

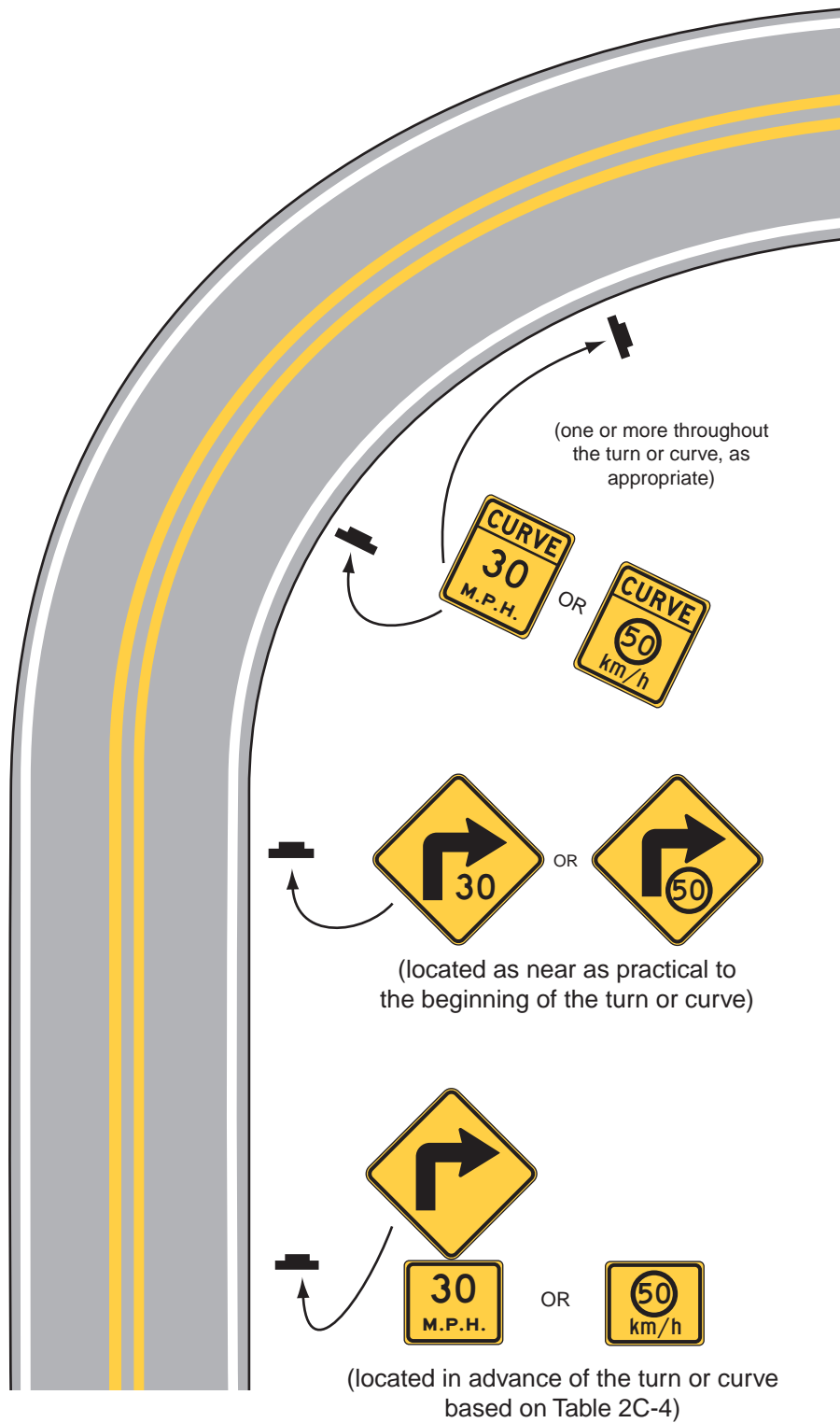
Section 2C.08 Combination Horizontal Alignment/Intersection Sign (W1-10)**Option:**

The Turn (W1-1) sign or the Curve (W1-2) sign may be combined with the Cross Road (W2-1) sign or the Side Road (W2-2 or W2-3) sign to create a combination Horizontal Alignment/Intersection (W1-10) sign (see Figure 2C-1) that depicts the condition where an intersection occurs within a turn or curve.

Guidance:

Elements of the combination Horizontal Alignment/Intersection sign related to horizontal alignment should conform to Section 2C.06, and elements related to intersection configuration should conform to Section 2C.34. No more than one Cross Road or two Side Road symbols should be shown on any one combination Horizontal Alignment/Intersection sign.

Figure 2C-2. Example of Advisory Speed Signing for a Turn or Curve



Section 2C.09 One-Direction Large Arrow Sign (W1-6)**Option:**

A One-Direction Large Arrow (W1-6) sign (see Figure 2C-1) may be used to delineate a change in horizontal alignment.

Standard:

The One-Direction Large Arrow sign shall be a horizontal rectangle with an arrow pointing to the left or right.

If used, the One-Direction Large Arrow sign shall be installed on the outside of a turn or curve in line with and at approximately a right angle to approaching traffic.

The One-Direction Large Arrow sign shall not be used where there is no alignment change in the direction of travel, such as at the beginnings and ends of medians or at center piers.

Guidance:

The One-Direction Large Arrow sign should be visible for a sufficient distance to provide the road user with adequate time to react to the change in alignment.

Section 2C.10 Chevron Alignment Sign (W1-8)**Option:**

The Chevron Alignment (W1-8) sign (see Figure 2C-1) may be used to provide additional emphasis and guidance for a change in horizontal alignment. A Chevron Alignment sign may be used as an alternate or supplement to standard delineators on curves or to the One-Direction Large Arrow (W1-6) sign.

Standard:

The Chevron Alignment sign shall be a vertical rectangle. No border shall be used on the Chevron Alignment sign.

If used, Chevron Alignment signs shall be installed on the outside of a turn or curve, in line with and at approximately a right angle to approaching traffic.

Option:

A Chevron Alignment sign may be used on the far side of an intersection to inform drivers of a change of horizontal alignment for through traffic.

Guidance:

Spacing of Chevron Alignment signs should be such that the road user always has at least two in view, until the change in alignment eliminates the need for the signs.

Chevron Alignment signs should be visible for a sufficient distance to provide the road user with adequate time to react to the change in alignment.

Section 2C.11 Hill Signs (W7-1, W7-1a, W7-1b)**Guidance:**

The Hill (W7-1) sign (see Figure 2C-3) should be used in advance of a downgrade where the length, percent of grade, horizontal curvature, and/or other physical features require special precautions on the part of road users.

The Hill sign and supplemental grade (W7-3) plaque (see Section 2C.44) used in combination, or the W7-1b sign used alone, should be installed in advance of downgrades for the following conditions:

- A. 5% grade that is more than 900 m (3,000 ft) in length;
- B. 6% grade that is more than 600 m (2,000 ft) in length;
- C. 7% grade that is more than 300 m (1,000 ft) in length;
- D. 8% grade that is more than 225 m (750 ft) in length; or
- E. 9% grade that is more than 150 m (500 ft) in length.

These signs should also be installed for steeper grades or where crash experience and field observations indicate a need.

Supplemental plaques (see Section 2C.44) and larger signs should be used for emphasis or where special hill characteristics exist. On longer grades, the use of the Hill sign with a distance (W7-3a) plaque or the combination distance/grade (W7-3b) plaque at periodic intervals of approximately 1.6 km (1 mi) spacing should be considered.

Standard:

When the percent grade is shown, the message X% plaque shall be placed below the inclined ramp/truck symbol (W7-1) or the word message HILL (W7-1a) sign.

Figure 2C-3. Vertical Grade Signs



W7-1



W7-1a



W7-1b



W7-4



W7-4b



W7-6



W7-4c

Option:

The word message HILL (W7-1a) sign may be used as an alternate to the symbol (W7-1) sign. The percent grade message may be included within these signs.

Section 2C.12 Truck Escape Ramp Signs (W7-4 Series)

Guidance:

Where applicable, truck escape (or runaway truck) ramp advance warning signs (see Figure 2C-3) should be located approximately 1.6 km (1 mi), and 0.8 km (0.5 mi) in advance of the grade, and of the ramp. A sign also should be placed at the gore. A regulatory sign with the legend RUNAWAY VEHICLES ONLY should be installed near the ramp entrance to discourage other road users from entering. No Parking (R8-3) signs should be placed near the ramp entrance.

Standard:

When truck escape ramps are installed, at least one of the W7-4 series signs shall be used.

Option:

A supplemental plaque may be used with the words SAND, GRAVEL, or PAVED to describe the ramp surface. State and local highway agencies may develop appropriate word message signs for the specific situation.

Section 2C.13 ROAD NARROWS Signs (W5-1, W5-1a)

Guidance:

A ROAD NARROWS (W5-1) sign (see Figure 2C-4) should be used in advance of a transition on two-lane roads where the pavement width is reduced abruptly to a width such that vehicles might not be able to pass without reducing speed.

Option:

Additional emphasis may be provided by the use of object markers and delineators (see Chapters 3C and 3D). The Advisory Speed (W13-1) plaque (see Section 2C.42) may be used to indicate the recommended speed.

The Road Narrows (W5-1a) symbol sign (see Figure 2C-4) may be used as an alternate to the word message ROAD NARROWS sign.

Figure 2C-4. Miscellaneous Warning Signs



W5-1



W5-1a



W5-2



W5-3



W6-1



W6-1a



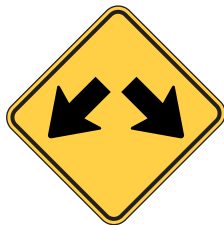
W6-1b



W6-2



W6-2a



W12-1



W12-2

OR



W14-1



W14-2



OR



W12-2P

Section 2C.14 NARROW BRIDGE Sign (W5-2)

Guidance:

A NARROW BRIDGE (W5-2) sign (see Figure 2C-4) should be used in advance of any bridge or culvert having a two-way roadway clearance width of 4.9 to 5.5 m (16 to 18 ft), or any bridge or culvert having a roadway clearance less than the width of the approach travel lanes.

Additional emphasis should be provided by the use of object markers, delineators, and/or pavement markings.

Option:

A NARROW BRIDGE sign may be used in advance of a bridge or culvert on which the approach shoulders are narrowed or eliminated.

Section 2C.15 ONE LANE BRIDGE Sign (W5-3)

Guidance:

A ONE LANE BRIDGE (W5-3) sign (see Figure 2C-4) should be used on two-way roadways in advance of any bridge or culvert:

- A. Having a clear roadway width of less than 4.9 m (16 ft), or
- B. Having a clear roadway width of less than 5.5 m (18 ft) when commercial vehicles constitute a high proportion of the traffic, or
- C. Having a clear roadway width of 5.5 m (18 ft) or less where the sight distance is limited on the approach to the structure.

Additional emphasis should be provided by the use of object markers, delineators, and/or pavement markings.

Section 2C.16 Divided Highway (Road) Sign (W6-1)

Guidance:

A Divided Highway (W6-1) symbol sign (see Figure 2C-4) should be used on the approaches to a section of highway (not an intersection or junction) where the opposing flows of traffic are separated by a median or other physical barrier.

Option:

The word message DIVIDED HIGHWAY (W6-1a) or DIVIDED ROAD (W6-1b) sign (see Figure 2C-4) may be used as an alternate to the symbol sign.

Section 2C.17 Divided Highway (Road) Ends Sign (W6-2)

Guidance:

A Divided Highway Ends (W6-2) symbol sign (see Figure 2C-4) should be used in advance of the end of a section of physically divided highway (not an intersection or junction) as a warning of two-way traffic ahead.

Option:

The Two-Way Traffic (W6-3) symbol sign (see Section 2C.31) may be used to give warning and notice of the transition to a two-lane, two-way section.

The word message DIVIDED HIGHWAY ENDS (W6-2a) or DIVIDED ROAD ENDS (W6-2b) sign (see Figure 2C-4) may be used as an alternate to the symbol sign.

Section 2C.18 Double Arrow Sign (W12-1)

Option:

The Double Arrow (W12-1) sign (see Figure 2C-4) may be used to advise road users that traffic is permitted to pass on either side of an island, obstruction, or gore in the roadway. Traffic separated by this sign may either rejoin or change directions.

Guidance:

If used on an island, the Double Arrow sign should be mounted near the approach end.

If used in front of a pier or obstruction, the Double Arrow sign should be mounted on the face of, or just in front of, the obstruction. Where stripe markings are used on the obstruction, they should be discontinued to leave a 75 mm (3 in) space around the outside of the sign.

Section 2C.19 DEAD END/NO OUTLET Signs (W14-1, W14-2)

Option:

The DEAD END (W14-1) sign (see Figure 2C-4) may be used at the entrance of a single road or street that terminates in a dead end or cul-de-sac. The NO OUTLET (W14-2) sign may be used at the entrance to a road or road network from which there is no other exit.

The DEAD END or NO OUTLET plaques (see Section 2C.46) may be used in combination with the Street Name (D3-1) sign (see Section 2D.38) at intersections instead of or in addition to the W14-1 or W14-2 signs.

Standard:

When the W14-1 or W14-2 sign is used, the sign shall be posted as near as practical to the entry point or at a sufficient advance distance to permit the road user to avoid the dead end or no outlet condition by turning off, if possible, at the nearest intersecting street.

Section 2C.20 Low Clearance Signs (W12-2 and W12-2P)**Standard:**

The Low Clearance (W12-2) sign (see Figure 2C-4) shall be used to warn road users of clearances less than 300 mm (12 in) above the statutory maximum vehicle height.

Guidance:

The actual clearance should be shown on the Low Clearance sign to the nearest 25 mm (1 in) not exceeding the actual clearance. However, in areas that experience changes in temperature causing frost action, a reduction, not exceeding 75 mm (3 in), should be used for this condition.

Where the clearance is less than the legal maximum vehicle height, the W12-2 sign with a supplemental distance plaque should be placed at the nearest intersecting road or wide point in the road at which a vehicle can detour or turn around.

In the case of an arch or other structure under which the clearance varies greatly, two or more signs should be used as necessary on the structure itself to give information as to the clearances over the entire roadway.

Clearances should be evaluated periodically, particularly when resurfacing operations have occurred.

Option:

The Low Clearance sign may be installed on or in advance of the structure. If a sign is placed on the structure, it may be a rectangular shape (W12-2P) with the appropriate legend (see Figure 2C-4).

Section 2C.21 BUMP and DIP Signs (W8-1, W8-2)**Guidance:**

BUMP (W8-1) and DIP (W8-2) signs (see Figure 2C-5) should be used to give warning of a sharp rise or depression in the profile of the road.

Option:

These signs may be supplemented with an Advisory Speed plaque (see Section 2C.42).

Standard:

The DIP sign shall not be used at a short stretch of depressed alignment that might momentarily hide a vehicle.

Guidance:

A short stretch of depressed alignment that might momentarily hide a vehicle should be treated as a no-passing zone when centerline striping is provided on a two-lane or three-lane road (see Section 3B.02).

Section 2C.22 SPEED HUMP Sign (W17-1)**Guidance:**

The SPEED HUMP (W17-1) sign (see Figure 2C-5) should be used to give warning of a vertical deflection in the roadway that is designed to limit the speed of traffic.

If used, the SPEED HUMP sign should be supplemented by an Advisory Speed plaque (see Section 2C.42).

Option:

If a series of speed humps exists in close proximity, an Advisory Speed plaque may be eliminated on all but the first SPEED HUMP sign in the series.

The legend SPEED BUMP may be used instead of the legend SPEED HUMP on the W17-1 sign.

Figure 2C-5. Roadway Condition and Advance Traffic Control Signs



W8-1



W8-2



W8-3



W8-4



W8-5



W8-9



W8-9a



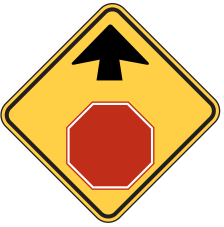
W8-11



W8-13



W17-1



W3-1a



W3-2a



W3-3



W3-4

Section 2C.23 PAVEMENT ENDS Sign (W8-3)**Guidance:**

A PAVEMENT ENDS (W8-3) word message sign (see Figure 2C-5) should be used where a paved surface changes to either a gravel treated surface or an earth road surface.

Option:

An Advisory Speed plaque (see Section 2C.42) may be used when the change in roadway condition requires a reduced speed.

Section 2C.24 Shoulder and UNEVEN LANES Signs (W8-4, W8-9, W8-9a, and W8-11)**Support:**

The signs discussed in this Section are also appropriate for use in temporary traffic control zones (see Section 6F.41).

Standard:

When used in temporary traffic control zones, the sign legend and border shall be black on an orange background.

Option:

The SOFT SHOULDER (W8-4) sign (see Figure 2C-5) may be used to warn of a soft shoulder condition.

The LOW SHOULDER (W8-9) sign (see Figure 2C-5) may be used to warn of a shoulder condition where there is an elevation difference of less than 75 mm (3 in) between the shoulder and the travel lane.

Standard:

The SHOULDER DROP-OFF (W8-9a) sign (see Figure 2C-5) shall be used when a shoulder drop-off, adjacent to the travel lane, exceeds 75 mm (3 in) in depth and is not protected by portable barriers.

Guidance:

The UNEVEN LANES (W8-11) sign (see Figure 2C-5) should be used during construction and maintenance operations that create a substantial difference in elevation between adjacent lanes.

Additional shoulder signs should be placed at appropriate intervals along the road where the condition continually exists.

Standard:

When used, shoulder signs shall be placed in advance of the condition (see Table 2C-4).

Section 2C.25 Slippery When Wet Sign (W8-5)

Option:

The Slippery When Wet (W8-5) sign (see Figure 2C-5) may be used to warn that a slippery condition might exist.

Guidance:

When used, a Slippery When Wet sign should be placed in advance of the beginning of the affected section (see Table 2C-4), and additional signs should be placed at appropriate intervals along the road where the condition exists.

Section 2C.26 Advance Traffic Control Signs (W3-1a, W3-2a, W3-3, W3-4)

Standard:

The Advance Traffic Control symbol signs (see Figure 2C-5) include the Stop Ahead (W3-1a), Yield Ahead (W3-2a), and Signal Ahead (W3-3) signs. These signs shall be installed on an approach to a primary traffic control device that is not visible for a sufficient distance to permit the road user to respond to the device (see Table 2C-4). The visibility criteria for a traffic control signal shall be based on having a continuous view of at least two signal faces for the distance specified in Table 4D-1.

Support:

Permanent obstructions causing the limited visibility might include roadway alignment or structures. Intermittent obstructions might include foliage or parked vehicles.

Guidance:

Where intermittent obstructions occur, engineering judgment should determine the treatment to be implemented.

Option:

An Advance Traffic Control sign may be used for additional emphasis of the primary traffic control device, even when the visibility distance to the device is satisfactory.

Word messages (W3-1, W3-2, W3-3a) may be used as alternates to the Advance Traffic Control symbol signs.

A supplemental street name plaque (see Section 2C.45) may be installed above or below an Advance Traffic Control sign.

A warning beacon may be used with an Advance Traffic Control sign.

A BE PREPARED TO STOP (W3-4) sign (see Figure 2C-5) may be used to warn of stopped traffic caused by a traffic control signal or in advance of a section of roadway that regularly experiences traffic congestion.

Standard:

When a BE PREPARED TO STOP sign is used in advance of a traffic control signal, it shall be used in addition to a Signal Ahead sign.

Option:

The BE PREPARED TO STOP sign may be supplemented with a warning beacon.

Guidance:

When the warning beacon is interconnected with a traffic control signal or queue detection system, the BE PREPARED TO STOP sign should be supplemented with a WHEN FLASHING plaque.

Section 2C.27 CROSS TRAFFIC DOES NOT STOP Plaque (W4-4)**Option:**

The CROSS TRAFFIC DOES NOT STOP (W4-4) plaque (see Figure 2C-9) may be used in combination with a STOP sign when engineering judgment indicates that drivers frequently misinterpret the intersection as a multi-way stop condition.

Standard:

If the W4-4 plaque is used, it shall be installed below the STOP sign.

Section 2C.28 Merge Signs (W4-1, W4-1a)**Option:**

A Merge (W4-1) sign (see Figure 2C-6) may be used to warn road users on the major roadway that merging movements might be encountered in advance of a point where lanes from two separate roadways converge as a single traffic lane and no turning conflict occurs.

A Merge sign may also be installed on the side of the entering roadway to warn road users on the entering roadway of the merge condition.

Guidance:

The Merge sign should be installed on the side of the major roadway where merging traffic will be encountered and in such a position as to not obstruct the road user's view of entering traffic.

Where two roadways of approximately equal importance converge, a Merge sign should be placed on each roadway.

When a Merge sign is to be installed on an entering roadway that curves before merging with the major roadway, such as a ramp with a curving horizontal alignment as it approaches the major roadway, the Entering Roadway Merge (W4-1a) sign (see Figure 2C-6) should be used to better portray the actual geometric conditions to road users on the entering roadway.

The Merge sign should not be used where two roadways converge and merging movements are not required.

The Merge sign should not be used in place of a Lane Ends sign where lanes of traffic moving on a single roadway must merge because of a reduction in the actual or usable pavement width (see Section 2C.30).

Section 2C.29 Added Lane Signs (W4-3, W4-3a)**Guidance:**

The Added Lane (W4-3) sign (see Figure 2C-6) should be installed in advance of a point where two roadways converge and merging movements are not required. When possible, the Added Lane sign should be placed such that it is visible from both roadways; if this is not possible, an Added Lane sign should be placed on the side of each roadway.

When an Added Lane sign is to be installed on a roadway that curves before converging with another roadway that has a tangent alignment at the point of

Figure 2C-6. Merging and Passing Signs

convergence, the Entering Roadway Added Lane (W4-3a) sign (see Figure 2C-6) should be used to better portray the actual geometric conditions to road users on the curving roadway.

Section 2C.30 Lane Ends Signs (W4-2, W9-1, W9-2)

Guidance:

The LANE ENDS MERGE LEFT (RIGHT) (W9-2) word sign, or the Lane Reduction (W4-2) symbol sign, should be used to warn of the reduction in the number of traffic lanes in the direction of travel on a multilane highway (see Figure 2C-6).

Option:

The number of lanes depicted at the top and the bottom of the Lane Reduction (W4-2) sign may be modified to represent the actual road lane configuration.

The RIGHT (LEFT) LANE ENDS (W9-1) word sign (see Figure 2C-6) may be used in advance of the Lane Reduction (W4-2) symbol sign or the LANE ENDS MERGE LEFT (RIGHT) (W9-2) word sign as additional warning or to emphasize that the traffic lane is ending and that a merging maneuver will be required.

On one-way streets or on divided highways where the width of the median will permit, two Lane Ends signs may be placed facing approaching traffic, one on the right side and the other on the left side or median.

The reduction in traffic lanes may also be delineated with roadway edge lines (see Section 3B.09) and/or roadway delineation (see Chapter 3D).

Guidance:

Where an extra lane has been provided for slower moving traffic (see Section 2B.27), a Lane Ends word sign or a Lane Reduction (W4-2) symbol sign should be installed in advance of the end of the extra lane.

Lane Ends signs should not be installed in advance of the end of an acceleration lane.

Section 2C.31 Two-Way Traffic Sign (W6-3)

Guidance:

A Two-Way Traffic (W6-3) sign (see Figure 2C-6) should be used to warn road users of a transition from a multilane divided section of roadway to a two-lane, two-way section of roadway.

Option:

The Two-Way Traffic sign may be used at intervals along a two-way roadway and may be used to supplement the Divided Highway (Road) Ends (W6-2) sign discussed in Section 2C.17.

Section 2C.32 NO PASSING ZONE Sign (W14-3)

Standard:

The NO PASSING ZONE (W14-3) sign (see Figure 2C-6) shall be a pennant-shaped isosceles triangle with its longer axis horizontal and pointing to the right. When used, the NO PASSING ZONE sign shall be installed on the left side of the roadway at the beginning of no-passing zones identified by either pavement markings or DO NOT PASS signs or both (see Sections 2B.24 and 3B.02).

Section 2C.33 Advisory Exit, Ramp, and Curve Speed Signs (W13-2, W13-3, W13-5)**Standard:**

Advisory Exit, Ramp, and Curve Speed signs shall be vertical rectangles. The advisory Exit Speed (W13-2), Ramp Speed (W13-3), or Curve Speed (W13-5) signs (see Figure 2C-7) shall be used where engineering judgment indicates the need to advise road users of the recommended speed on an exit, a ramp, or a curve.

Guidance:

The Exit Speed sign should be used along the deceleration lane and one or more Ramp Speed signs should be used along the actual ramp since in some cases the ramp speed may be different from the deceleration exit speed (see Figure 2C-8).

The Exit Speed sign should be visible in time for the road user to make a safe slowing and exiting maneuver.

The Ramp Speed sign should be visible in time for the road user to reduce to the recommended speed.

Option:

Additional Ramp Speed signs may be used beyond the gore and along the ramp where the recommended speed changes because of a change in curvature or when there is a need to remind road users of the recommended speed. Based on engineering judgment, the Ramp Speed sign may be installed on the inside or outside of the curve to enhance its visibility.

A Curve Speed sign may be used at and beyond the beginning of a curve following a Horizontal Alignment and Advisory Speed sign combination, or when there is a need to remind road users of the recommended speed, or where the recommended speed changes because of a change in curvature (see Section 2C.06).

The 85th-percentile speed, which is equivalent to the 16-degree ball-bank indication or an 88 mm/second (0.28 ft/second) reading on an accelerometer, along the ramp or curve may be used to determine the recommended speed as it is the speed at which most road users' judgment recognizes incipient instability along a ramp or curve.

Section 2C.34 Intersection Warning Signs (W2-1 through W2-6)**Option:**

A Cross Road (W2-1) symbol, Side Road (W2-2 or W2-3) symbol, T-Symbol (W2-4), or Y-Symbol (W2-5) sign (see Figure 2C-9) may be used in advance of an intersection to indicate the

Figure 2C-7. Advisory Speed and Speed Reduction Signs

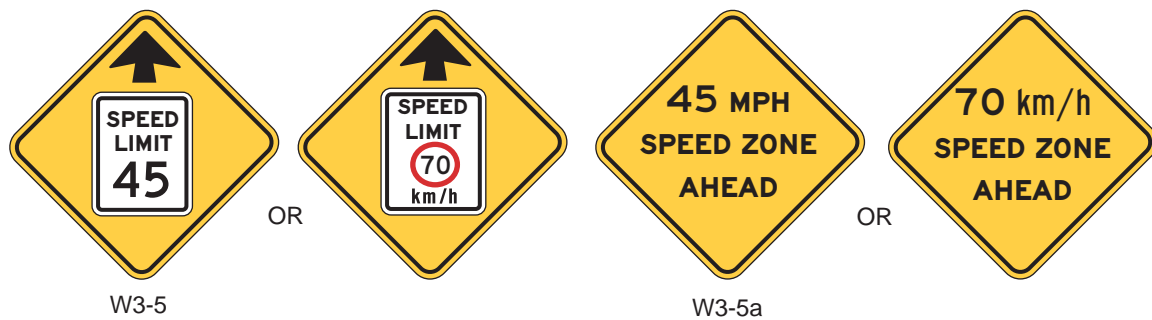
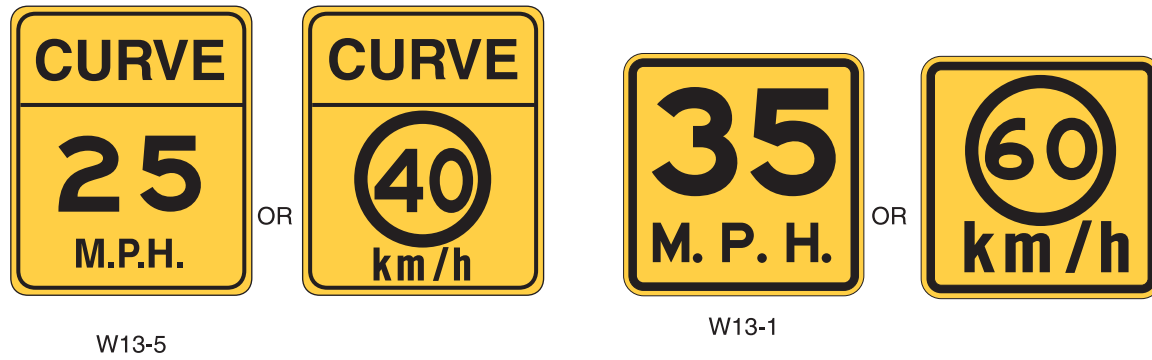
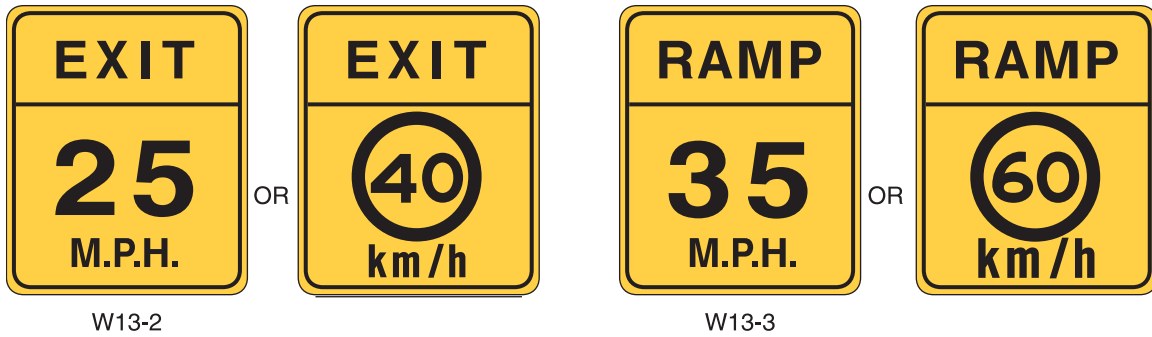


Figure 2C-8. Example of Advisory Speed Signing for an Exit Ramp

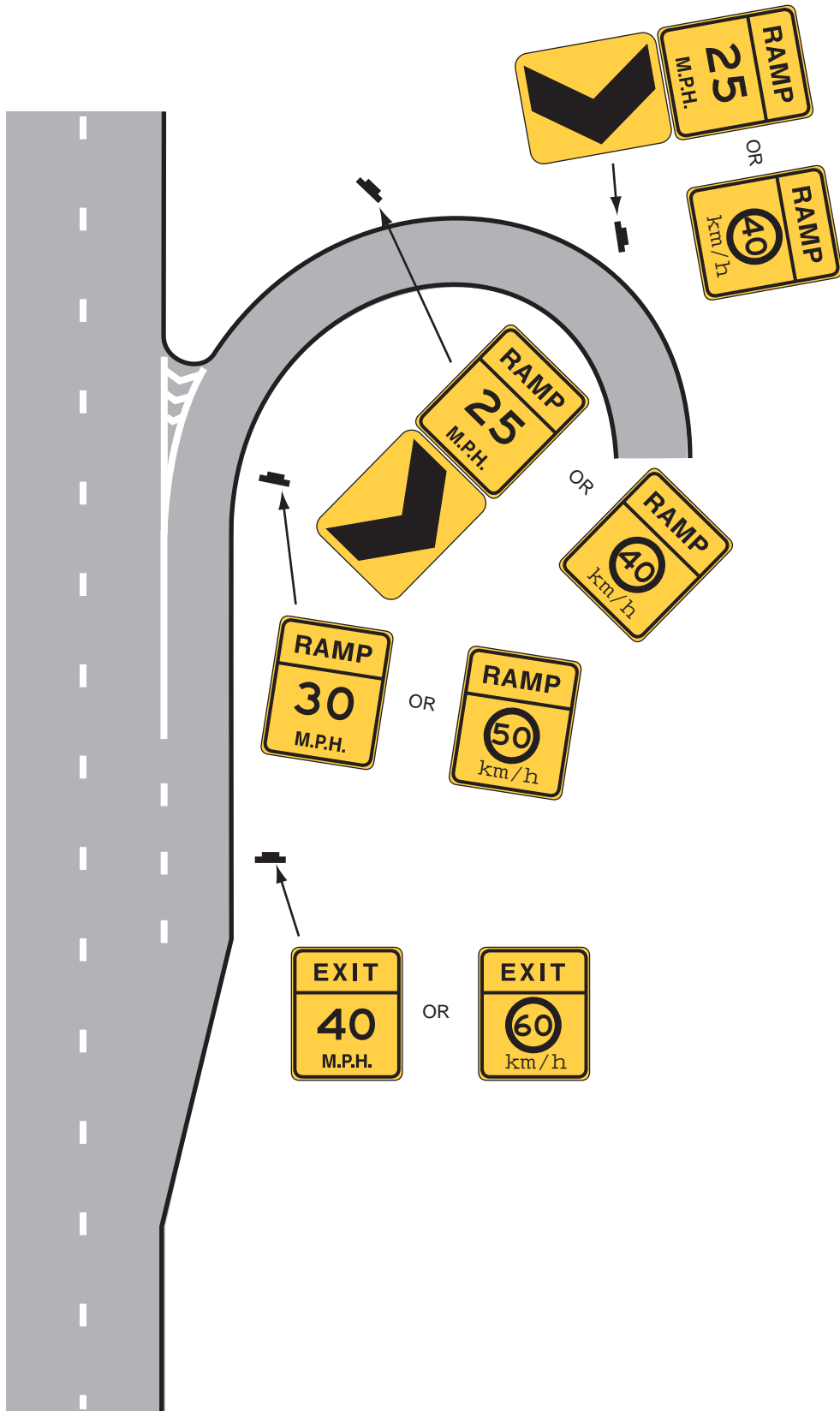


Figure 2C-9. Intersection Warning Signs

W2-1



W2-2



W2-3



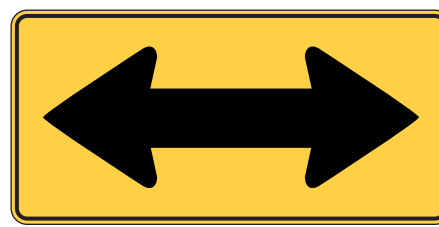
W2-4



W2-5



W2-6



W1-7



W25-1



W25-2



W4-4

presence of an intersection and the possibility of turning or entering traffic. The Circular Intersection (W2-6) symbol sign accompanied by an educational word message plaque may be installed in advance of a circular intersection.

The relative importance of the intersecting roadways may be shown by different widths of lines in the symbol.

An advance street name plaque (see Section 2C.45) may be installed below an Intersection Warning sign.

Guidance:

The Intersection Warning sign should illustrate and depict the general configuration of the intersecting roadway, such as cross road, side road, T-intersection, or Y-intersection.

Intersection Warning signs, other than the Circular Intersection symbol (W2-6) sign should not be used on approaches controlled by STOP signs, YIELD signs, signals, or where Junction signing (see Sections 2D.13 and 2D.28) or advance route turn assembly signs (see Section 2D.29) are present. The Circular Intersection symbol (W2-6) sign should be installed on the approach to a YIELD sign controlled roundabout intersection.

Where the side roads are not opposite of each other, the symbol for the intersection should indicate a slight offset.

Section 2C.35 Two-Direction Large Arrow Sign (W1-7)

Standard:

The Two-Direction Large Arrow (W1-7) sign (see Figure 2C-9) shall be a horizontal rectangle.

If used, it shall be installed on the far side of a T-intersection in line with, and at approximately a right angle to, approaching traffic.

The Two-Direction Large Arrow sign shall not be used where there is no change in the direction of travel such as at the beginnings and ends of medians or at center piers.

Guidance:

The Two-Direction Large Arrow sign should be visible for a sufficient distance to provide the road user with adequate time to react to the intersection configuration.

Section 2C.36 Motorized Traffic Signs (W8-6, W11-5, W11-5a, W11-8, W11-10, W11-10a, W11-12)

Option:

Motorized Traffic (W8-6, W11-5, W11-5a, W11-8, W11-10, or W11-10a, W11-12) signs (see Figure 2C-10) may be used to alert road users to locations where unexpected entries into the roadway by trucks, farm vehicles, emergency vehicles, or other vehicles might occur. The TRUCK CROSSING (W8-6) word message sign may be used as an alternate to the Truck Crossing symbol (W11-10) sign.

Support:

These locations might be relatively confined or might occur randomly over a segment of roadway.

Figure 2C-10. Motorized Traffic and Nonvehicular Signs



W8-6



W11-5



W11-5a



W11-8



W11-10



W11-11



W11-12



W11-1



W11-2



W11-3



W11-4



W16-1



W15-1



W11-14



W11-14a



W11-15



W16-5



W16-6



W16-7



W11-10a

Guidance:

Motorized Traffic signs should be used only at locations where the road user's sight distance is restricted, or the condition, activity, or entering traffic would be unexpected.

If the condition or activity is seasonal or temporary, the Motorized Traffic sign should be removed or covered when the condition or activity does not exist.

Option:

Supplemental plaques (see Section 2C.39) with legends such as AHEAD, XX METERS (XX FEET), NEXT XX KILOMETERS (NEXT XX MILES), or SHARE THE ROAD may be mounted below Motorized Traffic signs to provide advance notice to road users of unexpected entries.

Standard:

The Emergency Vehicle (W11-8) sign with the EMERGENCY SIGNAL AHEAD (W11-12) supplemental plaque (see Figure 2C-10) shall be placed in advance of all emergency-vehicle traffic control signals (see Chapter 4F).

Option:

The Emergency Vehicle (W11-8) sign, or a word message sign indicating the type of emergency vehicle (such as rescue squad), may be used in advance of the emergency vehicle station when no emergency-vehicle traffic control signal is present.

Section 2C.37 Nonvehicular Signs (W11-1, W11-2, W11-3, W11-4, W11-11, W11-14, W11-14a, W11-15)**Option:**

Nonvehicular signs (see Figure 2C-10) may be used to alert road users in advance of locations where unexpected entries into the roadway or shared use of the roadway by pedestrians, bicyclists, golf carts, animals, horse-drawn vehicles, and other crossing activities might occur.

Support:

These conflicts might be relatively confined, or might occur randomly over a segment of roadway.

Option:

When used in advance of a crossing, Nonvehicular warning signs may be supplemented with supplemental plaques (see Section 2C.39) with the legend AHEAD, XX METERS (XX FEET),

or NEXT XX KILOMETERS (NEXT XX MILES) to provide advance notice to road users of crossing activity.

Standard:

When used at the crossing, Nonvehicular warning signs shall be supplemented with a diagonal downward pointing arrow (W16-7) plaque (see Figure 2C-10) showing the location of the crossing.

Option:

The crossing location may be defined with crosswalk markings (see Section 3B.17).

Pedestrian, Bicycle, School Advance Crossing, and School Crossing signs and their related supplemental plaques may have a fluorescent yellow-green background with a black legend and border.

Guidance:

When a fluorescent yellow-green background is used, a systematic approach featuring one background color within a zone or area should be used. The mixing of standard yellow and fluorescent yellow-green backgrounds within a selected site area should be avoided.

Nonvehicular signs should be used only at locations where the crossing activity is unexpected or at locations not readily apparent.

Section 2C.38 Playground Sign (W15-1)

Option:

The Playground (W15-1) sign (see Figure 2C-10) may be used to give advance warning of a designated children's playground that is located adjacent to the road. The Playground sign may have a fluorescent yellow-green background with a black legend and border.

Guidance:

If the access to the playground area requires a roadway crossing, the application of crosswalk pavement markings (see Section 3B.17) and Nonvehicular signs (see Section 2C.37) should be considered.

Section 2C.39 Use of Supplemental Plaques**Option:**

A supplemental plaque may be displayed with a warning sign when engineering judgment indicates that road users require additional information beyond that contained in the main message of the warning sign.

Standard:

Supplemental plaques shall be used only in combination with warning or regulatory signs. They shall not be mounted alone or displayed alone. If used, a supplemental plaque shall be installed on the same post(s) as the warning sign.

Section 2C.40 Design of Supplemental Plaques**Standard:**

A supplemental plaque shall have the same color legend, border, and background as the warning sign with which it is displayed. Supplemental plaques shall be square or rectangular.

Section 2C.41 Distance Plaques (W16-2 series, W16-3 series, W16-4, W7-3a)**Option:**

The Distance Ahead (W16-2 series and W16-3 series) plaques (see Figure 2C-11) may be used to inform the road user of the distance to the condition indicated by the warning sign.

The Next Distance (W16-4 and W7-3a) plaques (see Figure 2C-11) may be used to inform road users of the length of roadway over which the condition indicated by the warning sign exists.

Section 2C.42 Advisory Speed Plaque (W13-1)**Option:**

The Advisory Speed (W13-1) plaque (see Figure 2C-7) may be used to supplement any warning sign to indicate the recommended speed for a condition.

Standard:

The Advisory Speed plaque shall be used where an engineering study indicates a need to advise road users of the recommended speed for a condition.

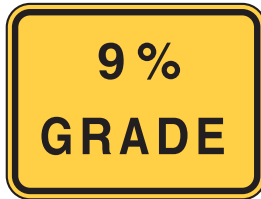
Figure 2C-11. Supplemental Warning Plaques



W7-2



W7-2b



W7-3



W7-3b



W16-8

OR



W7-3a



W16-2



W16-2a



W16-3



W16-11



W16-3a



W16-4



W16-10



W14--1P



W14-2P

If used, the Advisory Speed plaque shall carry the message XX km/h (XX M.P.H). The speed shown shall be a multiple of 10 km/h (5 mph).

Except in emergencies or when the condition is temporary, an Advisory Speed plaque shall not be installed until the recommended speed has been determined by an engineering study.

Guidance:

Because changes in conditions, such as roadway geometrics, surface characteristics, or sight distance, might affect the recommended speed, each location should be periodically evaluated and the Advisory Speed plaque changed if necessary.

Option:

The 85th-percentile speed, which is equivalent to the 16-degree ball-bank indication or an 88 mm/second (0.28 ft/second) reading on an accelerometer, along the ramp or curve may be used to determine the recommended speed as it is the speed at which most road users' judgment recognizes incipient instability along a ramp or curve.

Section 2C.43 Supplemental Arrow Plaques (W16-5, W16-6, W16-7)

Guidance:

If the condition indicated by a warning sign is located on an intersecting road and the distance between the intersection and condition is not sufficient to provide adequate advance placement of the warning sign, a Supplemental Arrow plaque (W16-5, W16-6, W16-7) (see Figure 2C.10) should be used below the warning sign.

Standard:

Supplemental Arrow plaques (see Figure 2C-10) shall have the same legend design as the Advance Turn Arrow and Directional Arrow auxiliary signs (see Sections 2D.25 and 2D.26) except that they shall have a black legend and border on a yellow or fluorescent yellow-green background, as appropriate.

Section 2C.44 Hill-Related Plaques (W7-2 Series, W7-3 Series)

Guidance:

Hill-Related (W7-2 series, W7-3 series) plaques (see Figure 2C-11) or other appropriate legends and larger signs should be used for emphasis or where special hill characteristics exist.

On longer grades, the use of the distance plaque (W7-3a or W7-3b) at periodic intervals of approximately 1.6 km (1 mi) spacing should be considered.

Section 2C.45 Advance Street Name Plaque (W16-8)

Option:

An Advance Street Name (W16-8) plaque (see Figure 2C-11) may be used with any Intersection sign (W2 series) or Advance Traffic Control (W3 series) sign to identify the name of the intersecting street.

Section 2C.46 DEAD END/NO OUTLET Plaques (W14-1P, W14-2P)

Option:

DEAD END (W14-1P) or NO OUTLET (W14-2P) plaques (see Figure 2C-11) may be used in combination with Street Name (D3-1) signs (see Section 2D.38) to warn turning traffic that the cross street ends in the direction indicated by the arrow.

At locations where the cross street does not have a name, DEAD END or NO OUTLET plaques may be used alone in place of a street name sign.

Section 2C.47 SHARE THE ROAD Plaque (W16-1)

Option:

In situations where there is a need to warn drivers to watch for other slower forms of transportation traveling along the highway, such as bicycles, golf carts, horse-drawn vehicles, or farm machinery, a SHARE THE ROAD (W16-1) plaque (see Figure 2C-10) may be used.

Section 2C.48 High-Occupancy Vehicle (HOV) Plaque (W16-11)

Option:

In situations where there is a need to warn drivers in an HOV lane of a specific condition, a HOV (W16-11) plaque (see Figure 2C-11) may be used. The HOV plaque may be used to differentiate a warning sign specific for HOV lanes when the sign is also visible to traffic on the adjoining general purpose roadway. Among the warning signs that may be possible applications of the HOV plaque are the Advisory Speed, Advisory Exit Speed, Added Lane, and Merge signs.

The diamond symbol may be used instead of the word message HOV on the W16-11 plaque. When appropriate, the words LANE or ONLY may be used on this plaque.

Section 2C.49 PHOTO ENFORCED Plaque (W16-10)

Option:

A PHOTO ENFORCED (W16-10) plaque (see Figure 2C-11) may be mounted below a warning sign to advise road users that the regulations associated with the condition being warned about (such as a traffic signal or a toll plaza) are being enforced by photographic equipment.

Standard:

If used below a warning sign, the PHOTO ENFORCED plaque shall be a rectangle with a black legend and border on a yellow background.

Section 2C.50 HILL BLOCKS VIEW Sign (W7-6)

Option:

A HILL BLOCKS VIEW (W7-6) sign (see Figure 2C-3) may be used in advance of a crest vertical curve to advise road users to reduce speed as they approach and traverse the hill as only limited stopping sight distance is available.

Guidance:

When a HILL BLOCKS VIEW sign is used, it should be supplemented by an Advisory Speed (W13-1) plaque indicating the recommended speed for traveling over the hillcrest based on available stopping sight distance.

Section 2C.51 Speed Reduction Signs (W3-5, W3-5a)

Guidance:

A Speed Reduction (W3-5 or W3-5a) sign (see Figure 2C-7) should be used to inform road users of a reduced speed zone when engineering judgment indicates the need for advance notice to comply with the posted speed limit ahead.

Standard:

If used, Speed Reduction signs shall be followed by a Speed Limit (R2-1) sign installed at the beginning of the zone where the speed limit applies.

The speed limit displayed on the Speed Reduction sign shall be identical to the speed limit displayed on the subsequent Speed Limit sign.

Section 2C.52 BRIDGE ICES BEFORE ROAD Sign (W8-13)**Option:**

A BRIDGE ICES BEFORE ROAD (W8-13) sign (see Figure 2C-5) may be used in advance of bridges to advise bridge users of winter weather conditions.

Guidance:

The BRIDGE ICES BEFORE ROAD sign should be removed or covered during seasons of the year when its message is not relevant.

Section 2C.53 Traffic Signal Signs (W25-1, W25-2)**Standard:**

Unless a separate left-turn signal face is provided and is operated as described in Section 4D.06, if the possibility exists that a CIRCULAR YELLOW signal indication could be displayed to an approach from which drivers are turning left permissively without the simultaneous display of a CIRCULAR YELLOW signal indication to the opposing approach (see Section 4D.05), either a W25-1 or a W25-2 sign (see Figure 2C-9) shall be installed near the left-most signal head. If the operation described in the previous sentence occurs regularly, the CAUTION ONCOMING GREEN EXTENDED (W25-1) sign shall be used; if the operation occurs only occasionally, the CAUTION ONCOMING GREEN MAY BE EXTENDED (W25-2) sign shall be used.

Section 2C.54 Truck Rollover Warning Signs (W1-13, W1-13a)**Option:**

A Truck Rollover Warning (W1-13) sign or Combination Truck Rollover/Advisory Speed (W1-13a) sign (see Figure 2C-1) may be used to warn drivers of vehicles with a high center of gravity, such as trucks, tankers, and recreational vehicles, of a curve or turn having geometric conditions that are prone to cause such vehicles to lose control and overturn.

Standard:

When the Truck Rollover Warning (W1-13) sign is used, it shall be accompanied by an Advisory Speed Plaque (W13-1) indicating the recommended speed for vehicles with a higher center of gravity.

Option:

The Truck Rollover Warning or Combination Truck Rollover/Advisory Speed sign may be displayed either as a static sign, a static sign supplemented by a flashing warning beacon, or as a changeable message sign activated by the detection of an approaching vehicle with a high center of gravity that is traveling in excess of the recommended speed for the condition.

