# Roadway Signs II

**Course Number:** CE-03-913

**PDH:** 3

**Approved for:** AK, AL, AR, GA, IA, IL, IN, KS, KY, LA, MD, ME, MI, MN, MO, MS, MT, NC, ND, NE, NH, NJ, NM, NV, OH, OK, OR, PA, SC, SD, TN, TX, UT, VA, VT, WI, WV, and WY

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# INTRODUCTION

Traffic signs are typically used for conveying laws and regulations, traffic and roadway conditions, and guidance and other information. These critical tools provide important information for safe travel on any U.S. roadway system.

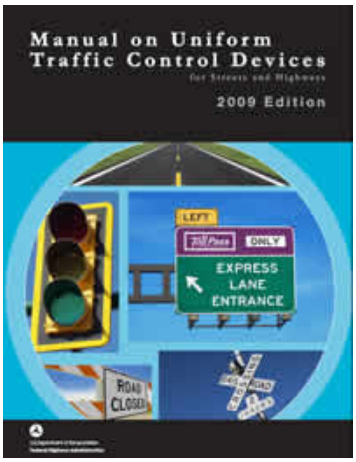
Traffic signs are not a cure for all traffic problems. Road users process different types of visual and non-visual information differently: speed, roadway conditions, traffic, legal enforcement, noise levels, etc. Also, traffic signs serve as reminders of important information, so road users do not have to memorize everything.

The goal is to provide drivers with relevant information when they need it - resulting in safer, more efficient roadways with reduced liability risks. However, poor sign management can greatly reduce safety, contribute to roadway incidents, and increase liability exposure.

This course is the second of two in this series that discusses how to effectively use signs to guide roadway traffic, and thereby reduce your liability exposure. This volume covers curve warning signs through emergency management signs. The contents of this course are intended to serve as guidance and not as an absolute standard or rule. Its purpose is to help you to use the **Manual on Uniform Traffic Control Devices (MUTCD) – Part 2** more effectively and not replace it. Should there be any discrepancies between the contents of this course and the MUTCD - always follow the MUTCD.

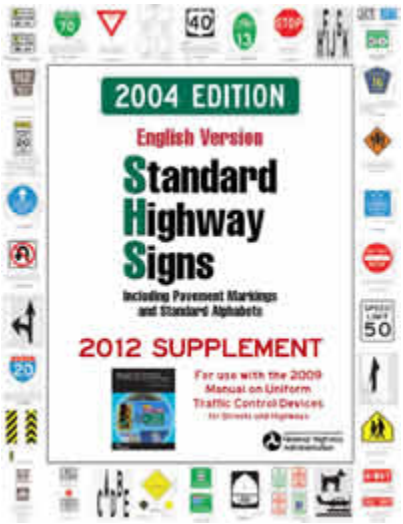
Upon course completion, you should be familiar with the general design guidelines for traffic signs. The course objective is to give engineers and designers an in-depth look at the principles to be considered when selecting and designing for traffic control.

For this course, the *Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) 2009 Edition* will serve as a reference for the fundamental design principles of traffic signs. The MUTCD is recognized as the **national standard** for all traffic control devices installed on any street, highway, bikeway, or private road open to public travel. Any traffic control device design or application contained within it is considered to be in the public domain and available for use.




**http://mutcd.fhwa.dot.gov/pdfs/2009/mutcd2009edition.pdf**

The *Standard Highway Signs and Markings* book contains detailed specifications for all adopted standard signs. All traffic control devices have to be similar to or mirror images of those shown in this manual. Any symbols or colors cannot be modified unless otherwise stated.




**http://mutcd.fhwa.dot.gov/SHSe/shs_2004_2012_sup.pdf**

## CURVES

Curves are the second most dangerous locations for serious roadway crashes which result in injuries and deaths. These incidents are generally due to lane departures, head-on incidents for curves to the right, and run-off-road crashes for curves to the left. Proper signing can aid in guiding motorists through curves without leaving their lane.

Curve warning signs fall into three main categories:

*curve warning signs*
*curve delineation signs (chevrons and arrows)*
*combination curve/intersection signs.*


Curve warning sign usage depends on the roadway geometry of the first curve, the advisory speed of the sharpest corner, and whether it is a single curve or multiple curves.

Alignment warning signs may be placed a maximum distance of 100 feet in advance of the curve, and a minimum distance of 100 feet from any other signs.

## Table 2C-5. Horizontal Alignment Sign Selection

| Type of Horizontal Alignment Sign | Difference Between Speed Limit and Advisory Speed | | | | |
|---|---|---|---|---|---|
| | 5 mph | 10 mph | 15 mph | 20 mph | 25 mph or more |
| Turn (W1-1), Curve (W1-2), Reverse Turn (W1-3), Reverse Curve (W1-4), Winding Road (W1-5), and Combination Horizontal Alignment/Intersection (W10-1) (see Section 2C.07 to determine which sign to use) | Recommended | Required | Required | Required | Required |
| Advisory Speed Plaque (W13-1P) | Recommended | Required | Required | Required | Required |
| Chevrons (W1-8) and/or One Direction Large Arrow (W1-6) | Optional | Recommended | Required | Required | Required |
| Exit Speed (W13-2) and Ramp Speed (W13-3) on exit ramp | Optional | Optional | Recommended | Required | Required |

W1-1 Turn signs are used for curves with advisory speeds of 30 mph or less. For curves with advisory speeds greater than 30 mph, W1-2 Curve signs are used. The proper sign to use is subject to engineering judgment that takes into account the roadway geometry, traffic volume, road type, and other factors.

W1-1

TURN

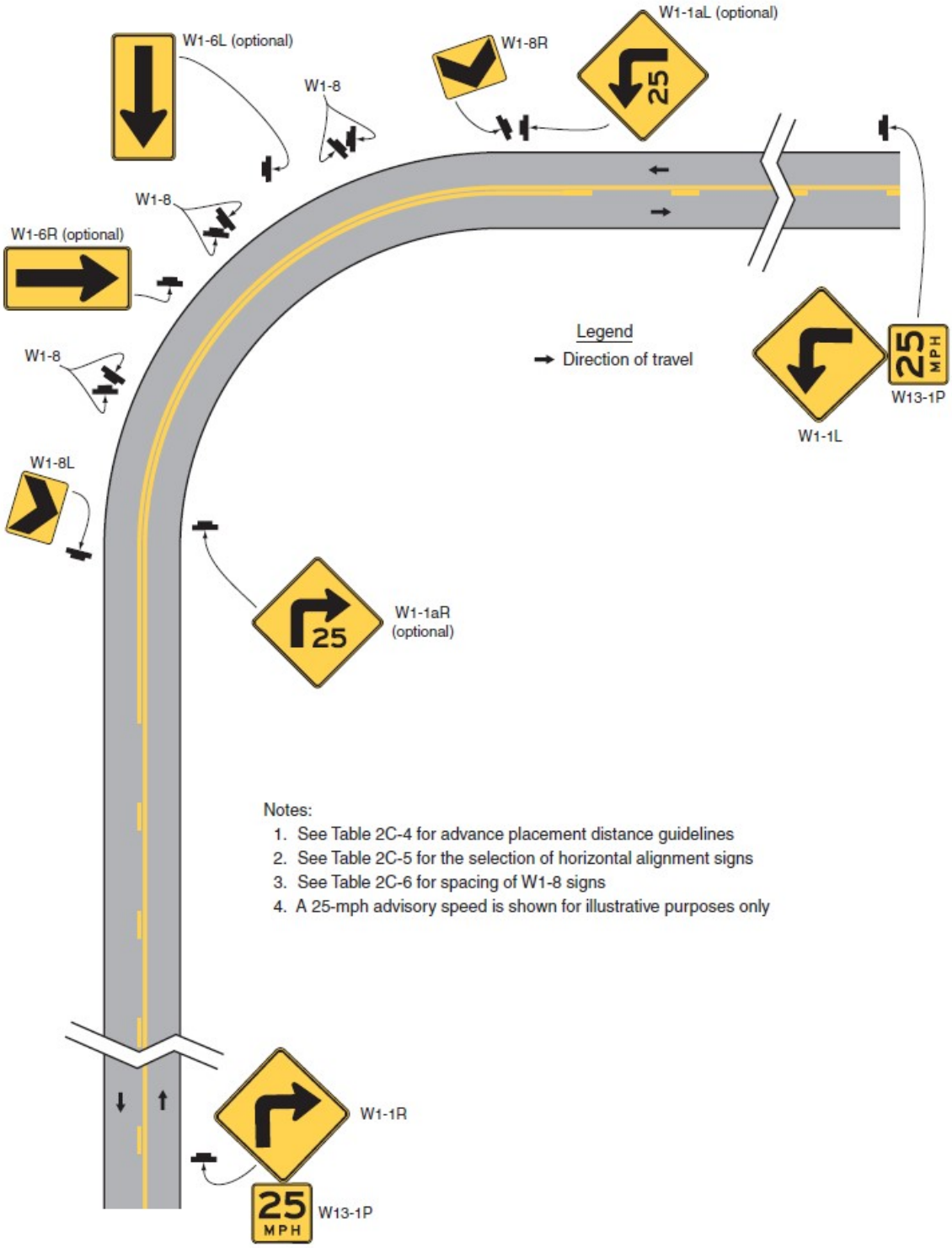
≤ 30 mph

W1-2

CURVE

> 30 mph

**Figure 2C-2. Example of Warning Signs for a Turn**




Notes:

1. See Table 2C-4 for advance placement distance guidelines
2. See Table 2C-5 for the selection of horizontal alignment signs
3. See Table 2C-6 for spacing of W1-8 signs
4. A 25-mph advisory speed is shown for illustrative purposes only

**Multiple curves**

For two curves in opposite directions that are separated by a maximum tangent distance of 600 feet, signage may include a W1-3 Reverse Turn or W1-4 Reverse Curve sign. At locations where the lower advisory speed of the two curves is 30 mph or slower, a W1-3 Reverse Turn sign should be used. If the lower advisory speed is greater than 30 mph, W1-4 Reverse Curve signs may be used.

For road segments with three or more curves less than 600 feet apart, W1-5 Winding Road signs may be appropriate. For locations with continuous roadway curves within a specific distance, NEXT XX MILES (W7-3aP) supplemental distance plate can be placed under the Winding Road sign.

Chevrons (W1-8) and Large Arrow (W1-6) signs have proven to be helpful for curve locations with curve warning signs still experiencing crashes. These signs convey critical information about the location and curve sharpness plus it helps guide the driver through the curves.

W1-6 W1-8

Chevrons need to be highly visible in order to provide adequate driver perception-reaction time. These signs should be installed on the outside of a turn or curve, in line with or at a right angle to approaching traffic. A minimum of two chevrons should always be visible by the road user. Three or more visible chevrons help drivers to visualize any changes in the alignment. Mounting chevrons on higher posts may be helpful for locations with limited sight distance or decreased visibility.

**Table 2C-6. Typical Spacing of Chevron Alignment Signs on Horizontal Curves**

| Advisory Speed | Curve Radius | Sign Spacing |
|---|---|---|
| 15 mph or less | Less than 200 feet | 40 feet |
| 20 to 30 mph | 200 to 400 feet | 80 feet |
| 35 to 45 mph | 401 to 700 feet | 120 feet |
| 50 to 60 mph | 701 to 1,250 feet | 160 feet |
| More than 60 mph | More than 1,250 feet | 200 feet |

Note: The relationship between the curve radius and the advisory speed shown in this table should not be used to determine the advisory speed.

One or more Arrow signs should be placed in each direction at curve locations with adequate perception-response time to react to the alignment change.

## Horizontal Curve Signing Considerations

*Speed of traffic approaching the curve*

If approaching traffic is substantially faster than the speed limit, you may want to measure the eighty-fifth-percentile speed. Document any reasoning for any approach speeds lower than the speed limit.

*Advisory speed*

If lower than the speed limit, advance signs and advisory speed panels may be used. If equal to the speed limit or to the speed limit plus 5 mph, advance curve signs are recommended.

Consider using chevrons, arrows or delineators at: curves with a history of run-off-road incidents; isolated curves; first curve after a long straightaway; and sharp curves.

**Object Markers**

Object markers may be used to mark obstructions within or adjacent to roadways (Types 1, 2 and 3), or used to mark the end of a roadway (Type 4).

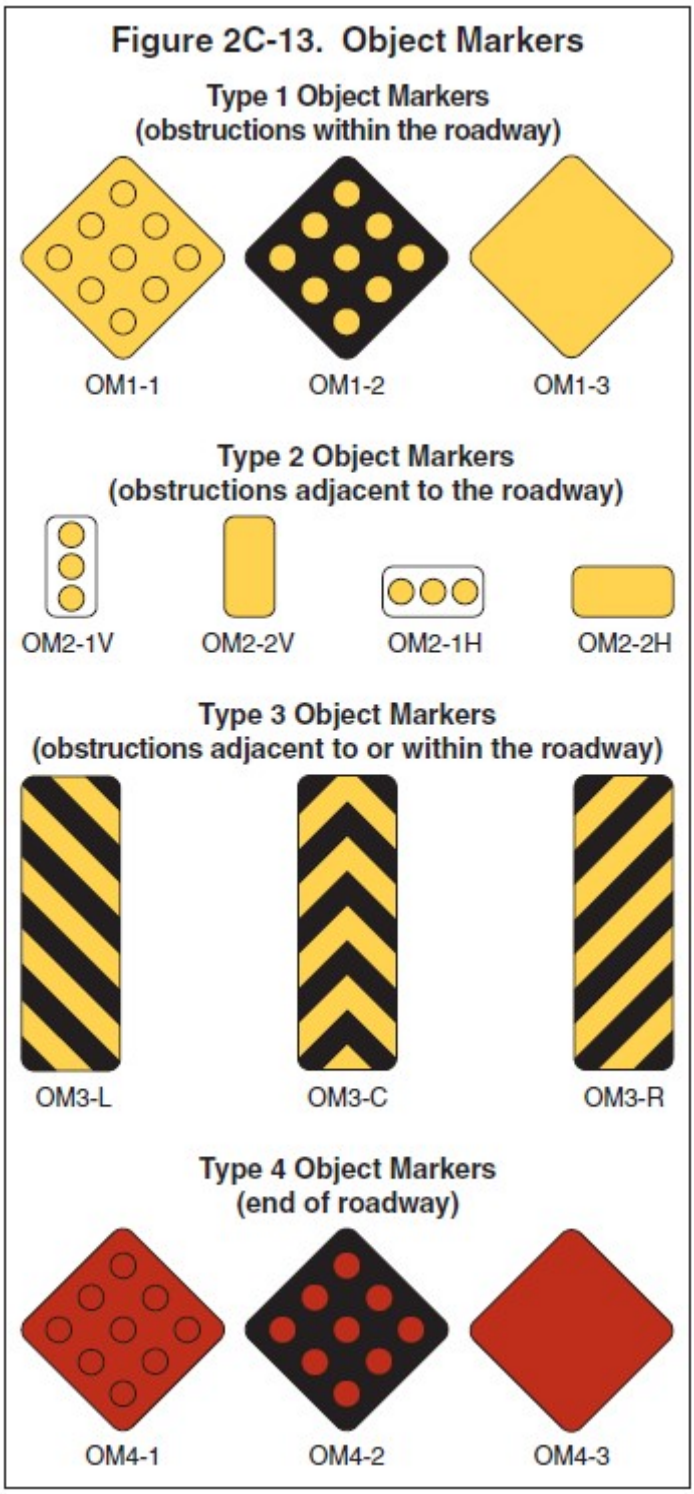
**Type 1** Diamond-shaped sign with 18-inch minimum sides
Either yellow or black sign
Nine yellow retroreflective devices (3-inch minimum diameter)

**Type 2** Horizontal or vertical white or yellow sign (6 x 12 inches)
Three yellow retroreflective devices (3-inch minimum diameter)

**Type 3** Vertical marker (12 x 36 inches) with alternating black and retroreflective yellow stripes
Minimum stripe width of 3 inches

**Type 4** Diamond-shaped sign with 18-inch minimum sides
Either red or black sign
Nine red retroreflective devices (3-inch minimum diameter)

Object markers should have a minimum clearance of 4 feet (measured from the bottom of the marker).




*MUTCD Sections 2C.63 to 2C.65* provide detailed information about the use and installation of object markers.

## INCIDENT MANAGEMENT SIGNS

The MUTCD defines a traffic incident as “an emergency road user occurrence, a natural disaster, or other unplanned event that affects or impedes the normal flow of traffic”. Examples include: vehicles blocking a traffic lane; hazardous material spills; and natural disasters (floods and severe storm damage). Incident management zones extend from the first warning device to the last temporary traffic control device - or to where vehicles clear the incident and return to the original lane alignment.

W3-4


W4-2

W9-3

E5-2a

The primary functions of temporary traffic control at a traffic incident management area is to temporarily guide road users safely past or around the incident, and reduce the likelihood of any secondary traffic incidents.

Traffic incidents can be divided into the following classes of duration:

**Major** - more than 2 hours
**Intermediate** - 30 minutes to 2 hours
**Minor** - under 30 minutes

Incident management signs have a black legend/border with a fluorescent pink background.

Local municipalities should coordinate their incident responses with appropriate local safety, emergency, enforcement, towing and recovery groups to minimize additional risk to other road users.

## GUIDE SIGNS

Guide signs provide information to road users that will guide them to their destination in the most simple, direct manner possible. These signs provide information about intersecting routes, directions for various destinations (cities, towns, etc.) or identification of nearby rivers, streams, parks and historical sites.


D1-2 D4-1 D4-2 M5-5

Typical guide signs on streets or highways are rectangular with white text and border on green, blue, or brown backgrounds. Work zone or detour signs are black with an orange background. All guide signs (message, border, legend and background) should be retroreflective or illuminated.

Guide signs should be limited to a *maximum of 3 lines* of legend to give the user adequate time for comprehension. Long messages (regardless of letter size) take longer for the reader to discern. Supplementary distance message or action information on guide signs may be helpful in addition to destinations. Providing accurate and timely navigation information is crucial to traffic safety. Guide signs can help prevent erratic maneuvers, or potential crashes.

**STREET NAME Signs**

Street Name signs should be placed at all intersections in urban areas. For rural locations, these signs should identify important unsigned routes. The lettering for the signs should be combination of upper and lower-case with standard abbreviations (Blvd, Ave, Rd, Dr, St, etc.). Borders are optional for Street Name signs.

Like any typical guide sign, Street Name signs have a white text and border (if used) on a green background. Other acceptable alternative color variations are:

| | |
|---|---|
| **White legend & border** | **Blue or brown background** |
| **Black legend & border** | **White background** |

Street Name signs should be mounted facing parallel to the referenced streets and may be mounted overhead to optimize visibility.

**Freeways**

Freeway and expressway signing should be a coordinated system of installations. An engineering study can help solve potential problems of multiple locations within the context of an entire route. Consistent signing should consider geographical, geometric, and operating factors that may create significant differences between urban and rural conditions.

**Functions of Guide Signs on Freeways and Expressways**

- Provide directions to destinations, roadways, intersections or interchanges;
- Advance notice of the approaches to intersections or interchanges;
- Direct road users in advance of diverging or merging movements;
- Identify routes and provide directions;
- Show distances to destinations;
- Indicate access points to motorist services, rest, scenic, and recreational areas;
- Provide other informational value.

**Figure 2E-8. Diagrammatic Guide Signs for a Two-Lane Exit to the Right with an Option Lane**

## RECREATIONAL AND CULTURAL INTEREST SIGNS

Recreational and cultural interest areas are open to the general public for the purpose of relaxation, play, or amusement. Recreational and cultural interest signs guide road users to general areas first and then to specific facilities. These signs are divided into two different subcategories: **symbol signs** and **destination guide signs.**

**Symbol Sign Categories**

General Applications
Accommodations
Services
Land Recreation
Water Recreation
Winter Recreation

**Recreational areas include:**

Parks Campgrounds Gaming facilities Ski areas

**Cultural attractions include:**

Museums Art galleries Historical buildings or sites

Recreational or cultural interest signs are rectangular with white symbols and borders on either a green, brown, or black background. The signs on highways outside of recreational interest areas will have white symbols/borders on brown backgrounds.

Exceptions include:

- Ferry, Post Office, Airport, Bus Stop, and Helicopter signs - white symbols with green backgrounds.
- Camping Tent and Trailer, Gas, Handicapped, Lodging, Picnic area, Rest Area, Telephone, Rest Room, Trailer Sanitary Station, Group Camping, Group Picnicking, Parking - white symbols with blue backgrounds.

**Symbol Sign Sizes**

| | |
|---|---|
| Typical | 24” x 24” |
| Freeways/Expressways | 30” x 30” |
| Low-speed, low-volume roads & non-roads | 18” x 18” |

Larger sizes should be used for locations where greater visibility or emphasis is needed. Sign enlargements should be in 6-inch increments.

## TOLL ROAD SIGNS

Toll road sign requirements are dependent on the type of facility and access (conventional road, freeway, etc.). Toll highways are generally limited access facilities where the entire route or part (crossing, bridge, tunnel) may be the only toll portion of the roadway.

Provisions of *MUTCD Chapters 2D and 2E* regarding guide signs will apply to toll facilities.

Typical signing designs will need to address toll plazas, collection points, and advance toll notification.

The color purple is used as a background color when information associated with the appropriate Electronic Toll Collection (ETC) account is shown on that portion of the sign. Backgrounds for the remaining part of the sign will meet regulatory, warning, or guide sign provisions.

Regulatory signs should be placed at locations that make their applicability clear to approaching road users. These signs convey restrictions on vehicle type, forms of acceptable payment, speed limits, and required stops.

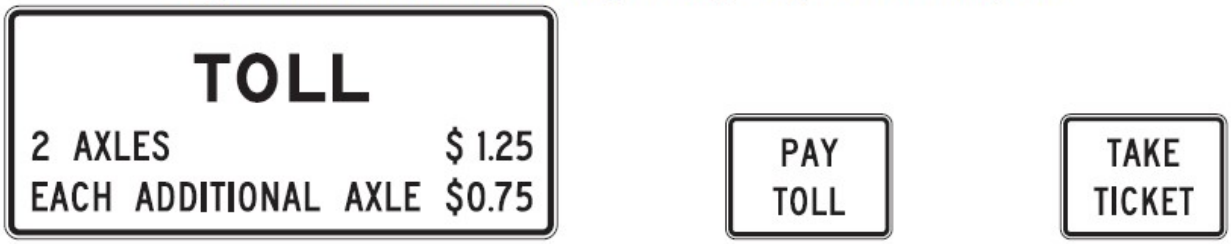
**Table 2F-1. Toll Road Sign and Plaque Minimum Sizes**

| Sign or Plaque | Sign Designation | Section | Conventional Road | | Expressway | Freeway | Minimum | Oversized |
|---|---|---|---|---|---|---|---|---|
| | | | Single Lane | Multi-Lane | | | | |
| Toll Rate | R3-28 | 2F.05 | — | — | 114 x 48 | 114 x 48 | — | — |
| Pay Toll (plaque) | R3-29P | 2F.05 | — | — | 24 x 18 | 24 x 18 | — | — |
| Take Ticket (plaque) | R3-30P | 2F.05 | — | — | 24 x 18 | 24 x 18 | — | — |
| Pay Toll XX Miles Cars (price) | W9-6 | 2F.06 | 96 x 66 | 96 x 66 | 96 x 66 | 96 x 66 | — | — |
| Pay Toll XX Miles Cars (price) (plaque) | W9-6P | 2F.07 | 288* x 36 | 288* x 36 | 288* x 36 | 288* x 36 | — | — |
| Stop Ahead Pay Toll Cars (price) | W9-6a | 2F.08 | 114 x 66 | 114 x 66 | 114 x 66 | 114 x 66 | — | — |
| Stop Ahead Pay Toll (plaque) | W9-6aP | 2F.09 | 252* x 36 | 252* x 36 | 252* x 36 | 252* x 36 | — | — |
| Last Exit Before Toll (plaque) | W16-16P | 2F.10 | — | — | 252* x 36 | 252* x 36 | — | — |
| Toll | M4-15 | 2F.11 | 24 x 12 | 24 x 12 | 36 x 18 | 36 x 18 | 24 x 12 | 36 x 18 |
| No Cash | M4-16 | 2F.12 | 24 x 12 | 24 x 12 | 36 x 18 | 36 x 18 | 24 x 12 | 36 x 18 |
| Toll Collector Symbol | M4-17 | 2F.13 | — | — | 48 x 48 | 48 x 48 | — | — |
| Exact Change Symbol | M4-18 | 2F.13 | — | — | 48 x 48 | 48 x 48 | — | — |
| ETC Only | M4-20 | 2F.12 | 24 x 24 | 24 x 24 | 36 x 36 | 36 x 36 | 24 x 24 | 36 x 36 |

* The width shown represents the minimum dimension. The width shall be increased as appropriate to match the width of the guide sign.

Notes: 1. Larger signs may be used when appropriate
2. Dimensions in inches are shown as width x height

**Figure 2F-2. Toll Plaza Regulatory Signs and Plaques**



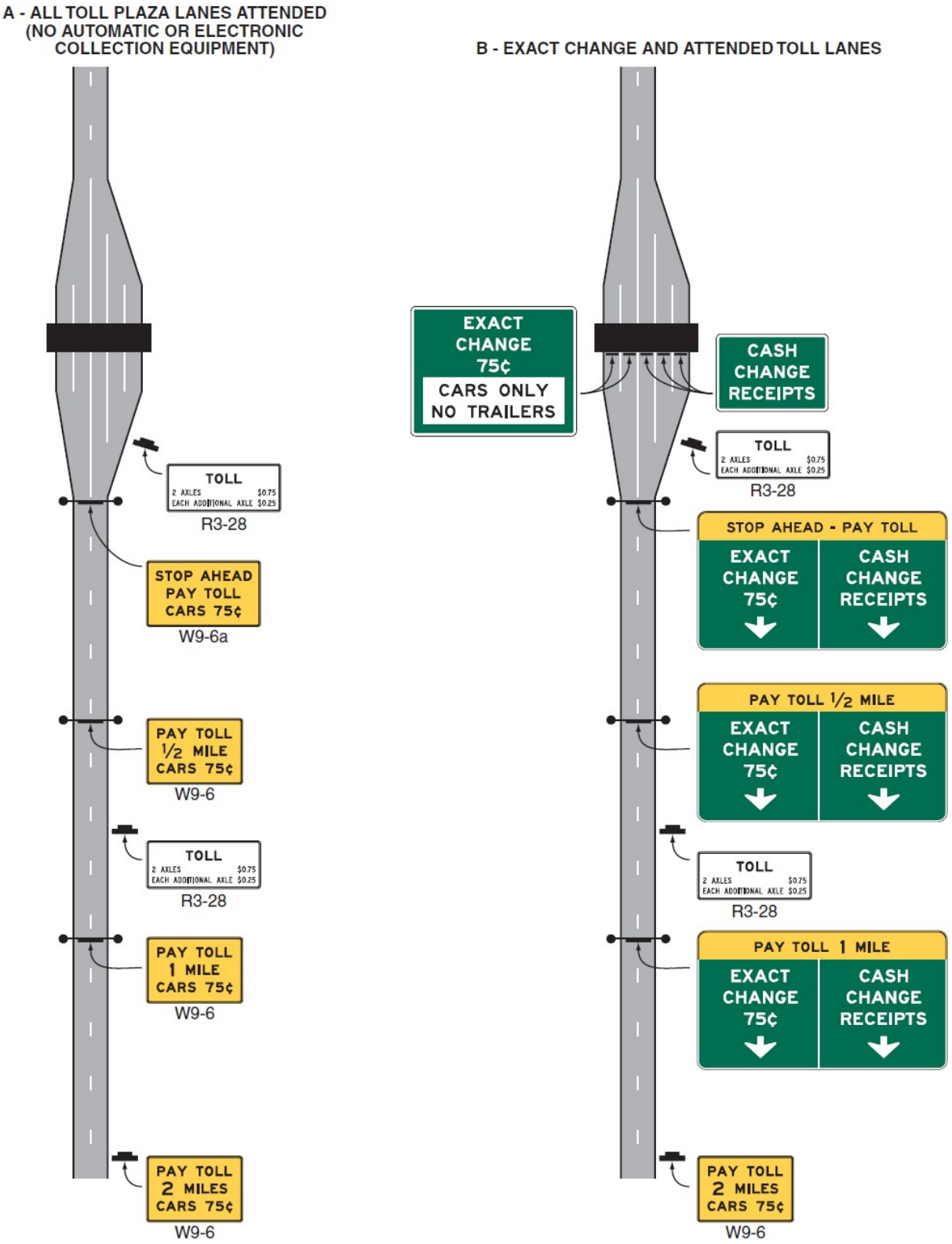

R3-28 R3-29P R3-30P

The speed limit should be determined from an engineering study that considered toll plaza geometry, roadway lanes, safety and operational factors.

Toll plaza signs should provide road users with advance and toll plaza lane-specific information regarding:

- Amount of the toll, types of acceptable payment, and type(s) of registered ETC accounts accepted for payment
- Lane(s) required or allowed to be used for each payment type
- Toll plaza lane(s) restrictions by vehicle type (such as cars only or no trucks).

**Figure 2F-10. Examples of Mainline Toll Plaza Approach and Canopy Signing**




## PREFERENTIAL AND MANAGED LANE SIGNS

Preferential lanes are specifically designated for special traffic use (examples: buses, taxis, light rail, bicycles, high-occupancy vehicles). Lane treatments may range from turn-lane restrictions during peak hours to separate roadway systems for certain classes of vehicles.

**Preferential Lane Options**

**Barrier-separated** - on a separate alignment or physically separated from the other travel lanes by a barrier or median

**Buffer-separated** - separated from the adjacent general-purpose lanes only by a narrow buffer area created with longitudinal pavement markings

**Contiguous** - separated from the adjacent general-purpose lanes only by a lane line

Preferential lanes might allow continuous access with the adjacent general-purpose lanes; restrict access for designated locations; operate in a constant direction or as reversible lanes; or function counter-flow to traffic on the immediately adjacent general-purpose lanes. These type of lanes may operate on a continual basis or for specific time periods only. Open-road tolling lanes or toll plaza lanes used to separate traffic by payment method are not considered to be preferential lanes.

R3-11b

R3-11c

R3-11P

R3-12b

R3-12c

R3-12d

Managed lanes are typically used for restricting access with the adjacent general-purpose lanes to designated locations only. For certain operations, a managed lane might be operated as an HOV lane in response to changing congestion levels.

## Table 2G-1. Managed and Preferential Lanes Sign and Plaque Minimum Sizes

| Sign or Plaque | Sign Designation | Section | Conventional Road | | Expressway | Freeway | Oversized |
|---|---|---|---|---|---|---|---|
| | | | Single Lane | Multi-Lane | | | |
| Preferential Lane Vehicle Occupancy Definition (post-mounted) | R3-10,10a | 2G.04 | 30 x 42 | 30 x 42 | 36 x 60 | 78 x 96 | 78 x 96 |
| Preferential Lane Periods of Operation (post-mounted) | R3-11 series | 2G.05 | 30 x 42 | 30 x 42 | 36 x 60 | 78 x 96 | 78 x 96 |
| Motorcycles Allowed (plaque) | R3-11P | 2G.03 | 30 x 15 | 30 x 15 | 36 x 18 | 78 x 36 | 78 x 36 |
| Preferential Lane Ahead or Ends (post-mounted) | R3-12 series | 2G.06 | 30 x 42 | 30 x 42 | 36 x 60 | 48 x 84 | 48 x 84 |
| Preferential Lane Vehicle Occupancy Definition (overhead) | R3-13,13a | 2G.04 | 66 x 36 | 66 x 36 | 84 x 48 | 144 x 78 | 144 x 78 |
| HOV Lane Periods of Operation (overhead) | R3-14,14a,14b | 2G.05 | 72 x 60 | 72 x 60 | 96 x 72 | 144 x 108 | 144 x 108 |
| Preferential Lane Periods of Operation (overhead) | R3-14c | 2G.05 | 90 x 60 | 90 x 60 | 108 x 72 | 156 x 102 | 168 x 102 |
| HOV Lane Ahead (overhead) | R3-15 | 2G.06 | 66 x 36 | 66 x 36 | 84 x 48 | 102 x 60 | 102 x 60 |
| HOV Lane Begins XX Miles (overhead) | R3-15a | 2G.06 | 78 x 42 | 78 x 42 | 102 x 54 | 132 x 72 | 132 x 72 |
| HOV Lane Ends (overhead) | R3-15b,15c | 2G.07 | 66 x 36 | 66 x 36 | 84 x 48 | 102 x 60 | 102 x 60 |
| Preferential Lane Ahead or Ends (overhead) | R3-15d,15e | 2G.07 | 42 x 36 | 42 x 36 | 54 x 48 | 72 x 60 | 72 x 60 |
| Priced Managed Lane Vehicle Occupancy Definition (post-mounted) | R3-40 | 2G.17 | — | — | 54 x 66 | 54 x 66 | 66 x 78 |
| Priced Managed Lane Ends (post-mounted) | R3-42,42b | 2G.17 | — | — | 48 x 60 | 48 x 60 | 60 x 78 |
| Priced Managed Lane Ends Advance (post-mounted) | R3-42a,42c | 2G.17 | — | — | 48 x 66 | 48 x 66 | 60 x 84 |
| Priced Managed Lane Vehicle Occupancy Definition | R3-43 | 2G.17 | — | — | 138 x 66 | 138 x 66 | — |
| Priced Managed Lane Periods of Operation (overhead) | R3-44 | 2G.17 | — | — | 90 x 84 | 90 x 84 | — |
| Priced Managed Lane Periods of Operation (overhead) | R3-44a | 2G.17 | — | — | 132 x 84 | 132 x 84 | — |
| Priced Managed Lane Ends (overhead) | R3-45 | 2G.17 | — | — | 90 x 66 | 90 x 66 | — |
| Priced Managed Lane Ends (overhead) | R3-45a | 2G.17 | — | — | 114 x 66 | 114 x 66 | — |
| Priced Managed Lane Toll Rate | R3-48 | 2G.17 | — | — | Varies | Varies | — |
| Priced Managed Lane Toll Rate | R3-48a | 2G.17 | — | — | Varies | Varies | — |
| HOV (plaque) | W16-11P | 2G.09 | 24 x 12 | 24 x 12 | 30 x 18 | 30 x 18 | 30 x 18 |
| Preferential Lane Entrance Gore | E8-1 | 2G.10 | — | — | 48 x 96 | 48 x 96 | — |
| Preferential Lane Intermediate Entrance Gore | E8-1a | 2G.10 | — | — | 48 x 84 | 48 x 84 | — |
| Preferential Lane Entrance Direction (overhead) | E8-2 | 2G.11 | — | — | 222 x 72 | 222 x 72 | — |
| Preferential Lane Entrance Direction (post-mounted) | E8-2a | 2G.11 | — | — | 186 x 108 | 186 x 108 | — |
| Preferential Lane Entrance Advance | E8-3 | 2G.11 | — | — | 186 x 96 | 186 x 96 | — |
| Preferential Lane Direct Exit Gore | E8-4 | 2G.15 | — | — | 60 x 78 | 60 x 78 | — |
| Preferential Lane Intermediate Egress Direction | E8-5 | 2G.13 | — | — | Varies x 90 | Varies x 90 | — |
| Preferential Lane Intermediate Egress Advance | E8-6 | 2G.13 | — | — | Varies x 84 | Varies x 84 | — |

Notes: 1. Larger signs may be used when appropriate
2. Dimensions in inches are shown as width x height

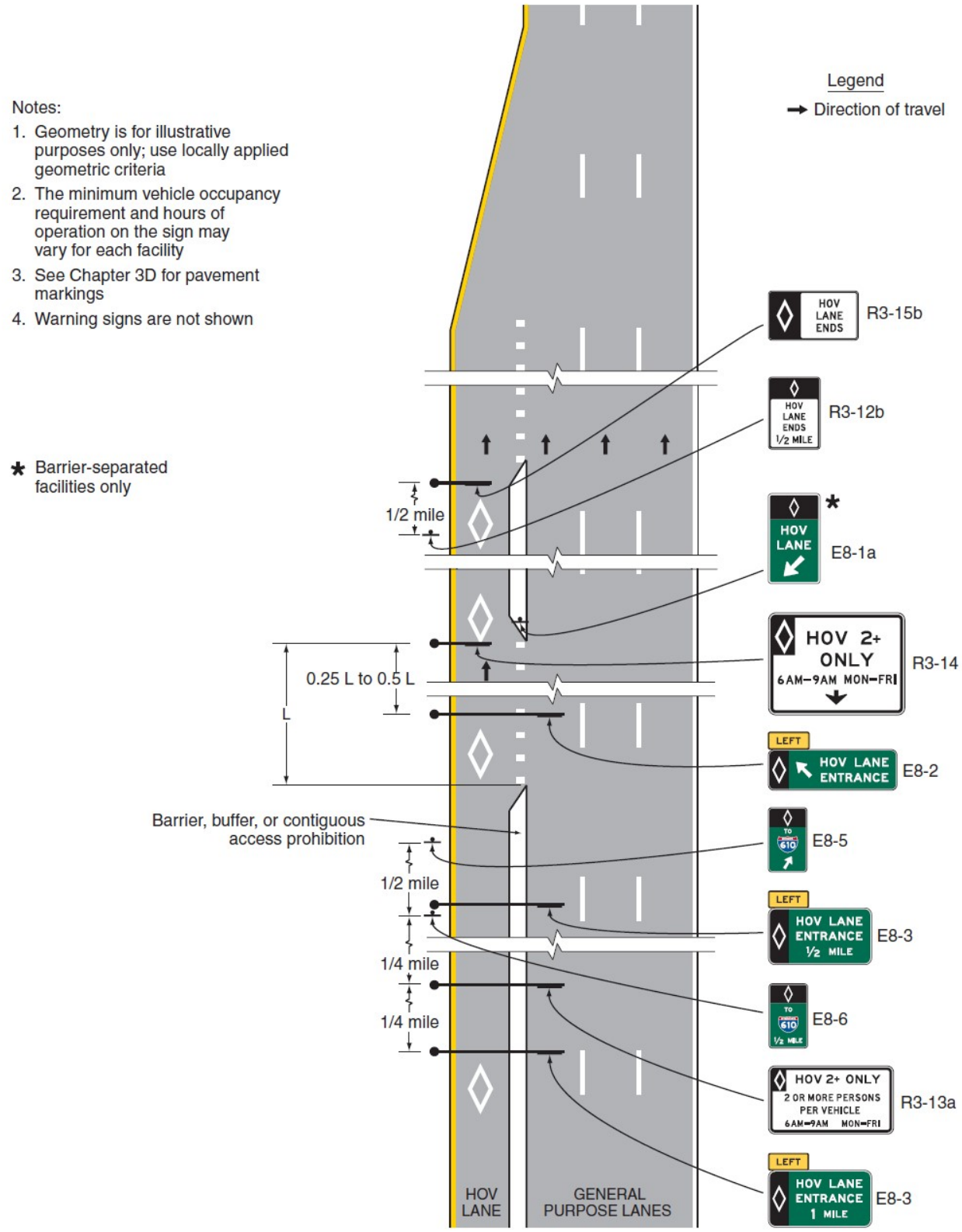
Preferential Lane signs should be designed to avoid information overload for the user. Regulatory signs will have priority over guide signs. The priority order for guide signs is

**Advance Guide**
**Preferential Lane Entrance Direction**
**Preferential Lane Exit Destination supplemental signs.**

For conventional roads, the specific type of Preferential Lane regulatory sign should be based on an engineering study that considers available space, existing adjacent signs, roadway and traffic characteristics, proximity of overhead signs, installation factors of overhead signs, etc.

Please refer to *Chapter 2G – MUTCD* for specific detailed information about Preferential and Managed Lane Signs.

**Figure 2G-10. Example of Signing for the Intermediate Entry to, Egress from, and End of Access-Restricted HOV Lanes**



## GENERAL INFORMATION SIGNS

General Information signs convey different kinds of information that may be of interest to travelers but not directly necessary for guidance. These signs sre sometimes used with recreational and cultural interest area symbol signs.

**Types of General Information Signs**

State lines
City limits
Political boundaries
Time zones
Stream names
Elevations
Landmarks
Geographical interest
Safety
Transportation-related

General Information signs should not be used within a series of guide signs or at critical locations unless there are specific reasons to highlight activities in the public interest. *Designs need to be simple, dignified, compliant with other guide signing, and without advertising.*

**Figure 2H-1. General Information and Miscellaneous Information Signs**


General Information signs have white legends/borders on a green rectangular background. Symbol signs may be supplemented by an educational plaque.

## GENERAL SERVICE SIGNS

General Service signs on conventional roads are used where general services are infrequent and located at intersections/interchanges. These signs are generally inappropriate for major interchanges and urban areas.

General Service signs have white letters, symbols, etc. on a blue background. A maximum of six general services can be displayed on a sign (including supplemental signs or plaques).

States that use General Service signing need to have a policy regarding usage and service availability criteria. The signs should display only services that meet the needs of the road user. General Service signs display one or more of the following services: *Gas, Food, Lodging, Phone, Hospital, 24-Hour Pharmacy, Camping, or Tourist Information.*

## General Service Sign Criteria

**Gas, Diesel, LP Gas, EV Charging, and/or other alternative fuels** if all of the following are available:

- Vehicle services such as gas, oil, and water;
- Modern sanitary facilities and drinking water;
- Continuous operations at least 16 hours per day, 7 days per week; and
- Public telephone.

**Food** if all of the following are available:

- Licensing or approval, where required;
- Continuous operation to serve at least two meals per day, at least 6 days per week;
- Public telephone; and
- Modern sanitary facilities.

**Lodging** if all of the following are available:

- Licensing or approval, where required;
- Adequate sleeping accommodations;
- Public telephone; and
- Modern sanitary facilities.

**Public Telephone** if continuous operation, 7 days per week is available.

**Hospital** if continuous emergency care capability, with a physician on duty 24 hours per day, 7 days per week is available. A physician on duty would include the following criteria and should be signed in accordance with the priority as follows:

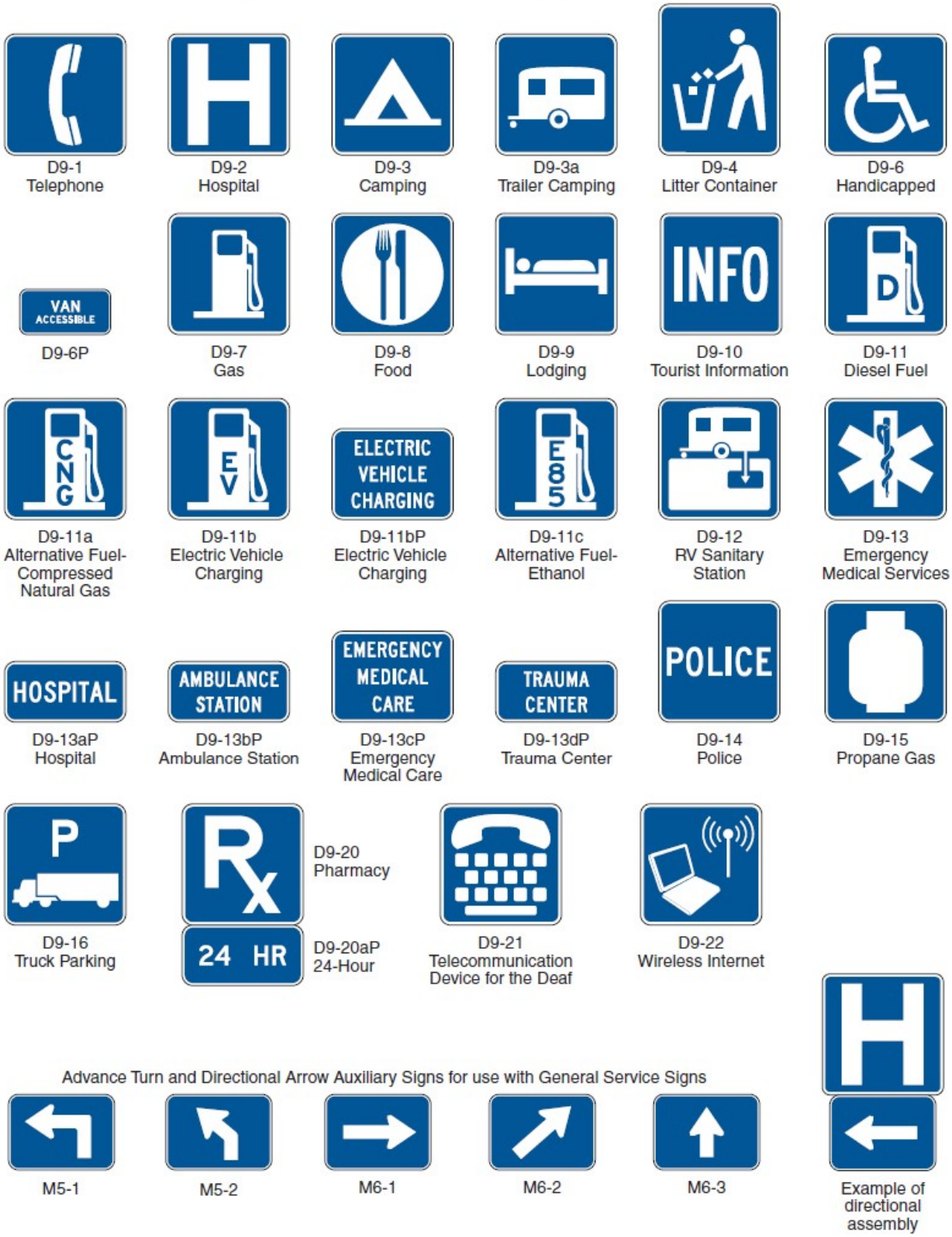
- Physician on duty within the emergency department;
- Registered nurse on duty within the emergency department, with a physician in the hospital on call; or
- Registered nurse on duty within the emergency department, with a physician on call from office
- or home.

**24-Hour Pharmacy** if a pharmacy is open, with a State-licensed pharmacist present and on duty, 24 hours per day, 7 days per week and is located within 3 miles of an interchange on the Federal-aid system.

**Camping** if all of the following are available:

- Licensing or approval, where required;
- Adequate parking accommodations; and
- Modern sanitary facilities and drinking water.

## Figure 2I-1. General Service Signs and Plaques



## SPECIFIC SERVICE SIGNS

Specific Service signs display business identification and directions for services and attractions. These signs are typically used in primarily rural areas or where adequate sign spacing can be maintained.

**Eligible Service Categories**

Gas
Food
Lodging
Camping
Attractions*
24-hour pharmacies**

*Facilities that provide amusement, historical, cultural, or leisure activities to the public
**Distance should not exceed 3 miles from interchange on Federal-aid system

The maximum number of Specific Service signs along an approaching road to an intersection/interchange is limited to **four**. The order of these signs (in direction of traffic) should be

**24-hour pharmacy attraction camping lodging food gas**

A maximum of three service types can be used on any sign/sign assembly – with no service type appearing on more than two signs.

Logos can be either a word message or symbol that must be placed on a separate sign panel attached to a Specific Service sign. These panels plus the amount and height of legend determine sign sizes. Each Specific Service sign is limited to a maximum of six logo sign panels.

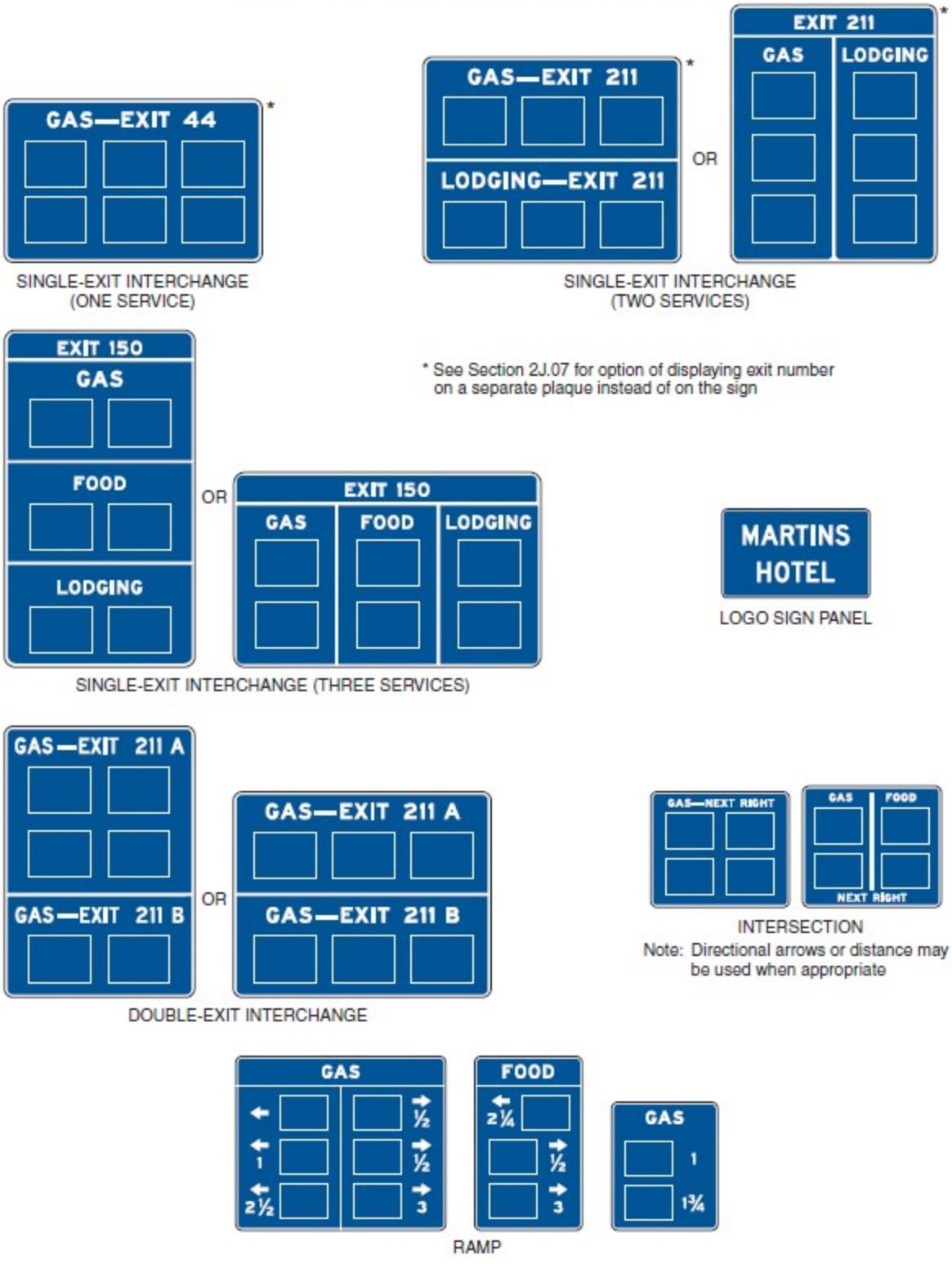
**Logo Sign Sizes**

| | |
|---|---|
| Freeways & expressways | 60” x 36” |
| Conventional roads/ramps | 30” x 18” |

**SPECIFIC SERVICE SIGN POLICY CRITERIA**

- Selection of eligible businesses
- Distances to eligible services
- Usage of Federal/State-approved panels, signs, and legends
- Removal and covering seasonal sign panels
- Use of Specific Service signs in non-rural areas
- Costs to businesses (permits, installation, maintenance, and sign removal)

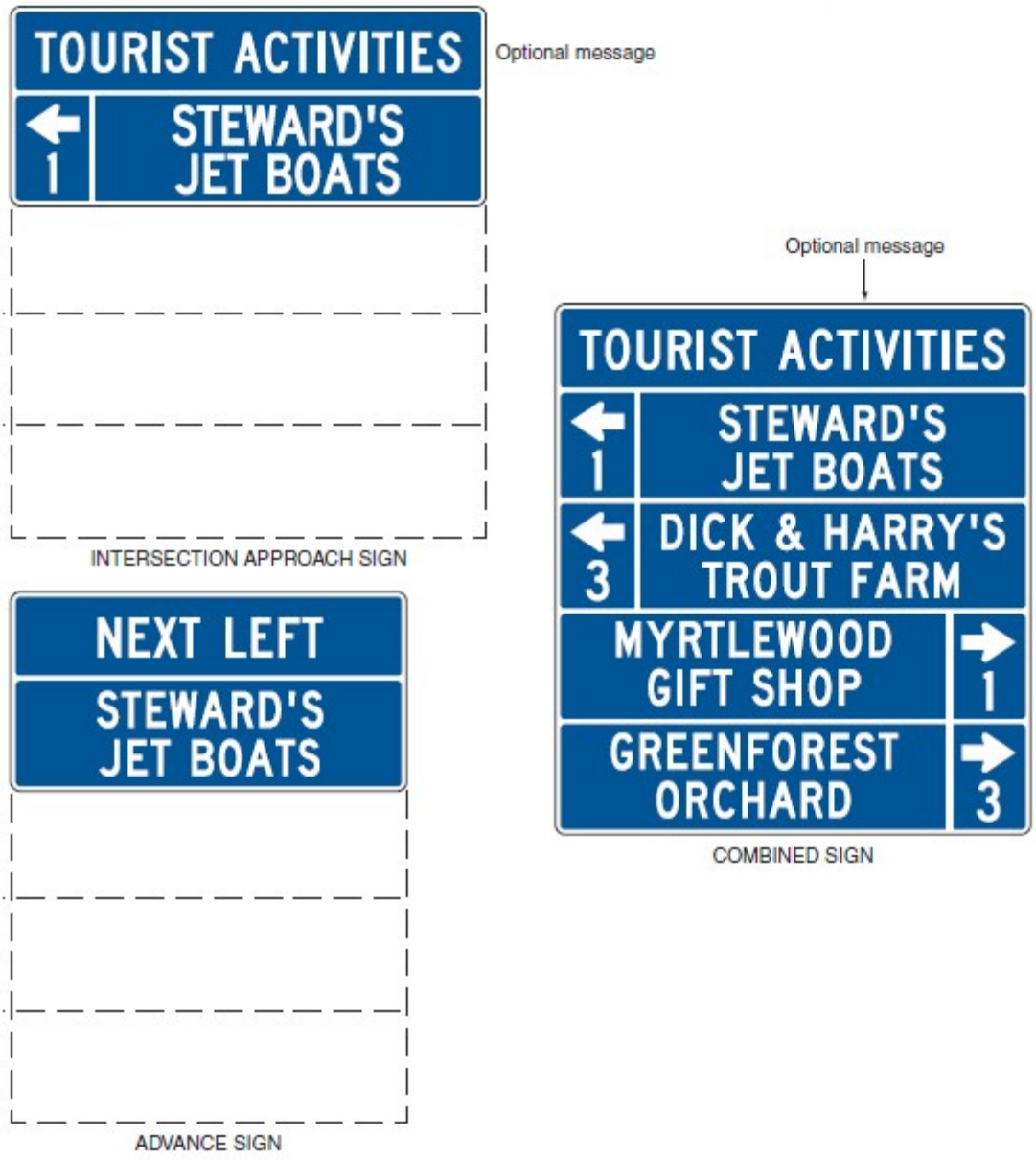
## Figure 2J-1. Examples of Specific Service Signs



## TOURIST-ORIENTED DIRECTIONAL SIGNS

Tourist-Oriented Directional signs (TODs) are guide signs that display business identification and directions for tourist-oriented businesses that attract road users from outside the immediate area. These signs have one or more rectangular sign panels with a white legend and border on a blue background. The legend on each panel is limited to identification and directional information for one eligible business, service, or activity facility – no promotional advertising. Each sign panel may have a maximum two-line legend with a limit of one symbol, separate directional arrow, and distance to facility.

**Figure 2K-1. Examples of Tourist-Oriented Directional Signs**




All letters and numbers on TODs should be upper-case and at least 6 inches in height (exception: logo sign panels).

The maximum height is limited to six feet for Tourist-Oriented Directional signs. Additional height may be needed for optional TOURIST ACTIVITIES messages.

For intersections, approach signs should be placed a minimum of 200 feet in advance and spaced 200 feet apart. Advance signs should be ½ mile from the intersection spaced 500 feet

apart. Advance sign placement priority should show destinations on left, destinations on the right, and last destinations straight ahead.

## CHANGEABLE MESSAGE SIGNS

Changeable Message Signs (CMS) display one or more messages containing traffic operational, regulatory, warning, and guidance information.

**CMS Applications**

Incident management
Adverse weather
Special event information
Roadway control
Travel times
Speed control
Destination guide
Warning situations
Homeland security
AMBER alerts

Changeable Message Signs can be used for multiple locations to address a specific situation. The messages should be consistent throughout the roadway corridor and may require multi-agency coordination.

Safety, transportation-related, emergency homeland security, or AMBER alert messages should be **simple, brief, legible,** and **clear**. Messages should not be used that would adversely affect its purpose.

**Legibility** distance for a sign is the point where its message can be read, whereas **visibility** is the point where the sign is detected. Adverse weather (rain, fog, snow, etc.) can impact the visibility of CMS and reduce legibility distances.
Changeable Message Signs should be visible from ½ mile (both day and night) for roadways with 55 mph speed limits or higher. The minimum legibility distance is **600 feet** for night conditions and **800 feet** for normal daylight conditions.

CMS should have a maximum of three lines of no more than 20 characters per line.

| Spacing | Distance |
|---|---|
| Between word characters | 25 – 40% of letter height |
| Between words | 75 – 100% of letter height |
| Between message lines | 50 – 75% of letter height |

The minimum letter height is 18 inches (45 mph or higher) and 12 inches (less than 45 mph).

For Changeable Message Signs with black backgrounds, the color of the legend should match the background color used on a standard sign for that type (white - regulatory; yellow – warning; orange – temporary traffic control; red – stop/yield; fluorescent pink – incident management; fluorescent yellow-green – bicycle, pedestrian & school warning).

A unit of information is a single answer to a single question used to make a decision (maximum of four words). The number of units determines the maximum length of a message.

Each message should have a maximum of two phases (limited to three lines of text per phase). All phases should be understood separately regardless of sequence.

## Message Design Principles

| | |
|---|---|
| Minimum time for individual phase display | 1 sec/word or 2 sec/unit of information<br>2 second minimum |
| Maximum cycle time (two-phase message) | 8 seconds |
| Duration between two phases | 0.3 seconds maximum |

Three units of information maximum per phase
Four units of information maximum for 35 mph or more
Five units of information maximum for less than 35 mph
One unit of information per line of CMS
Compatible units of information should be displayed on same phase

**Table 2L-1. Example of Units of Information**

| Question | Answer | Number of Information Units |
|---|---|---|
| What happened? | MAJOR CRASH | 1 |
| Where? | AT EXIT 12 | 1 |
| Who is the advisory for? | Drivers Heading TO NEW YORK | 1 |
| What is advised? | USE ROUTE 46 | 1 |

Note: The following is an example of a two-phase message that could be developed from the four information units shown in this table:


Phase 1 Phase 2

## EMERGENCY MANAGEMENT

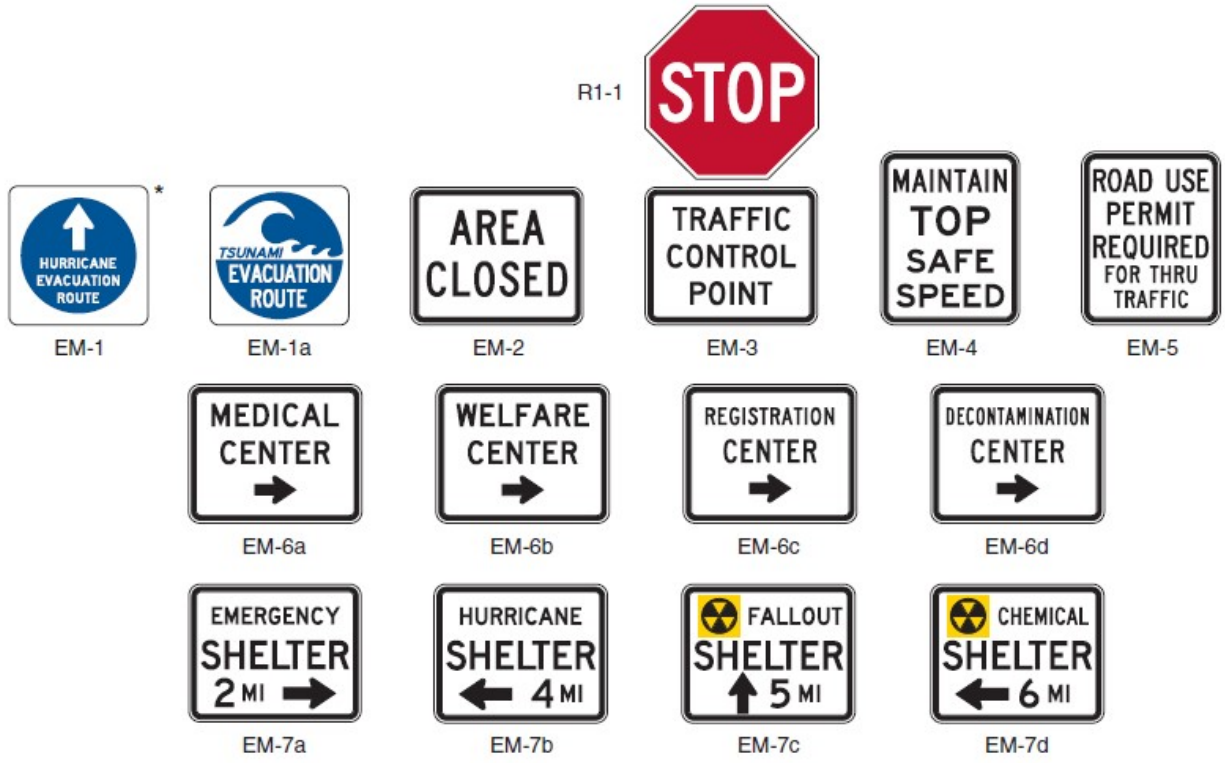
Emergency Management signs are used during a disaster or emergency to direct roadway traffic. State and local authorities are responsible for contingency plans in the event of an emergency evacuation.

**Contingency Plan Elements**

- Controlled operation of designated highways
- Established traffic operations for expediting vehicles
- Provision for emergency civilian aid centers

Since a large quantity of Emergency Management signs may be required during an emergency, weight and economic factors should be considered. These signs need to have a retroreflective background and should not permanently replace any applicable standard signs (see *Chapter 2N – MUTCD*).

Figure 2N-1. Emergency Management Signs




* HURRICANE is an example of one type of evacuation route. Legends for other types may also be used, or this line of text may be omitted.

**Non-Traffic Control Devices**

Non-traffic control devices are signs or markers that do not regulate, warn, or guide traffic. These devices include signs with non-traffic regulations (i.e. leash laws) and devices like fire hydrant markers or culvert markers. Civic group signs (Rotary Clubs, etc.) also fall into this category.

Non-traffic control devices should be prevented from interfering with official traffic control devices. These devices should be installed on crashworthy signposts to prevent the creation of a hazard to the traveling public.

# SUMMARY

Traffic signs are critical tools that convey regulations, traffic, roadway conditions, and other important information. These devices allow users to travel safely on any U.S. roadway. The goal of traffic control is to provide drivers with relevant information when they need it.

The overall objective of this course was to give engineers and designers an in-depth look at roadway traffic signs selection and design principles. The *Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) 2009 Edition* was used to explain the fundamental design principles of traffic signs. This text is the recognized **national standard** for all traffic control devices installed on any road or bikeway.

This course was the second of two and focused on curve warning signs through emergency management signage. Its contents were intended to serve as guidance and not as an absolute rule. It was written to help you learn to use the MUTCD more effectively for establishing roadway traffic control using roadway traffic signs.

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(Note: All figures, tables, exhibits, etc. contained in this course are from the MUTCD, except where noted otherwise.)