Sign Installation Guide
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Introduction

It is very important to install standard traffic control signs consistently and correctly. The effectiveness of a sign can be compromised if it is used inappropriately or if it is installed incorrectly. A sign that is confusing, or one that cannot be seen in time, is useless.

This guide contains information needed to install traffic control signs on National Forest System roads in accordance with the “Manual on Uniform Traffic Control Devices” (MUTCD) and EM 7100-15, “Sign and Poster Guidelines for the Forest Service.” The guide provides a visual reference for contractors, volunteers, and Forest Service field personnel who install and maintain signs. A quick check of the guide should ensure far fewer errors in installations.

Before any signs are ordered and installed, this guide assumes that:

- A sign plan has been completed and approved.
- An engineering study or engineering judgment has been used to determine sign needs.
- All traffic control signs, messages, and sizes meet MUTCD and Forest Service standards.

Uniform installation of signs is highly desirable. However, because no two roads are exactly alike, unusual situations may be encountered relating to topography, man-made objects, intermediate intersections, or other circumstances that may require some modifications to typical sign placement guidelines and standards. The most suitable placement of each sign must be determined at the site—where all variables are visible. Any deviations or adjustments should be documented.

State and county sign requirements may vary. Check with local jurisdictions when installing signs on county, State, or Federal roads. The Forest Service has no authority to install signs of any nature within the right-of-way of county, State, or Federal roads without a signed agreement from the authorizing agency.

The guide is not intended to serve as a substitute for training nor does it include every type of sign. Refer to the “Manual on Uniform Traffic Control Devices” (MUTCD) and EM 7100-15, “Sign and Poster Guidelines for the Forest Service,” for complete information.
Placement Guidelines

Locate signs on the **right side of the road** unless specific standards require otherwise.

Place signs where they are clearly visible and provide adequate time for proper viewer response. Consider factors such as vehicle speed, road conditions, intermediate intersections, sight distance, and alignment. Select locations that minimize viewing obstructions.

**Avoid locations such as:**
- Dips in the road
- Just beyond the crest of a hill
- Where a sign could be obscured by other signs or objects
- Where the sign may interfere with the normal use of the road
- Where there is increased need for users to focus on the road
- Where vegetation could cover the sign
- Snow removal and disposal areas

**Certain signs supplement each other and are mounted on the same post, such as:**
- A warning sign with an advisory speed plate (page 14)
- Route markers and destination signs (pages 22 to 25)

**Some signs should not be mounted together. Signs with different messages should be erected individually on separate posts, such as:**
- A speed limit and a one-way sign
- A curve warning sign and a junction-ahead sign
- A warning sign and a guide sign

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**Sign Spreading**

Several signs at the same location can overload users with too much information, causing confusion and detracting from critical messages. Signs requiring different decisions should be spaced sufficiently far apart for the required decisions to be made independently and safely. To determine the minimum spread distance between signs, use table 1.

**Table 1—Minimum spread distance (distance between signs) for the speed posted.**

<table>
<thead>
<tr>
<th>Speed</th>
<th>Minimum Spread Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 35 miles per hour</td>
<td>100 feet</td>
</tr>
<tr>
<td>&gt; 40 miles per hour</td>
<td>5 x the speed = _______ feet</td>
</tr>
</tbody>
</table>

In situations where two or more signs are needed at about the same location, use the following placement order:

1. Location-critical regulatory signs, such as STOP and YIELD
2. Location-critical warning signs, such as TURN and INTERSECTION
3. Other regulatory or warning signs, such as SPEED LIMIT or LIVESTOCK
4. Route markers and guide signs
5. Other informational signs
Placement Guidelines (cont.)

Lateral Offset

Lateral offset is the distance from the edge of the traveled way to the nearest edge of the sign—not the distance to the sign post.

1. On conventional roads, use:
   a) A minimum of 12 feet from the edge of the traveled way
   b) Where the shoulder is wider than 6 feet, a minimum of 6 feet from the edge of the shoulder
   c) No less than 2 feet where it is impractical to follow a or b

2. On roads where signs are placed behind barriers such as curbs or guardrails, use:
   a) A minimum of 2 feet from the roadside edge of the barrier

3. On low-volume roads (fewer than 400 vehicles per day) with no shoulders, use:
   a) A minimum of 12 feet where terrain and vegetation permit
   b) A minimum of 2 feet where terrain or vegetation make it impractical to follow a

If a sign is installed within the clear zone, a breakaway sign post shall be used (see page 4). The clear zone is the area that ideally would be clear of obstacles that might be a hazard to a vehicle that left the road. The width of the clear area depends on traffic volume, vehicle speed, and the terrain.

Mounting Height

Mounting height is measured from the road surface to the bottom of the sign.

Primary Sign

Use a minimum of 5 feet in:
- Rural areas

Use a minimum of 7 feet in:
- Areas with parking or pedestrians
- Urban, business, commercial, or residential areas
- Areas where the view of the sign may be obstructed

Supplemental plaque or sign

Supplemental plaques or signs may be 1 foot lower than the minimum mounting height for the primary sign.

Allow a 1-inch gap between stacked signs so they can expand and contract.
Breakaway Guidelines for Wood Sign Posts

*All posts closer than 7 feet from each other act together. Install no more posts than allowed within 7 feet of each other so the combination of posts meets the breakaway guidelines.

Breakaway Design Requirements

<table>
<thead>
<tr>
<th>Post size (in)</th>
<th>Hole diameter (in)</th>
<th>D minimum burial depth (ft)</th>
<th>B minimum breakaway distance (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 by 4</td>
<td>—</td>
<td>3</td>
<td>—</td>
</tr>
<tr>
<td>4 by 6</td>
<td>1.5</td>
<td>4</td>
<td>—</td>
</tr>
<tr>
<td>6 by 6</td>
<td>2</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>6 by 8</td>
<td>3</td>
<td>4</td>
<td>7</td>
</tr>
</tbody>
</table>
Wood Sign Post Spacing and Size Requirements

<table>
<thead>
<tr>
<th>Post Size** (in)</th>
<th>One post</th>
<th>Two posts</th>
<th>Three posts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. width (in)</td>
<td>Max. sign area (sq. ft)</td>
<td>Max. width (in)</td>
<td>Max. sign area (sq. ft)</td>
</tr>
<tr>
<td>4 by 4</td>
<td>48***</td>
<td>10</td>
<td>72</td>
</tr>
<tr>
<td>4 by 6</td>
<td>48</td>
<td>20</td>
<td>72</td>
</tr>
<tr>
<td>6 by 6</td>
<td>48</td>
<td>20</td>
<td>96</td>
</tr>
</tbody>
</table>

*Post spacing applies to both wood and steel posts.
**For sizes of steel posts, refer to EM 7100-15, chapter 3c.
***The maximum width is 36 inches for diamond-shaped signs.

Nonbreakaway sign posts should be installed outside the clear zone, behind a guardrail, or behind a nontraversable ditch.
Sign Face Orientation Angle

Signs are mounted at approximately right angles to oncoming traffic. It may be necessary to rotate a sign slightly off 90 degrees to avoid glare reflecting off the sign face directly into the driver’s eyes.

An angle of about 93 degrees to the line of approaching traffic is recommended.

On curves, orient the sign to face the oncoming traffic—not the road edge.

On steep grades, it may be necessary to tilt the sign forward (uphill grades) or back (downhill grades) to make it easier for motorists to read.
Sign Decals

When they are first installed, all signs should have the installation date and vandal warning decals attached to the corner of the sign closest to the road. The vandal warning decal goes on the back of STOP or YIELD signs, but on the front of all other signs. The installation date decal goes on the back of all signs.

Both decals may be obtained from Unicor.

Installation Date Decal

Vandal Warning Decal
**Regulatory Sign Installations**

**Regulatory signs:**
- Inform users of traffic laws, regulations, and legal requirements
- Are enforceable
- Are placed at the point where the regulation begins

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**Yield and Stop Signs**

*As close as practical, following the lateral offset guidelines on page 3.*

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**Other Regulatory Signs Used on National Forest System Roads**

*The 5-foot minimum mounting height applies only in rural areas. See page 3 for the mounting height guidelines that apply in other areas.*
Regulatory Signs for a Low-Volume Rural Road

*The 2-foot minimum distance for low-volume roads applies only where terrain or vegetation limit the distance. See page 3 for lateral offset guidelines on other types of roads or where terrain and vegetation are not factors.

**The 5-foot minimum mounting height applies only in rural areas. See page 3 for the mounting height guidelines that apply in other areas.
Warning Sign Installations

Warning signs:
• Warn drivers of unexpected conditions or situations
• Indicate need for caution
• May call for reduced speed or an unexpected vehicle maneuver
• Are placed in advance of the situation to allow adequate time for proper response considering approach speed, road conditions, intermediate intersections, and other factors as shown in table 2 on page 11

Example
Using table 2: 85th-percentile speed = 35 mph
Minimum distance from intersection = 225 ft
Warning Sign Installations (cont.)

Minimum Advance Placement Distances

Table 2—Advance warning sign placement distances for unpaved low-volume roads.

<table>
<thead>
<tr>
<th>Posted speed or 85th-percentile speed (mph)</th>
<th>Stopping sight distance (ft)</th>
<th>Distance for deceleration (feet) to advisory speed listed (mph)</th>
<th>Additional distance (feet) on downgrade (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>20</td>
<td>115</td>
<td>125</td>
<td>—</td>
</tr>
<tr>
<td>25</td>
<td>155</td>
<td>150</td>
<td>—</td>
</tr>
<tr>
<td>30</td>
<td>200</td>
<td>200</td>
<td>150</td>
</tr>
<tr>
<td>35</td>
<td>250</td>
<td>250</td>
<td>225</td>
</tr>
<tr>
<td>40</td>
<td>305</td>
<td>325</td>
<td>300</td>
</tr>
<tr>
<td>45</td>
<td>360</td>
<td>400</td>
<td>350</td>
</tr>
<tr>
<td>50</td>
<td>425</td>
<td>475</td>
<td>450</td>
</tr>
<tr>
<td>55</td>
<td>495</td>
<td>550</td>
<td>525</td>
</tr>
</tbody>
</table>

• These minimum distances may be exceeded when necessary.
• Distance for deceleration is the minimum distance a warning sign should be placed in advance of a condition.
• Sign placement distances are based on sign legibility for 24-inch signs and 4-inch letters.
• If larger signs are used, evaluate the placement distances as part of the engineering study or use engineering judgment to determine whether the placement distances may be reduced. Document calculations and rationale.
• Distances are for level roadways. Increase placement distance on downgrades of 3 percent or steeper.
• Placement distances on upgrades may be reduced by one-half the distances listed for downgrades.
• On conventional roads and paved low-volume roads (fewer than 400 vehicles per day), use the MUTCD.
Warning Sign Installations (cont.)

Low-Volume Rural Roads
Where Terrain or Vegetation
Limit the Lateral Offset

Not less than 2 ft from
drive edge of
terrain or vegetation

5 ft**

Road surface

EDGES OF 
TRAVELLED 
WAY

5 ft**

Not less than 2 ft from
edge of traveled way

NARROW STEEP ROAD

Not less than 12 ft*

4 ft**

Edge of
traveled way

HEAVY TRUCK TRAFFIC

Not less than 2 ft

Road surface

GUARDRAIL OR CURB

NEXT 7 MILES

5 ft**

5 ft**

Lateral Offset and Mounting Height for Warning Signs

*See page 3 for lateral offset guidelines that apply to roads with shoulders or where the 12-foot minimum is not practical.
**The 5-foot minimum mounting height applies only in rural areas. See page 3 for the mounting height guidelines that apply in other areas.
***See page 3 for the mounting height of supplemental plaques or signs and for the recommended gap between stacked signs.
Warning Sign for Low-Volume Rural Roads  
(no supplemental plaques)

*The 2-ft minimum distance for low-volume roads applies only where terrain or vegetation limit the distance. See page 3 for lateral offset guidelines on other types of roads or where terrain and vegetation are not factors.

**The 5-foot minimum mounting height applies only in rural areas. See page 3 for the mounting height guidelines that apply in other areas.
Advisory speed plates supplement the warning sign and shall not be used alone.

*See page 3 for lateral offset guidelines on other types of roads or where terrain or vegetation limit the distance.

**The 5-foot minimum mounting height applies only in rural areas. See page 3 for the mounting height guidelines that apply in other areas.

***See page 3 for the mounting height of supplemental plaques or signs.
Warning Sign With Advisory Speed Plate and Supplemental Plaque for Conventional or Low-Volume Rural Roads

Advisory speed plates and supplemental plaques are not to be used alone. They shall be used only to supplement a warning sign.

*See page 3 for lateral offset guidelines on other types of roads or where terrain or vegetation limit the distance.

**See page 3 for the mounting height of supplemental plaques or signs.
Object and Barricade Marker Installations

Type 3 object markers are used to mark objects that intrude into or constrict the roadway.

Placement of Type 3 Object Markers

Notes:
1. Stripes slope downward toward the side of the obstruction on which traffic is to pass.
2. For a bridge with a railing but no curb, mark the inner edge of the railing.

*Vertical mounting height may vary according to need. Mounting height is normally 4 feet, but shall be no less than 6 inches.
Bridge Signing With Type 3 Object Markers
(to mark objects that intrude into or constrict the roadway)

Option: Type 1 object markers also may be used to mark objects that intrude into or constrict the roadway. For a bridge with a railing but no curb, mark the inner edge of the railing.
Type 2 Object Marker Installations

Type 2 Object Markers are used to mark objects that are outside the roadway, but close enough to present a hazard. For narrow objects, such as cattleguards, object markers may be mounted back to back on the same post.

Object Marker Locations on a Cattleguard

Alternate location

Object markers mounted back to back

Modified Type 2 Object Marker
Cattleguard Signing With Type 2 Object Markers (roadway is not constricted)

*Vertical mounting height may vary when an object requires a lower or higher mounting. Mount at least 6 inches above the road surface.
Gate Sign Installation

Barricade Markers (BM), Type 2 Object Markers (OM), and End-of-Roadway Markers (OM4-1, 2, or 3) Used on Gates

If motorized or nonmotorized use (such as bicycles) occurs behind a gate, the back side may require signing also. The size of barricade markers depends on approach speeds.
Gate Signing With Object Markers (OM) for One-Lane Roads
Guide Sign Installations

Guide signs:
- Are placed ahead of the intersection
- Provide guidance

- **Destination sign**
  - Not less than 12 ft*
  - 5-ft min.**
- **Route markers**
  - Not less than 12 ft*
  - 4-ft min.***
- **Mile marker**
  - Not less than 12 ft*
  - 5-ft min.**
- **Road surface**
  - Not less than 12 ft*
  - 3-ft min. to lowest number
  - 4-ft min.

Edge of traveled way

*See page 3 for lateral offset guidelines that apply to roads with shoulders or where the 12-foot minimum is not practical.

**The 5-foot minimum mounting height applies only in rural areas. See page 3 for the mounting height guidelines that apply in other areas.

***See page 3 for the mounting height of supplemental plaques or signs and for the recommended gap between stacked signs.

Lateral Placement and Mounting Height for Guide Signs
Guide Sign Installations (cont.)

Table 3—Advance placement of guide signs at intersections. Speeds are rounded off to the nearest 5-miles per hour.

<table>
<thead>
<tr>
<th>Speed limit or 85th-percentile speed (mph)</th>
<th>Maintenance level 3, 4, 5 roads (ft)</th>
<th>Maintenance level 2 roads and roads within administrative or recreation sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 15</td>
<td>At or near intersection</td>
<td>At or near intersection</td>
</tr>
<tr>
<td>15 to 25</td>
<td>100</td>
<td>At or near intersection</td>
</tr>
<tr>
<td>30 to 40</td>
<td>100 to 200</td>
<td>—</td>
</tr>
<tr>
<td>45 and higher</td>
<td>200 minimum</td>
<td>—</td>
</tr>
</tbody>
</table>

*Use 25 to 200 feet on unpaved roads or about 300 feet on paved roads.

Example using table 3 for a maintenance level 4 road:
85th-percentile speed = 45 mph
Road maintenance level = 4
Min. distance = 200 ft

Placement of Guide, Destination, and National Forest Access Signs

**Use table 3 for distances.
Guide Sign Installations (cont.)

Placement for Destination Signs

*Obtain distance from table 3 (page 23) based on the speed limit or anticipated speed of traffic on the road.

Allow a 1-inch gap between stacked signs so they can expand and contract.

Center the sign for the approaching lane of traffic.
Destination Sign With Route Markers for Conventional and Low-Volume Rural Roads

*See page 3 for lateral offset guidelines on other types of roads or where terrain or vegetation limit the distance.

**The 5-foot minimum mounting height applies only in rural areas. See page 3 for the mounting height guidelines that apply in other areas.

***See page 3 for the mounting height of supplemental plaques or signs and for the recommended gap between stacked signs.
Guide Sign Installations (cont.)

Installation of Route Markers

Locations for Distinctive and Horizontal Route Markers for Maintenance Level 3, 4, and 5 Roads

Note: Route markers may be installed below applicable guide signs as shown on page 24.

*Use table 3 to determine the distance based on the speed limit or anticipated speed of traffic on the road.
Horizontal or Distinctive Route Marker on Low-Volume Rural Roads

*The 2-ft minimum distance for low-volume roads applies only where terrain or vegetation limit the distance. See page 3 for lateral offset guidelines on other types of roads or where terrain and vegetation are not factors.

**The 5-foot minimum mounting height applies only in rural areas. See page 3 for the mounting height guidelines that apply in other areas.
Guide Sign Installations (cont.)
Installation of Vertical Route Markers

Locations for Vertical Route Markers on Maintenance Level 1 and 2 Roads

Option: Use a delineator post with a wood or aluminum sign panel.

*Distances may be greater when the entrance is intentionally disguised to discourage use.
Vertical Route Marker for Maintenance Level 1 and 2 Roads
Trailblazer Assembly for Conventional or Low-Volume Rural Roads

*See page 3 for lateral offset guidelines on other types of roads or where terrain or vegetation limit the distance.

**The 5-foot minimum mounting height applies only in rural areas. See page 3 for the mounting height guidelines that apply in other areas.
Milepost Marker for Conventional or Low-Volume Rural Roads

Not less than 12 ft

4-ft min. from road surface

Edge of traveled way

Road surface

*See page 3 for lateral offset guidelines on other types of roads or where terrain or vegetation limit the distance.
Federal Recreation Symbol Assembly for Conventional or Low-Volume Rural Roads

Generally, no more than four symbols should be mounted on a single sign assembly.
*See page 3 for lateral offset guidelines on other types of roads or where terrain or vegetation limit the distance.

**The 5-foot minimum mounting height applies only in rural areas. See page 3 for the mounting height guidelines that apply in other areas.
Notes:
1. Colors (as viewed by driver) on two-way roads, including single-lane roads, are white on both sides of the road. On one-way roads, colors are white on the right and yellow on the left side of the road. (From MUTCD Section 3D.03)
2. Delineator posts may be galvanized steel U-posts, 1.12 pounds per linear foot, 6.5 feet long, or flexible fiberglass posts.
3. Reflectors may be fastened to posts using rivets or other suitable, nonremovable fasteners.
4. The delineators shall be 4- by 4-inch (silver) crystal on both sides, Type 3 retroreflective sheeting. The delineator housing shall be the bidirectional type.
### Delineator Installations (cont.)

**Positioning and Spacing**

When engineering judgment indicates a need, the figure below shows the position and spacing of delineators for curves on low-volume roads.

#### Table: Delineator Placement and Spacing on Curves

<table>
<thead>
<tr>
<th>Operating speed (mph)</th>
<th>Approx. curve radius (ft)</th>
<th>On-curve spacing (ft) S</th>
<th>Spacing before and after curve (ft)</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>100</td>
<td>25</td>
<td>50</td>
<td>75</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>250</td>
<td>40</td>
<td>80</td>
<td>120</td>
<td>240</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>500</td>
<td>65</td>
<td>130</td>
<td>195</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>800</td>
<td>80</td>
<td>160</td>
<td>240</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>1,000</td>
<td>90</td>
<td>180</td>
<td>270</td>
<td>300</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
1. Prorate distance “x” among all spacings so the last delineator falls on the end of the curve.
2. Install delineators perpendicular to oncoming traffic.
Library Card


This guide shows how regulatory, warning, and guide signs are properly mounted and installed on roads. It includes drawings and photographs showing the specifications for placing signs along Forest Service roads and is intended to help new employees or volunteers install road signs.

The guide is based on standards established by the Manual on Uniform Traffic Control Devices and the Sign and Poster Guidelines for the Forest Service (EM-7100-15).

Keywords: road signs, specifications, standards, traffic control devices, traffic safety, volunteers