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Remarks and Instructions

The complete manual, revision packages, and individual chapters can be accessed at www.wsdot.wa.gov/publications/manuals/m51-02.htm.

Please contact Cathy Cooper at 360-705-7411 or cooperc@wsdot.wa.gov with comments, questions, or suggestions for improvement to the manual.

For updating printed manuals, page numbers indicating portions of the manual that are to be removed and replaced are shown below.

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/s/

Approved By

Signature



**Washington State
Department of Transportation**

Traffic Manual

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Engineering and Regional Operations

Traffic Operations

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These responsibilities are further defined:

- On limited access roadways, including any interchange cross-streets, the department is responsible for signing ([RCW 47.52.020](#) and [RCW 47.24.020\(2\)](#)). This can be superseded by an agreement with a local agency that designates other responsibility arrangements ([RCW 47.52.090](#)).
- Responsibility for signing along city streets that are part of the state highway system is assigned based on the population of the city ([RCW 47.24.020\(12\)](#) and (13)) and is shown in [Table 2-4](#). Population is determined by the Washington State Office of Fiscal Management and can be found at www.ofm.wa.gov/pop/april1/finalpop.pdf.

It is important to work with each city to ensure that city signs are not installed on department sign posts and that adequate sign spacing is maintained. The only exception is for STREET NAME signs above a STOP sign.

Sign Type	Responsibility Based on City Population	
	Over 25,000	Under 25,000
Regulatory	City	State
Parking	City	City
Warning	City	State
Route Markers	State	State
Primary Guide Signs	State	State
Street Name	City	City
School	City	State
MIS Logo	City	City*
Informational	City	City
DUI Victim Memorial	City	City

*The department may install these signs, if authorized through a specific agreement with a city or town.

**Sign Installation and Maintenance Responsibility
Non-Limited Access Highways
Table 2-4**

2.5 Traffic Sign Management System (TSMS)

TSMS is a statewide sign inventory computer program that provides both a complete inventory and a history of maintenance actions for each sign on the state highway system.

The Headquarters and region Traffic Offices use TSMS to provide accurate records regarding:

- Sign location.
- Original installation and replacement dates.

- Sign message.
- Sign size.
- Letter height.
- Direction of sign face.
- Sheeting type and color.
- Maintenance history.

The region Traffic Offices are responsible for keeping the TSMS up to date including:

- Entering new sign data.
- Collecting the Sign Activity Reports (SAR) from region maintenance personnel and inputting that data to keep the TSMS current and factual.
- Conducting periodic field inventories.
- Inventorying all signs installed by contract.
- Updating inventory after construction projects are completed.
- Night reflectivity review.

The region maintenance personnel are responsible for filling out a Sign Activity Report (SAR) that details each activity performed. This provides important history and identifies needed maintenance actions. The SAR is sent to the region Traffic Office for input into the TSMS. In some regions, maintenance personnel input SAR data in cooperation with the region Traffic Office

Regions also provide TSMS reports to Traffic, Maintenance, or other offices as requested.

The Headquarters Traffic Operations Office is responsible for maintaining and updating the TSMS program to meet the department's business needs, including data storage and selective retrieval of sign inventory and maintenance activity data.

2.6 State Traffic Laws and Regulations Requiring a Sign for Enforcement

Some Rules of the Road ([RCW 46.61](#)) are not enforceable unless appropriate signs are posted. The following signs must be installed to enforce a regulation (RCW). Place these signs at the point of regulation or where the prohibition begins and ends.

Install the appropriate TURN or CURVE sign where the recommended curve speed is 5 MPH or more below the posted speed limit.

Install a supplemental ADVISORY SPEED PLAQUE (W13-1) below the TURN or CURVE sign if the advisory speed is 5 mph or more below the posted speed limit, or if an engineering and traffic investigation indicates the need for the sign.

If a supplemental DISTANCE PLAQUE is used, such as beneath a WINDING ROAD (W1-5L/R) sign, show the distance as a fraction of a mile rather than a decimal ($\frac{1}{2}$ **mile** rather than **.5 mile**). The fraction is more quickly read and easily understood by the motorists.

(2) Hairpin Curve

Install a HAIRPIN CURVE sign (W1-901L/R) where the change in the roadway horizontal alignment is 135 degrees or more, and:

- A traffic engineering analysis of roadway, geometric, and operating conditions shows the recommended curve speed to be 30 mph or less.
- The recommended curve speed is equal to or less than the posted speed limit.

Install a supplemental advisory speed plaque (W13-1) below the HAIRPIN CURVE sign if an engineering and traffic investigation indicates the need for the sign. A large arrow sign (W1-6) or chevron alignment signs (W1-8) should be used in conjunction with the hairpin curve sign.

(3) Chevron Alignment

CHEVRON ALIGNMENT (W1-8) signs are used to provide emphasis and guidance for a change in horizontal road alignment. When the curve advisory speed is 15 mph or more below the speed limit, CHEVRONS shall be installed. Refer to [MUTCD Table 2C-5](#) for additional guidance.

If used, CHEVRONS shall be installed on the outside of a turn or curve, in line with and at approximately a right angle to approaching traffic. Install a minimum of three signs in a series, with at least two signs visible to the motorist at all times throughout the curve.

They should be installed on circular interchange ramps, or on other curving alignments where run off the road crashes have demonstrated an operational deficiency.

(4) Speed Limit Reduction Ahead

The SPEED LIMIT REDUCTION AHEAD (W3-5) warning sign has replaced the black on white “SPEED LIMIT AHEAD XX” regulatory sign. The SPEED LIMIT REDUCTION AHEAD sign is installed at locations where the speed limit reduces by 10mph or greater. On multilane divided roadways, install a SPEED LIMIT REDUCTION AHEAD sign on both the left and right sides. Locate the sign to allow sufficient distance to safely slow the vehicle to the reduced speed as shown in [Table 2-6](#).

		Approach Speed Limit (mph)								
		70	65	60	55	50	45	40	35	30
Reduced Speed Limit (mph)	65	430								
	60	720	390							
	55	1000	660	350						
	50	1250	910	600	310					
	45	1470	1140	820	540	270				
	40	1670	1340	1030	740	470	230			
	35	1850	1520	1200	920	650	410	200		
	30	2000	1670	1360	1070	810	570	350	160	
	25	2140	1800	1490	1200	940	700	480	290	120
	20	2240	1910	1600	1310	1040	800	590	390	230

Speed Reduction Signs Advance Location
Table 2-6

(5) Truck Tipping

The TRUCK ROLLOVER (W1-13) sign may be installed in advance of a horizontal curve where there is a history of truck tipping crashes, a Ball Bank indication of 12 degrees or more, or a side friction factor of $f > 0.21^*$. Display the recommended speed on an ADVISORY SPEED PLAQUE (W13-1) below the TRUCK ROLLOVER sign. Install the TRUCK ROLLOVER sign in addition to standard CURVE, TURN, LARGE ARROW, and/or CHEVRON warning signs.

*Use the following formula for a third method to determine the truck speed of a curve:

$$V^2 = 15 R (e + f)$$

Where:

V = Speed in miles per hour

R = Radius curve in feet

e = Rate of super-elevation in feet per foot

f = > 0.21 (Safe coefficient of side friction)

(6) Low Clearance

LOW CLEARANCE (W12-301) warning signs shall be installed where there is 15'3" or less of vertical clearance between the roadway surface and an overhead obstruction such as an overpass.

- The state highway is part of a recreational or commuter bicycle route that is officially recognized by the department, or a county or regional transportation organization, such as an Regional Transportation Planning Organization or Municipal Planning Organization.

Install the BICYCLE sign with BIKES ON ROAD plaque in advance of or within the first 300 feet of the narrow shoulder area. If the narrow shoulder distance is between 3 and 8 miles, a reminder sign should be placed at mid-point. If the mileage distance exceeds eight miles, reminder signs should be placed at 5-mile spacing.

These signs can be modified to say “BIKES ON BRIDGE” and installed at bridge locations where there is inadequate shoulder (less than 4 feet) for bicyclists.

- (c) **Share the Road** – WSDOT **does not** use the supplemental SHARE THE ROAD (W16-1) plaque. Instead, use BIKES ON ROAD or a warning sign that indicates the specific roadway condition, such as NO SHOULDERS or NARROW SHOULDERS.
- (d) **Fire Station/Emergency Vehicle** – FIRE STATION/EMERGENCY VEHICLE (W11-8) signs with the EMERGENCY SIGNAL AHEAD (W11-12P) supplemental plaque shall be placed in advance of all emergency vehicle traffic control signals. The signs may also be installed at locations where there is limited sight distance to the fire station road approach or where the approach is in an area where a motorist would not normally expect to see a fire truck or emergency vehicle enter the roadway. Fire station/emergency vehicle warning signs are not generally used at intersections, unless an emergency vehicle traffic control signal is present.
- (e) **Snowmobile** – A snowmobile crossing which is located at least 100 feet from any public roadway intersection ([RCW 46.10.100](#)) may be signed with SNOWMOBILE (W11-6) signs. This sign is seasonal and should be removed, folded, or covered when the condition does not exist.
- (f) **Farm Machinery** – FARM MACHINERY signs (W11-5, W11-5A) may be installed at locations where farm machinery or equipment enters, crosses, or travels along a roadway and where there is limited sight distance or an operational concern. If the farm machinery will be on the roadway for more than ¼ mile, a supplemental DISTANCE PLAQUE (W13-401) may be added.

Consider sign installation where:

- There is limited sight distance to the farm machinery crossing or entrance onto the roadway.
- The road user would not normally expect to see a farm vehicle, such as where a farm is operating in an area that has or is being developed for residential or commercial use.
- There is inadequate stopping sight distance to a slow moving vehicle along the roadway.

- There is a history of police, farmer, or public complaints, or operational conflicts.

To reduce operational conflicts, work with the farmer to restrict highway driving to daylight hours and non-peak periods, to drive on the shoulder if possible, and to use alternate routes if available.

Farm equipment used on the roadway must be equipped with a reflective hazard triangle sign and a flashing beacon ([RCW 46.37.160](#)).

(18) Nonvehicular Traffic Signs

NONVEHICULAR TRAFFIC signs may be used to alert road users to general locations where unexpected entries into the roadway or shared use of the roadway may occur.

- (a) Pedestrian** – A PEDESTRIAN CROSSING sign (W11-2) may be installed where attention needs to be drawn to the pedestrian presence, as evidenced by a traffic engineering analysis. Fluorescent yellow green may be used as a background sign color where extra attention needs to be drawn to a crossing, such as in urban areas with many distractions. When used at a specific crossing, the sign shall be supplemented with a diagonal downward pointing arrow plaque (W16-7P) showing the crossing location.
- (b) Deer Crossing** – Install DEER CROSSING (W11-3) signs to alert motorists when approaching an area where deer or elk may unexpectedly enter the roadway.

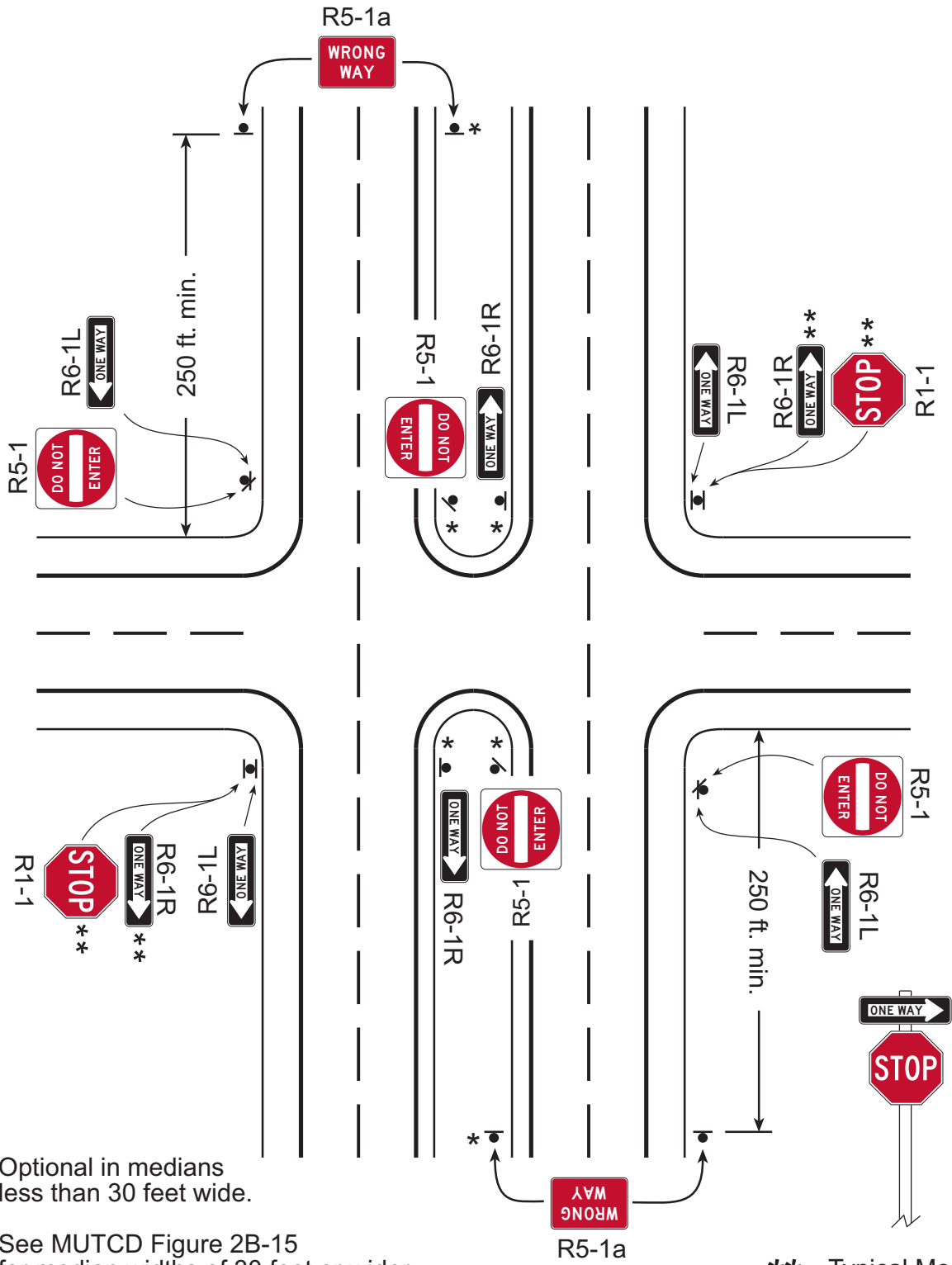
Gather information from the following sources when considering sign installation:

- Region Maintenance personnel.
- WSDOT Headquarters Environmental Services Office, Fish and Wildlife program. They compile a Wildlife Carcass Removal data base which notes deer and other wildlife killed on state highways.
- Records of crashes with wildlife, maintained by the WSDOT Travel and Collision Data Office.
- The Department of Fish and Wildlife's regional biologists have additional information on concentrations and migratory routes of deer.

Consider the following criteria before installing DEER CROSSING (W11-3) signs:

- Minimum of five documented deer/vehicle collisions per mile per year for at least two of the past 10 years.
- Minimum of 10 carcass counts per mile per year for at least three of the past 10 years.
- Concurrence from region maintenance personnel

Existing DEER CROSSING sign locations should be reviewed every five years.



* Optional in medians less than 30 feet wide.

See MUTCD Figure 2B-15 for median widths of 30 feet or wider.

** Typical Mounting

