DYNAMIC MESSAGE SIGN (DMS) OPERATIONS MANUAL

The New Mexico Department of Transportation (NMDOT) has developed a Dynamic Message Sign (DMS) Operations Manual to standardize the operation and the placement of messages on the DMSs statewide. The DMSs are being deployed along the New Mexico Roadway system to increase the efficiency and safety of the transportation system within the state.

It is the responsibility of the NMDOT to ensure that the DMSs are operated in an effective manner and that the messages are in compliance with state, federal, and other national standards.

The function of DMSs are to inform motorists of road and traffic conditions, primarily as it relates to incidents and weather related events. In addition to this, consideration has been given to the intermittent posting of safety related, public service messages specific to transportation initiatives. This manual will describe the type and duration in which these messages will be allowed to be displayed.

Tom Church, Interim Cabinet Secretary

Date

3/4/13
VERSION CONTROL PAGE

Table Of Revisions

<table>
<thead>
<tr>
<th>Version Number</th>
<th>Revision Number</th>
<th>Revision Date</th>
<th>Revised Page Numbers</th>
</tr>
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<tr>
<td>1.1</td>
<td>1</td>
<td>March 1, 2013</td>
<td>Signature Page, 94, 95</td>
</tr>
</tbody>
</table>

Versions of this Manual are numerically documented with a single decimal point, for example as Version 1.0 which would be the initial version of the DMS Manual. Version control takes into account both minor and major changes that occur in the Manual. Minor changes are denoted as changes represented by numerical progressions after the decimal point, or namely 1.1, 1.2, 1.3 and so on. Minor changes would occur for example with changes to DMS deployments (numbers and or locations). Major changes are denoted as changes represented by numerical progressions before the decimal point, namely 2.0, 3.0, and so on. Major changes would occur, for example, with any changes with federal regulations affecting DMS operations or with the adoption of new platforms or policies that aren’t addressed in the current version of the Manual, (for example use of full color symbols for message sets, sharing DMS control with other entities, ....)
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Memo B (M.B) Memorandum on the Use of Changeable Message Signs
Memo C (M.C) Memorandum on Safety Message Signs Interpretation ("Click it or Ticket" Signs)
Memo D (M.D) Memorandum on AMBER Alert Use of Changeable Message Sign (CMS)
Memo E (M.E) Memorandum on Use of Changeable Message Sign (CMS) for Emergency Security Messages
Memo F (M.F) Memorandum on Dynamic Message Sign (DMS) Recommended Practice and Guidance
Memo G (M.G) FHWA Work Zone Safety and Mobility Final Rule

Appendices (Electronic File Only)
Electronic Federal B (EF.B) Impacts of Using Dynamic Features to Display Messages on Changeable Message Signs - Publication No. FHWA-HOP-05-069
Electronic New Mexico A (EN.A) Strategic ITS Plan for the State of New Mexico State RFP 06-24 ITS Architecture Development
Electronic New Mexico B (EN.B) Memorandum on the Use of Portable Variable Message Signs on NMDOT Right-of-Way (R/W) within District Three
Electronic State A (ES.A) Arizona Department of Transportation Guidelines on the Use of Permanent Variable Message Signs
Electronic State B (ES.B) Colorado Department of Transportation Variable Message Signs Committee
Electronic State C (ES.C) Ohio DOT Dynamic Message Sign Policy for Ohio Freeway Management System Projects
Electronic State D (ES.D) PennDOT Dynamic Message Signs Operating Guidelines
Electronic State F (ES.F) Virginia Changeable Message Sign Usage Procedure
Common Terms and Acronyms

DMSs, Changeable Message Signs (CMSs) and Variable Message Signs (VMSs) have subtle differences. In practice, these terms have become interchangeable. For the purpose of this manual, the term DMS will be used to describe a traffic control device whose message can be changed manually, electrically, mechanically, or electromechanically to provide motorists with information about traffic congestion, traffic crashes, maintenance operations, construction operation, adverse weather conditions, or other highway conditions or features. The most common types of DMSs are:

- Permanent mount DMS (often referred to as VMS) – DMS mounted to sign structures, pedestals, cantilevers, etc. Typically includes remote communication to the location.

- Semi-permanent DMS (often referred to as semi-permanent CMS or VMS) – Portable DMS secured permanently on a concrete pad. Typically includes remote communication to the location.

- Portable DMS (often referred to as CMS) – Portable DMS placed at locations for temporary usages. Typically requires programming of messages in the field; however more and more Portable DMSs come with remote communications capabilities.

Below is list of common acronyms used throughout this manual.

<table>
<thead>
<tr>
<th>Common Acronyms</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMBER</td>
<td>America's Missing: Broadcast Emergency Response</td>
</tr>
<tr>
<td>AVI</td>
<td>Automatic Vehicle Identification</td>
</tr>
<tr>
<td>AVL</td>
<td>Automatic Vehicle Location</td>
</tr>
<tr>
<td>CCTV</td>
<td>Closed-circuit Television</td>
</tr>
<tr>
<td>CMS</td>
<td>Changeable Message Sign</td>
</tr>
<tr>
<td>DMS</td>
<td>Dynamic Message Sign</td>
</tr>
<tr>
<td>DOT’s</td>
<td>Departments of Transportation</td>
</tr>
<tr>
<td>EAS</td>
<td>Emergency Alert System</td>
</tr>
<tr>
<td>EMA</td>
<td>Emergency Management Agency</td>
</tr>
<tr>
<td>FHWA</td>
<td>Federal Highway Administration</td>
</tr>
<tr>
<td>GPS</td>
<td>Global Positioning System</td>
</tr>
<tr>
<td>HAR</td>
<td>Highway Advisory Radio</td>
</tr>
<tr>
<td>ITS</td>
<td>Intelligent Transportation Systems</td>
</tr>
<tr>
<td>LED</td>
<td>Light Emitting Diode</td>
</tr>
<tr>
<td>MUTCD</td>
<td>Manual on Uniform Traffic Control Devices</td>
</tr>
<tr>
<td>NMDOT</td>
<td>New Mexico Department of Transportation</td>
</tr>
<tr>
<td>PDMS</td>
<td>Portable Dynamic Message Sign</td>
</tr>
<tr>
<td>PVMS</td>
<td>Portable Variable Message Sign</td>
</tr>
<tr>
<td>TMC</td>
<td>Transportation Management Center</td>
</tr>
<tr>
<td>VMS</td>
<td>Variable Message Sign</td>
</tr>
</tbody>
</table>
Summary of DMS Operations Key Points

The purpose of New Mexico Department of Transportation’s Dynamic Message Sign Operations Manual is to establish the policy and procedures for the use of Dynamic Message Signs (DMSs) and Portable Dynamic Message Signs (PDMSs) throughout the state of New Mexico. It also ensures DMS messages are used to inform and direct motorists of situations in a uniform, consistent, and orderly manner.

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The following information is a summary of key points contained in the New Mexico Department of Transportation’s Dynamic Message Sign Operations Manual. Additional detail is included in subsequent sections.

Deployment Rationale

- In general, DMSs should be permanently installed at the following locations:
  - Upstream from major decision points (e.g., exit ramps, freeway-to-freeway interchanges, or the intersection of major routes that will allow drivers to take an alternate route).
  - Upstream of bottlenecks, high-accident areas, and/or major special event facilities (e.g., stadiums, convention centers).
  - Where regional information concerning weather conditions such as snow, ice, fog, wind, or dust is essential.

- Current NMDOT specifications require full matrix DMS installations.

Usage and Priorities

- Used effectively, DMSs will provide changing – but specific information to the driver. For example:
To be effective, DMSs must provide timely, reliable, accurate and relevant information and they must be operated properly. Never display specific traffic information before it has been verified.

Federal DMS operations dictate that:

- DMSs shall display pertinent traffic operational and guidance information only and not advertising.
- The use of DMSs for the display of general public information or other nonessential messages is discouraged.
- The display of safety messages associated with a safety campaign is allowable under the current MUTCD, as long as it conforms to sign design, location, and spacing requirements and does not block other regulatory, guide and/or warning signs.
- AMBER Alert or child abduction messages can be displayed on DMSs.
- Emergency or security alert messages can be displayed on DMSs if public agencies have developed policies and procedures that govern the messages.

NMDOT personnel have responsibility for the operation of DMSs on roadways under the jurisdiction of the NMDOT. The District Traffic Engineer or their designee has final authority for approving the placement and removal of messages on all DMSs on roadways in that District. The ITS Bureau Chief or his designee as well as the Transportation Management Center (TMC) Dispatch Lead Workers have working responsibility to ensure authorized and approved messages are posted.
Prohibited uses for DMS include: static messages, advertising messages, general public service announcement (PSA) contact information and date and time. General (non-safety) Prohibited PSA announcements include messages on community involvement, education, health and non-traveler related safety. Examples include “DONATE BLOOD,” “ROCK THE VOTE,” “FOOD DRIVE,” etc.

DMS Operations

Continuous record keeping of the use of DMSs during incidents, roadwork, inclement weather, special events, etc. will be useful in documenting the benefits of the DMS system.

DMSs should always be used with a specific purpose or objective in mind.

Two simple questions should be asked when determining which DMS should be activated:

- Is the expected duration of the incident or lane closure longer than the expected travel time from that DMS to the incident or lane closure?
- Are there a significant number of motorists traveling past the DMS who are destined for the incident or lane closure location?

If the answer to either of these questions is “no,” the DMS is probably not appropriate to activate for that situation.

Unfortunately, motorists are not equipped to perceive, process, and remember a large amount of information at one time. The job of the TMC Dispatch Lead Workers is to decide what information is most important and how to present that information on a DMS in a way that maximizes motorist understanding and encourages them to take appropriate actions.

DMS Message Design

Message design involves recognition of the basic principles for the following:

- Message Content refers to specific information displayed on a DMS.
- Message Length refers to either the number of words or the number of characters and spaces in a DMS message.
- Unit of Information (Informational Unit) refers to the answer to a question a motorist might ask.
- Message Load refers to the amount of information in the total message.
- Message Format refers to the order and arrangement of the units of information on a DMS.

- Messages should be limited to two panels (or phases) unless approved by the District Traffic Engineer and/or the ITS Manager (or their designees). A panel should be limited to no more than 3 units of information.

- DMS Messages should adhere to the following guidelines whenever possible.
  - No more than 5 units of information (total all panels) for operating speeds less than 35 mph.
  - No more than 4 units of information (total all panels) for operating speeds of 35 mph or more.

**Example (less than 35 mph):**

<table>
<thead>
<tr>
<th>Message Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel 1 (or Phase 1)</td>
</tr>
<tr>
<td>Panel 2 (or Phase 2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Units of Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What happened?</td>
</tr>
<tr>
<td>2. Where?</td>
</tr>
<tr>
<td>3. What effect on traffic?</td>
</tr>
<tr>
<td>4. Who is advisory for?</td>
</tr>
<tr>
<td>5. What is advised?</td>
</tr>
</tbody>
</table>

**Message Load** = 5 Units

**Message Length** = 10 words or 46 characters/spaces

**Example (35 mph or greater):**

<table>
<thead>
<tr>
<th>Message Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel 1 (or Phase 1)</td>
</tr>
<tr>
<td>Panel 2 (or Phase 2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Units of Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What happened/where?</td>
</tr>
<tr>
<td>2. What effect on traffic?</td>
</tr>
<tr>
<td>3. Who is advisory for?</td>
</tr>
<tr>
<td>4. What is advised?</td>
</tr>
</tbody>
</table>

**Message Load** = 4 Units

**Message Length** = 8 words or 42 characters/spaces
- At higher speeds, avoid longer messages that cannot be fully read:
  - 8 words per panel at 55 mph
  - 7 words per panel at 65 mph
  - 6 words per panel at 70 mph
- If possible, words should be spelled out to provide clarity and understanding. However, because of the limitations associated with the DMS display, the operator may occasionally need to shorten the message by using abbreviations so that relevant information can fit the allowable space.
- DMS messages should not be displayed with single flashing lines.
- Alternating line messages should not be displayed.
- Graphics consistent with the MUTCD can be used on a full-matrix DMS with a pixel resolution that allows clear display of the graphics.
1 Introduction

1.1 Purpose of the Manual

The purpose of New Mexico Department of Transportation’s Dynamic Message Sign Operations Manual is to establish the policy and procedures for the use of DMSs and PDMSs throughout the state of New Mexico. It also ensures DMS messages are used to inform and direct motorists of situations in a uniform, consistent, and orderly manner. The manual details:

- Operations Policies and Regulations
- Messaging Priorities
- Operating Fundamentals
- Message Design
- Operating Examples.

This manual also defines uses of messages which are prohibited.

DMSs are a valuable resource for the New Mexico Department of Transportation (NMDOT). DMS messages are for the purpose of traffic control, traffic incident management and timely traveler information; therefore, the guidelines set forth in this manual should be adhered to in order to provide clear and consistent information to the motoring public.
1.2 DMS Technology Overview

1.2.1 Categories

DMSs are classified into the following three different categories:

- **Light-Reflecting** - This type of DMS (e.g., reflective disk, rotating drum) reflects light from some external light source such as vehicle headlights or the sun. This sign needs power only when the message is changed or for the operation of environmental equipment such as fans and heaters.

- **Light-Emitting** - This type of DMS generates its own light on or behind the viewing surface, requiring power at all times when a message is displayed. The more common types of light-emitting DMSs are bulb matrix, fiber-optic matrix, and light-emitting diode (LED) matrix. NMDOT uses primarily LED DMS.

- **Hybrid** - This type of DMS combines the technologies of the two aforementioned DMSs; for example, some manufacturers have integrated fiber-optic or LED with reflective disk matrix technologies.

Currently, NMDOT only has light-emitting DMSs in its inventory.

1.2.2 Display Format

DMSs display characters and symbols in a matrix format, which are generally designed in the following three patterns:

- **Character Matrix** - In this format, each character of the desired message is composed of a 5 X 7 matrix of pixels. The number of characters per line varies, depending on the manufacturer and the desired usage, although most transportation agencies deploy three-line, 18-character DMSs. Practically all highway DMSs display messages which use capital letters because the configuration of the 5 X 7 matrix does not lend itself to displaying lower-case letters.

- **Line Matrix** - In this format, the display lines are separate from each other, with each line consisting of continuous matrix of pixels, as shown below.
- Full Matrix - In this format, the entire display consists of continuous matrix of pixels, as shown below.

NMDOT specifications call for full matrix displays on DMSs used throughout the state.

**Key Point**

Current NMDOT specifications require full matrix DMS installations.
1.3 Overview of DMS Deployments

1.3.1 Deployment Philosophy

The most critical locations for installing permanent DMSs are in advance of interchanges or highways where drivers can have the opportunity to take some action in response to messages displayed on the DMS. A DMS should not compete with existing roadway signs. At the time of installation, relocation of some static signs may be required in order to install a DMS at a critical location.

Generally, motorists do not anticipate using a different route until they see and read a DMS message. Motorists who are traveling in the inside lanes need ample time to read the message and change lanes to exit.

In general, DMSs should be permanently installed at the following locations:

- Upstream from major decision points (e.g., exit ramps, freeway-to-freeway interchanges, or the intersection of major routes that will allow drivers to take an alternate route).
- Upstream of bottlenecks, high-accident areas, and/or major special event facilities (e.g., stadiums, convention centers).
- Where regional information concerning weather conditions such as snow, ice, fog, wind, or dust is essential.

1.3.2 Existing Permanent DMS Deployments

DMSs currently exist predominantly in the Albuquerque area along I-40 and I-25. The following table provides information on existing DMS deployments currently on-line along with proposed DMS deployments that are currently under construction or will be in the near future:

<table>
<thead>
<tr>
<th>Route</th>
<th>Location</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-25 NB</td>
<td>Rio Grande – MP 214</td>
<td>ADDCO Roadside</td>
</tr>
<tr>
<td>I-25 NB</td>
<td>Sunport – MP 221</td>
<td>Adaptive Overhead</td>
</tr>
<tr>
<td>I-25 SB</td>
<td>Sunport – MP 221</td>
<td>Adaptive Overhead</td>
</tr>
<tr>
<td>I-25 NB</td>
<td>Central – MP 224</td>
<td>Adaptive Overhead</td>
</tr>
<tr>
<td>I-25 SB</td>
<td>Lomas – MP 225</td>
<td>Adaptive Overhead</td>
</tr>
<tr>
<td>I-25 NB</td>
<td>Comanche – MP 228</td>
<td>ADDCO Roadside</td>
</tr>
<tr>
<td>I-25 NB</td>
<td>Paseo Del Norte – MP 232</td>
<td>Skyline Overhead</td>
</tr>
<tr>
<td>I-25 SB</td>
<td>Tramway – MP 233</td>
<td>ADDCO Roadside</td>
</tr>
<tr>
<td>I-25 SB</td>
<td>Bernalillo – MP 244</td>
<td>ADDCO Roadside</td>
</tr>
</tbody>
</table>
## DMS Deployment Table

<table>
<thead>
<tr>
<th>Route</th>
<th>Location</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-25 SB</td>
<td>NM 599 – MP 276</td>
<td>ADDCO Portable</td>
</tr>
<tr>
<td>I-25 SB</td>
<td>San Antonio – MP 231</td>
<td>ADDCO Roadside</td>
</tr>
<tr>
<td>I-40 EB</td>
<td>West Gallup – MP 16</td>
<td>Skyline Overhead</td>
</tr>
<tr>
<td>I-40 WB</td>
<td>East Gallup – MP 26</td>
<td>Skyline Overhead</td>
</tr>
<tr>
<td>I-40 EB</td>
<td>Paseo del Volcan – MP 148</td>
<td>Proposed Overhead</td>
</tr>
<tr>
<td>I-40 EB</td>
<td>W 98th – MP 151</td>
<td>Skyline Overhead</td>
</tr>
<tr>
<td>I-40 WB</td>
<td>W 98th – MP 151</td>
<td>Skyline Overhead</td>
</tr>
<tr>
<td>I-40 EB</td>
<td>Unser – MP 154</td>
<td>ADDCO Roadside</td>
</tr>
<tr>
<td>I-40 WB</td>
<td>Rio Grande – MP 157A</td>
<td>Skyline Overhead</td>
</tr>
<tr>
<td>I-40 EB</td>
<td>Carlisle – MP 160</td>
<td>Proposed Overhead</td>
</tr>
<tr>
<td>I-40 WB</td>
<td>Washington – MP 161</td>
<td>Proposed Overhead</td>
</tr>
<tr>
<td>I-40 EB</td>
<td>San Pedro – MP 162</td>
<td>Adaptive Overhead</td>
</tr>
<tr>
<td>I-40 EB</td>
<td>Pennsylvania – MP 163</td>
<td>Adaptive Overhead</td>
</tr>
<tr>
<td>I-40 WB</td>
<td>Lomas – MP 165</td>
<td>Proposed Overhead</td>
</tr>
<tr>
<td>I-40 WB</td>
<td>Carnuel – MP 170</td>
<td>ADDCO Roadside</td>
</tr>
<tr>
<td>I-40 WB</td>
<td>Moriarty – MP 196</td>
<td>ADDCO Portable</td>
</tr>
<tr>
<td>I-40 WB</td>
<td>Tijeras – MP 275</td>
<td>Proposed Overhead</td>
</tr>
<tr>
<td>Coors NB</td>
<td>Fortuna – MP 13</td>
<td>Skyline Overhead</td>
</tr>
<tr>
<td>Coors SB</td>
<td>St. Josephs – MP 15</td>
<td>Skyline Overhead</td>
</tr>
<tr>
<td>Louisiana NB</td>
<td>Constitution – S of I-40</td>
<td>Adaptive Overhead</td>
</tr>
<tr>
<td>Louisiana SB</td>
<td>Indian School – N of I-40</td>
<td>Adaptive Overhead</td>
</tr>
<tr>
<td>NM 47 NB</td>
<td>Isleta – MP 40</td>
<td>ADDCO Roadside</td>
</tr>
<tr>
<td>NM 528 WB</td>
<td>Enchanted Hills – MP 15</td>
<td>ADDCO Roadside</td>
</tr>
<tr>
<td>San Mateo NB</td>
<td>Haines – S of I-40</td>
<td>Proposed Overhead</td>
</tr>
<tr>
<td>San Mateo SB</td>
<td>Cutler – N of I-40</td>
<td>Proposed Overhead</td>
</tr>
<tr>
<td>Unser NB</td>
<td>Los Volcanes – S of I-40</td>
<td>Proposed Overhead</td>
</tr>
<tr>
<td>Unser SB</td>
<td>Ladera – N of I-40</td>
<td>Proposed Overhead</td>
</tr>
<tr>
<td>US 70 EB</td>
<td>Organ – MP 155</td>
<td>Skyline Overhead</td>
</tr>
<tr>
<td>US 550 EB</td>
<td>Sprint – MP 3</td>
<td>ADDCO Roadside</td>
</tr>
</tbody>
</table>

Statewide and Albuquerque Metropolitan DMS deployment maps are provided on the next two pages. A detailed index of existing Albuquerque Metropolitan DMS deployments is contained in Appendix M.A.
1.4 DMS Primer

DMSs are a valuable and effective traffic control tool for managing construction and maintenance activities as well as for providing traveler information. However, care must be taken that DMSs are not used for advertising.

DMSs are able to convey variable information, often in near real-time, which make them more effective in presenting information on changing traffic conditions. It has been determined that motorists are less frustrated and aggravated when they are provided with information on the location of congestion and the expected length of delay to be encountered. This in itself tends to increase the safety and comfort of their trips as well as improve the overall efficiency of the system.

Used effectively, DMSs will provide changing – but specific information to the driver. For example:

A roadway problem
The approximate location
The instruction to the motorist

A DMS can be utilized to notify the traveling public about several possible roadway elements. These elements include:

- Incident Management
- Emergency Alerts
- Traveler Information
  - Travel Times
  - Recurring and Nonrecurring Congestion
  - Driving and Road Conditions (especially related to adverse weather)
- Construction and Maintenance Activities

This manual sets forth the basic principles governing the use of DMS messages. As stated in the MUTCD Section 1A.02, DMS messages should meet the following requirements:

- Fulfill a need
- Command attention
- Convey a clear, simple meaning
Dynamic Message Sign
Operations Manual

- Command respect of road users
- Give adequate time for proper response

The first rule of good DMS operation is that specific traffic information (e.g., crashes) should not be displayed before it has been verified.

For example:

- Does the DMS operator know there was a crash?
- Does he/she know where it occurred?
- Does he/she know how many lanes are closed?
- Does he/she know if a specific route for diversion can handle the capacity?

It is the responsibility of the DMS operator to ensure that the motorists respect the DMS and continue to have confidence in them.

Each DMS message shall be displayed for a specific purpose such as those provided in this manual. DMS messages requested for roadway conditions or restrictions should be removed immediately when those conditions cease to exist or the restrictions are withdrawn.

To be effective, DMS must provide **timely, reliable, accurate and relevant** information and they must be operated properly. An important consideration in properly operating a DMS system is to maintain credibility. Regardless of how well a message is designed, there is a risk of motorists distrusting the signing system if the messages are not changed at the correct times and updated to reflect current traffic conditions. Each time the information displayed is disproved, the credibility of the system decreases. Eventually motorists ignore the messages and the DMS system is in jeopardy.
## 1.5 Resources and References

The following resources and references were utilized in the development of this manual.

<table>
<thead>
<tr>
<th>Reference</th>
<th>Description</th>
<th>Electronic Appendix</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Federal Resources</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changeable Message Sign Operation and Messaging Handbook</td>
<td>The Changeable Message Sign Operation and Messaging Handbook is written for personnel in state, regional, and local transportation agencies that have responsibility for the operation of and/or message design for large permanent changeable message signs (CMSs) or portable CMSs. The Handbook is designed to help both new and experienced users of CMSs at various levels of the agency including a) entry level personnel, b) personnel very experienced with traffic operations, and c) managers. It provides very specific information for entry-level personnel, reminders for experienced personnel, and higher-level information for managers regardless whether or not they work in one of the traffic management centers in the state.</td>
<td>EF.A</td>
</tr>
<tr>
<td>Impacts of Using Dynamic Features to Display Messages on Changeable Message Signs</td>
<td>The objective of the research effort documented in this report was to conduct human factors driving simulator studies to determine the effects on motorists of the following three types of changeable message sign (CMS) dynamic display features: 1) flashing an entire one-phase message; 2) flashing one line of a one-phase message; and 3) alternating text on one line of a three-line CMS while keeping the other two lines of text constant on the second phase of the message thus displaying redundant information. Guidelines emanating from this research and recommendations for changes/additions to the existing sections of the Manual on Uniform Traffic Control Devices are documented.</td>
<td>EF.B</td>
</tr>
<tr>
<td>Freeway Management and Operations Handbook</td>
<td>This document is the third such handbook for freeway management and operations. It is intended to be an introductory manual – a resource document that provides an overview of the various institutional and technical issues associated with the planning, design, implementation, operation, and management of a freeway network. The goal is to provide the user with a better understanding the wide variety of potential strategies, tools, and technologies that may be used to support management and operation of the freeway network.</td>
<td>EF.C</td>
</tr>
<tr>
<td><strong>Resources from Other States</strong></td>
<td></td>
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<tr>
<td>Arizona Department of Transportation Guidelines on the Use of Permanent Variable Message Signs</td>
<td>Operating policies, priorities and guidelines for dynamic message sign usage in other states.</td>
<td>ES.A</td>
</tr>
<tr>
<td>Colorado Department of Transportation Variable Message Signs Committee</td>
<td></td>
<td>ES.B</td>
</tr>
<tr>
<td>Ohio DOT Dynamic Message Sign Policy for Ohio Freeway Management System Projects</td>
<td></td>
<td>ES.C</td>
</tr>
<tr>
<td>PennDOT Dynamic Message Signs Operating Guidelines</td>
<td></td>
<td>ES.D</td>
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**Resources from Other States (cont.)**
<table>
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<tr>
<th>Reference</th>
<th>Description</th>
<th>Electronic Appendix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Texas Dynamic Message Sign Message Design and Display Manual March 2004</td>
<td>Operating policies, priorities and guidelines for dynamic message sign usage in other states.</td>
<td>ES.E</td>
</tr>
<tr>
<td>Virginia Changeable Message Sign Usage Procedure February 2004</td>
<td></td>
<td>ES.F</td>
</tr>
<tr>
<td><strong>Resources from New Mexico</strong></td>
<td></td>
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</tr>
<tr>
<td>Strategic ITS Plan for the State of New Mexico State RFP 06-24 ITS Architecture Development September 25, 2007</td>
<td>The ITS Strategic Plan for the State of New Mexico describes the statewide vision and direction for ITS in New Mexico. It provides planning level information for the purpose of informing the public and transportation constituencies about the proposed ITS deployment activities within the state. It provides not only a description of the planned ITS projects, but connects these projects to a planning framework for deployment and the projects are traced to the New Mexico Statewide ITS Architecture, also developed under this contract. This plan is intended for stakeholders involved in transportation planning or in the development of transportation projects with ITS elements.</td>
<td>EN.A</td>
</tr>
<tr>
<td>Memorandum on The Use of Portable Variable Message Signs on NMDOT Right-of-Way (R/W) within District Three August 14, 2007</td>
<td>Defines operating policies, priorities and guidelines for the use of portable variable message signs on NMDOT Right-of-Way (R/W) within District Three.</td>
<td>EN.B</td>
</tr>
</tbody>
</table>
1.6 Acknowledgements

This manual was developed under the direction of the following individuals:

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D 3 ADE – Engineering Support 
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(505) 841-2761 
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NMDOT, ITS-TMC 
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Albuquerque, NM 87102 
(505) 222-6554 
charles.remkes@state.nm.us

Any questions or comments regarding the content of this manual should be directed to Mr. Tony Abbo or Mr. Charles Remkes.

This manual was developed with the assistance of Gannett Fleming West, Inc.

1.7 Disclaimer

This manual was developed utilizing existing guidance on DMS operations and common engineering resources. Engineering judgment was applied where appropriate. Due to periodic changes in regulations, national guidelines and resources should be consulted periodically.
2 DMS Operations Policies

2.1 National Policies

There are no written DMS operations policies at the national level. However, policies, standards, and guidance are embodied in the MUTCD and in FHWA Policy Memorandums. In summary, Federal policies dictate that:

1. DMSs shall display pertinent traffic operational and guidance information only and not advertising.
2. The use of DMSs for the display of general public information or other nonessential messages is discouraged.
3. The display of safety messages associated with a safety campaign is allowable under the current MUTCD, as long as it conforms to sign design, location, and spacing requirements and does not block other regulatory, guide and/or warning signs.
4. AMBER Alert or child abduction messages can be displayed on DMSs if:
   a. It is part of a well-established local AMBER Plan Program, and
   b. Public agencies have developed a formal policy that governs the operation and messages that are displayed on DMSs.
5. Emergency or security alert messages can be displayed on DMSs if public agencies have developed policies and procedures that govern the messages.

<table>
<thead>
<tr>
<th>Description of Policy</th>
<th>Key Points</th>
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</thead>
</table>
| Manual on Uniform Traffic Control Devices | - Section 2A.07 of the Manual on Uniform Traffic Control Devices (MUTCD) requires that DMSs shall conform to the principles established in the MUTCD related to the use of signs within the right-of-way of all classes of public highways, and to the extent practical, the design and applications prescribed in Sections 6.F.02 and 6F.52.
- Section 2E.21 of the MUTCD specifies that, “Changeable message signs shall display pertinent traffic operational and guidance information only, not advertising”. |
<table>
<thead>
<tr>
<th>Description of Policy</th>
<th>Key Points</th>
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</table>
| Memorandum on the Use of Changeable Message Signs | ▪ Supports the use of DMSs as a traffic control device to safely and efficiently manage traffic by informing motorists of roadway conditions and required actions to perform.  
▪ “Appropriate use of a CMS and other types of real-time displays should be limited to managing travel, controlling and diverting traffic, identifying current and anticipated roadway conditions, or regulating access to specific lanes or the entire roadway.”  
▪ “The use of a CMS for the display of general public information or other nonessential messages is discouraged. Only essential messages should be displayed on a CMS as per MUTCD.”  
▪ “The content of a CMS message should be based on requiring the motorist to take an action. However, operational, road condition, and driver safety focused messages are acceptable to be displayed on a CMS. If driver safety focused messages are to be displayed on a CMS, they should be kept current and relate to a specific safety campaign. The period of time that a specific message is displayed for a safety campaign should be limited to a few weeks. Motorists tend to ignore messages that are displayed for long periods of time.”  
▪ “The improper operation and display of outdated or inaccurate information on a CMS has the potential to adversely affect traffic flow. Inaccurate, incomprehensible, or inappropriate information displayed on a CMS can also cause motorists to question the credibility and ignore all CMS messages. The CMS message should be continuously updated to display the action required by motorists, or to present essential information related to either the current or expected future roadway conditions.” |

| Memorandum on Safety Message Signs Interpretation (*Click it or Ticket* Signs) | ▪ “The display of safety messages associated with a safety campaign is allowable under the current MUTCD, as long as it conforms to sign design, location, and spacing requirements and does not block other regulatory, guide and/or warning signs. We have determined that the "Click it or Ticket" signs meet the design requirements and are in conformance with the Manual based on the following analysis.”  
▪ “The Federal Highway Administration (FHWA) supports the use of a Changeable Message Sign (CMS) as a traffic control device to safely and efficiently inform motorists of roadway conditions and required actions to perform. The FHWA issued a policy memorandum on CMS January 19, 2001 (copy attached). That policy gives general guidance and allows driver safety messages to be displayed on a CMS including those associated with a safety campaign. The "Click it or Ticket" sign design for a safety campaign conforms to the information in this memorandum.” |

[Appendix M.B](http://www.fhwa.dot.gov/legsregs/directives/policy/pame.htm)  
[Appendix M.C](http://mutcd.fhwa.dot.gov/resources/memorandum_clickit.htm)
<table>
<thead>
<tr>
<th>Description of Policy</th>
<th>Key Points</th>
</tr>
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</table>
| Memorandum on AMBER Alert Use of Changeable Message Sign (CMS) | "If public agencies decide to display AMBER Alert or child abduction messages on a CMS, FHWA has determined that this application is acceptable only if (A) it is part of a well-established local AMBER Plan Program, and (B) public agencies have developed a formal policy that governs the operation and messages that are displayed on CMS."

| | "(A) A local AMBER Plan Program would include written criteria for issuing and calling off an AMBER Alert, procedures on issues to coordinate with local agencies and other interests, and conforms to the recommendations of the national program (www.missingkids.org). Specific criteria for issuing an Alert and the associated procedures may include:

1. Confirmation that a child has been abducted,

2. Belief that the circumstances surrounding the abduction indicate that the child is in danger of serious bodily harm or death, and

3. Enough descriptive information about the child, abductor, and/or suspect's vehicle to believe an immediate broadcast alert will help."

| | "(B) The formal public agency policy and procedures relating to displaying AMBER Alert or child abduction messages on CMS must address the following issues:

1. The criteria under which CMS will be used for AMBER Alerts.

2. Clear identification of the law enforcement agency responsible for issuing the alert (e.g., State police, local police department, etc.).

3. Agencies, interests, and persons to be contacted and information to be disseminated to initiate or call off an AMBER Alert.

4. Specific recognition that traffic messages, such as lane closures, fog alerts, detours, etc., are the highest priority, and circumstances under which the AMBER Alert message could or could not be displayed.

5. Length of time to display the message (should be of short duration, typically a few hours). (Note: 4 and 5 should be defined in cooperation with the responsible law enforcement agency based on the specific circumstances of the abduction.)

6. Geographic area over which the information is to be displayed (should be limited to a reasonable search distance that is reachable within a few hours).

7. Circumstances that would cause the discontinuation of use of the CMS if the AMBER Alert message creates an adverse traffic impact such as queues, markedly slowing of traffic, etc.

8. Format and content of the messages to be displayed. Agencies should follow the recommended national CMS practices related to the development, use of text, manner in which messages should be displayed, and how CMS are operated."
<table>
<thead>
<tr>
<th>Description of Policy</th>
<th>Key Points</th>
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</table>
| **Memorandum on Use of Changeable Message Sign (CMS) for Emergency Security Messages**<br>March 21, 2003<br>[http://www.fhwa.dot.gov/legregs/directives/policy/securmemo.htm](http://www.fhwa.dot.gov/legregs/directives/policy/securmemo.htm) **Appendix M.E** | - “We continue to discourage the display of general public information or other nonessential messages on CMS.”
- “If public agencies decide to display emergency or security alert messages on a CMS, FHWA has determined that this application is acceptable if public agencies have developed policies and procedures that govern the messages that are displayed on CMS and their operation. The public agency policy and procedures relating to displaying emergency or security alert messages on CMS must address the following issues:

1. The criteria under which CMS will be used for emergency or security alert messages, including the necessary coordination with public safety or security agencies. Formal policies among critical stakeholders (such as law enforcement, security, transportation, and public safety) can be used to establish these agreed upon criteria.
2. Protocols or hierarchy for prioritizing messages and determining which messages are to be displayed.
3. Geographic area over which the information is to be displayed, to be determined in cooperation with public safety and security agencies.
4. Identification of the circumstances under which transportation-related messages, such as lane closures, fog alerts, detours, or other messages that may be needed because of dangerous travel conditions in the immediate vicinity, would preempt emergency or security alert messages.
5. The criteria that would cause the discontinuation of use of the CMS if the emergency or security alert message creates an adverse traffic impact such as queues, markedly slowing traffic, etc.
6. Methodology for developing and displaying messages that are appropriate for CMS display including but not limited to standard message sets. Agencies should follow the recommended national CMS practices related to the development, use of text, manner in which messages should be displayed, human factors related to understandability of the messages, and how CMS are operated.” |
- It is important that these assets and investments be used more effectively to provide motorists with meaningful and useful information. Providing travel time information is an excellent method of notifying motorists about current conditions in a manner that can be easily interpreted and understood |
| **FHWA Work Zone Safety and Mobility Final Rule**<br>October 12, 2007<br>[http://ops.fhwa.dot.gov/wz/rule_guide/sec3.htm#footnote1](http://ops.fhwa.dot.gov/wz/rule_guide/sec3.htm#footnote1) **Appendix M.G** | - “Policy guidance and agency processes and procedures help institutionalize, streamline, and standardize work zone safety and mobility practices. Policy guidance and agency processes and procedures may either be incorporated in the agency’s policy, or be considered as an extension of the policy. Agency-level guidance, processes, and procedures for addressing work zone issues could streamline decision-making, make project delivery more efficient and effective, and ultimately result in better work zones. The following are examples of topics that can be addressed in such guidance, policies, and procedures:....”
- “...Work zone management strategies (e.g., use of intelligent transportation systems, traveler information, real-time work zone monitoring, traffic incident management, enforcement).” |
## 2.2 New Mexico Policies

<table>
<thead>
<tr>
<th>Description of Policy</th>
<th>Key Points</th>
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<tbody>
<tr>
<td></td>
<td>- This memo does not include the use of VMSs for construction projects.</td>
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<tr>
<td></td>
<td>- “No Portable Variable Message Signs (PVMS) shall be placed within the NMDOT District Three R/W unless it is part of an approved traffic control plan or approval for its use has been granted, in writing, by the District Three Engineer, District Three Construction Engineer, District Three Maintenance Engineer, and/or the District Three Traffic Engineer or his/her designee.”</td>
</tr>
<tr>
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<td>- “The following will determine the relative priority of displayed messages on PVMSs:</td>
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<tr>
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<td>- Road and/or ramp closures and emergency situations;</td>
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<td></td>
<td>- Incident or crash;</td>
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<td>- Construction or maintenance operations;</td>
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<td>- Adverse weather or environmental conditions;</td>
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<tr>
<td></td>
<td>- Special public safety messages.”</td>
</tr>
<tr>
<td></td>
<td>- “Public Service Announcement (PSA) shall not be displayed on a PVMS.”</td>
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<tr>
<td></td>
<td>- The District has revised its policy to say - “With the approval of the District Traffic Engineer, special public safety messages may be displayed on a PVMS.”</td>
</tr>
<tr>
<td></td>
<td>- Advertising messages, including tourist information, shall not be displayed on any PVMS.”</td>
</tr>
<tr>
<td></td>
<td>- “If a special event is likely to impact traffic operations, a message may be displayed on a PVMS to inform drivers about exit and parking information. The message should avoid direct mention of a specific private establishment or event.”</td>
</tr>
<tr>
<td></td>
<td>- “Information related to changes in public law or traffic control, which is determined by the District Manager or Construction Project Manager to be necessary for the safety of the traveling public, is not considered to be a PSA.”</td>
</tr>
<tr>
<td></td>
<td>- “In general, test messages on a PVMS shall not be displayed to traffic. However, short duration tests will be considered on a case by case base.”</td>
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<tr>
<td></td>
<td>- “Messages should not display anticipated road conditions due to expected extreme weather more than 24 hours in advance. Information on extended road or lane closures for construction or maintenance activities should be displayed prior to, but generally no more than, one week in advance of the closure.”</td>
</tr>
<tr>
<td></td>
<td>- “It is not possible to display messages regarding icy conditions everywhere or every time they occur. Messages related to icy conditions should only be posted if conditions are unusual and not normally experienced on that section of roadway. Black ice or ice that develops rapidly are examples of unusual conditions. District maintenance personnel are in the best position to determine if icy conditions at a particular location are unusual. Previous ice-related incidents or crashes at the location could provide additional support for providing motorists information about the current situation. If the icy conditions are unusual, an available PVMS can be used to display an ice-related message. An acceptable message is “WATCH FOR ICE” which may be followed by the additional message “NEXT xx MILES” on a second panel.”</td>
</tr>
</tbody>
</table>

Memorandum on The Use of Portable Variable Message Signs on NMDOT Right-of-Way (R/W) within District Three
August 14, 2007
Electronic Appendix EN.B
2.3 Proposed Operational Policies

As stated in the MUTCD, Section 2E.21: “Changeable message signs shall display pertinent traffic operational and guidance information only, not advertising.” This is consistent with New Mexico Department of Transportation policy as stated in the Memorandum on the Use of Portable Variable Message Signs on NMDOT Right-of-Way (R/W) within District Three dated August 14, 2007.

NMDOT personnel have responsibility for the operation of DMSs on roadways under the jurisdiction of the NMDOT. The District Traffic Engineer or their designee has final authority for approving the placement and removal of messages on all DMSs on roadways in that District. The ITS Manager or his designee as well as Transportation Management Center (TMC) Dispatch Lead Workers have working responsibility to ensure authorized and approved messages are posted.

NMDOT personnel having the authority to place messages on DMSs will do so only when the message content has been verified from a credible source. The District Traffic Engineer and/or his/her designee will be responsible for authorizing the removal of said message in their respective district when applicable.

**Key Point**

DMS message priorities are:
1. Road/ramp closures
2. Incidents and crashes
3. Adverse weather or environmental conditions
4. AMBER alerts
5. Emergency security messages
6. Special events traveler information
7. Construction or maintenance operations
8. Travel time and travel related information
9. Special public safety messages
10. Test messages
Per Federal and New Mexico policies and regulations, the following are the operational priorities and policies dictating DMS usage:

<table>
<thead>
<tr>
<th>Message Priority</th>
<th>Proposed Policy Statement</th>
</tr>
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<tbody>
<tr>
<td><strong>Blank mode</strong></td>
<td>DMSs will be in a blank mode during the peak and off-peak periods when traffic, roadway, environmental, or pavement conditions, or public service announcements do not warrant the display of a message, or messages.</td>
</tr>
</tbody>
</table>
| **1** Road/lane(s)/ramp closures | DMS messages shall not divert motorists to specific alternative routes unless positive guidance is available along the alternative route in the form of a) guide signs and/or trailblazers to the major destination, or b) law enforcement or traffic control personnel positioned at critical locations along the alternative route to control and guide traffic. Furthermore, both of the following conditions must be met:  
- The TMC Dispatch Lead Workers have current and continuously-updated knowledge of the traffic conditions on the alternative route; and  
- The alternative route will result in a significant savings in time for the diverted motorists.  
Messages giving specific alternative routes may be displayed when the route is another state route. Specific messages recommending that motorists divert to specific roadways and/or local streets that are not within the jurisdiction of the NMDOT are not permitted unless severe conditions exist and the appropriate agencies are involved. Messages supporting preplanned diversion routes established via written agreements with the local transportation agency are permitted at all times. “Soft” diversion messages (i.e., USE OTHER ROUTES) may be displayed when conditions warrant. |
| **2** Incidents and crashes | The following constitutes the policy for displaying incident messages on DMSs.  
- Messages should be displayed for all verified major incidents that occur on a roadway of a DMS. The message should include the location of the incident (or closure) and the number of lanes closed.  
- Information concerning verified minor incidents and lane closures should be displayed for incidents, provided that information about the location and the number of lanes closed can also be given.  
- Information concerning verified lane-blocking incidents that occur on an intersecting roadway may be displayed on DMSs that are located upstream of the interchange with that roadway depending on the location, severity and duration of the incident. |
| **3** Adverse weather or environmental conditions | DMS messages may be used to warn of adverse weather or roadway conditions downstream that may impact the drivers’ visibility or safety. These conditions may include snow, icy roadways, fog, dust storms, falling rocks, mudslides, high winds, etc. Messages related to icy conditions should be posted if conditions are unusual and not normally experienced on that section of roadway. DMS messages may also be used to inform drivers a regulatory winter chain law is in effect. |
| **4** AMBER alerts | DMS messages may be displayed for AMBER Alerts. Only credible real-time information, where it is crucial to the safety of the victim to disseminate the information to the public in the near term, will be displayed on these DMS signs. Law enforcement activates an AMBER Alert when circumstances meet the following criteria:  
- The missing child is of a pre-determined age  
- The law enforcement agency believes the child has been kidnapped; the agency believes the missing child is under threat of serious bodily harm or death.  
NMDOT will only respond to AMBER alert requests from the New Mexico State Police. The District Traffic Engineer (or his designees) and local New Mexico State Police staff shall jointly agree upon the most appropriate DMS message content(s).  
- The District Traffic Engineer (or his designees) shall consult with New Mexico State Police staff regarding the length of time to display messages (initially 2-3 hours), and extent of roadway system to display the messages (i.e. radius and/or directions and specific routes).  
- The District Traffic Engineer (or his designees) should discuss with the requester the limitations on message content, the number of signs that can be deployed within a given time period, conflicts with other necessary sign messages etc. |
<table>
<thead>
<tr>
<th>Message Priority</th>
<th>Proposed Policy Statement</th>
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</table>
| 5                | Emergency security messages: It is unacceptable to post electronic security messages except if public agencies have developed policies and procedures that govern the messages to be displayed. The policy and procedures relating to displaying emergency or security alert messages on DMSs must address the following issues:  
- The criteria under which DMSs will be used for emergency or security alert messages, including the necessary coordination with public safety or security agencies  
- Geographical area over which the information is to be displayed, to be determined in cooperation with public safety and security agencies.  

The discontinuation of use is at the discretion of the District Traffic Engineer (or his designees) if the emergency or security alert message creates an adverse traffic impact such as queues, markedly slowing traffic, etc. |
| 6                | Special events traveler information: If a special event is likely to impact traffic operations, a message may be displayed on DMSs to inform drivers about exit and parking location information. The message should avoid direct mention of a specific private establishment or event.  
Traffic-related information that provides advance notice of upcoming special events that will adversely affect travel by generating major traffic or by requiring street or highway closures (e.g., parades, street auto races, etc.) may be displayed. The advance notification should not be given more than 7 days prior to the special event. Calendar dates should not be used in the message. |
| 7                | Construction or maintenance operations: Traffic-related information that provides advance notice of upcoming roadwork may be displayed, but should be replaced by current information whenever applicable. The advance notification should not be given more than 7 days prior to the roadwork; however, calendar dates should not be used in the message. DMSs may also be used to warn motorists of upcoming short-term or temporary construction activities that will impact traffic flow. This may include lane closures, lane shifts, two-way traffic, shoulder work, and construction traffic entering the highway, detours, etc. This will supplement normal roadwork signing as required by the MUTCD. Long-term changes should be signed using static signing. |
| 8                | Travel time and travel related information: Travel time information may be displayed if travel times can be measured or calculated using the electronic sensor equipment on the freeway and in the TMC, and if the information can be displayed and updated on the DMS automatically by the system computers.  
Travel related information directed at individual vehicles (example: YOUR SPEED, XX MPH) may be displayed if accurate information can be measured or calculated using the electronic sensor equipment on the freeway and if the site conditions allow for the information to be targeted to individual vehicles. |
| 9                | Special public safety messages: Messages related to driver safety campaigns will be allowed if other media is used, such as radio, TV, newspapers, billboards, etc. This is necessary since the message could be confusing to drivers if they have not been exposed to the information. In this case the DMS should be used randomly, and sparingly. The total duration of display in these cases should not exceed two hours per day on any one message board. Information related to changes in public law or traffic control, which is determined by the District Traffic Engineer to be necessary for the safety of the traveling public, is not considered to be a PSA. |
| 10               | Test messages: Test messages are discouraged; however, during DMS system testing or during maintenance, test messages are permitted to test sign functionality. Test messages are for short duration. |

NOT PERM Static messages: Static descriptors shall not be used to advise motorists of normal daily conditions that are constant (24/7).  
NOT PERM Advertising messages: Advertising messages, including tourist information, shall not be displayed on a DMS.  
NOT PERM General Public Service Announcement (PSA): General Public Service Announcement (PSA) shall not be displayed on a DMS. Not permitted general (non-safety) Prohibited PSA announcements include messages on community involvement, education, health and non-traveler related safety. Examples include “DONATE BLOOD,” “ROCK THE VOTE,” “FOOD DRIVE,” etc.  
NOT PERM Contact information: Phone numbers (other than designated traveler information numbers), websites (other than designated traveler information or NMDOT supported) or mailing addresses shall NOT be displayed on DMS.  
NOT PERM Date and time: Messages displaying only the date and time are not permitted.  

Specific examples of permitted sign uses are contained in Section 6.
2.4 Coordination Activities

2.4.1 Coordination with Other States

DMSs may be used to display messages relating to major incidents and major construction for other agencies. The priority for displaying messages should remain in the control of NMDOT. If another agency’s message is preempted by NMDOT for higher priority needs, NMDOT shall notify the other agency.

Contact information for neighboring states ITS Traffic Management Centers are listed below.

<table>
<thead>
<tr>
<th>STATE</th>
<th>TITLE</th>
<th>PHONE NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arizona</td>
<td>AZ Traffic Operations Center - Dispatch</td>
<td>(602) 257-1563</td>
</tr>
<tr>
<td>Colorado</td>
<td>CO Traffic Operations Center - Dispatch</td>
<td>(303) 512-5826</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>OK Traffic Management Department</td>
<td>(405) 521-6460</td>
</tr>
<tr>
<td></td>
<td>After hours cell phone</td>
<td>(405) 919-6573 (cell)</td>
</tr>
<tr>
<td>Texas</td>
<td>Amarillo Traffic Management Center</td>
<td>(806) 356-3292</td>
</tr>
<tr>
<td></td>
<td>After hours cell phone</td>
<td>(806) 681-3024 (cell)</td>
</tr>
<tr>
<td></td>
<td>El Paso Traffic Management Center</td>
<td>(915) 791-4422 6am-8pm</td>
</tr>
<tr>
<td></td>
<td>Lubbock Traffic Management Center (TxDOT)</td>
<td>(806) 445-3430 (cell)</td>
</tr>
<tr>
<td></td>
<td>Lubbock Traffic Management Center (City)</td>
<td>(806) 559-8225 (cell)</td>
</tr>
<tr>
<td>Utah</td>
<td>UT Traffic Operations Center - Dispatch</td>
<td>(801) 887-3700</td>
</tr>
<tr>
<td></td>
<td>After hours cell phone</td>
<td>(801) 887-3800 11pm-5am</td>
</tr>
</tbody>
</table>

2.4.2 Coordination with Highway Advisory Radio Messaging

Often, there are opportunities to coordinate DMS messaging with Highway Advisory Radio (HAR) messaging. There may be instances when certain events or multiple events will not fit on a DMS. In such cases, a DMS may be used to alert motorists to “tune to” the local HAR station for all messages or to listen to a lower priority message.

A standard HAR message on a DMS is:

```
I-25 NB CLOSED
TUNE TO XXXX AM
```

The first panel or other lines may detail the event such as Amber Alert, weather alert, road closure, etc.

```
AMBER ALERT
TUNE TO XXXX AM
```
2.5 Priorities When Competing Message Needs Arise

Sometimes the DMS operator is faced with competing message needs when two or more events take place at the same time. For example, the DMS may contain a message about a downstream crash when a second crash occurs on the roadway. The DMS operator must decide which of the two crashes should be presented on the DMS because it is neither possible nor advisable to display information about two crashes.

There are a number of different combinations of events that can take place on the primary roadway, on intersecting roadways, and on roadways in adjoining states. In general, the following priority principles shall apply:

- Messages about downstream lane closures (blockages) or full closures (blockages) on the primary roadway receive priority over events on downstream intersecting roadways or on roadways in other states, and
- Messages about lane closures (blockages) or full closures (blockages) on downstream intersecting roadways receive priority over events on roadways in other states.

The tables below are examples of message display priorities when a major crash occurs upstream and downstream of another freeway event that was established by the New Jersey DOT. These tables represent a generalization applicable for most conditions. However, the event that is having the most immediate and severe impact on traffic is the one that needs to be posted. Other priority lists when other types of events occur can be found in the New Jersey DOT Variable Message Sign Operations Manual.

<table>
<thead>
<tr>
<th>Major Crash Occurs Upstream of:</th>
<th>Give Message Priority to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crash (Major)</td>
<td>Upstream major crash</td>
</tr>
<tr>
<td>Crash (Minor)</td>
<td>Upstream major crash</td>
</tr>
<tr>
<td>Construction project</td>
<td>Upstream major crash</td>
</tr>
<tr>
<td>Construction project with temporary lane closure(s)</td>
<td>Upstream major crash</td>
</tr>
<tr>
<td>Disabled vehicle blocking a lane</td>
<td>Upstream major crash</td>
</tr>
<tr>
<td>Incident (Load spill, debris, etc.) requiring lane closure</td>
<td>Upstream major crash</td>
</tr>
<tr>
<td>Incident (Load spill, debris, etc.) requiring total freeway closure</td>
<td>Upstream major crash</td>
</tr>
<tr>
<td>Maintenance operations with lane closure(s)</td>
<td>Upstream major crash</td>
</tr>
<tr>
<td>Maintenance operations requiring total freeway closure</td>
<td>Upstream major crash</td>
</tr>
<tr>
<td>Special event exit</td>
<td>Upstream major crash</td>
</tr>
<tr>
<td>Adjoining state crash (Major)</td>
<td>Upstream major crash</td>
</tr>
<tr>
<td>Adjoining state maintenance operations requiring total freeway closure</td>
<td>Upstream major crash</td>
</tr>
<tr>
<td>Adjoining state incident (Load spill, debris, etc.) requiring total freeway closure</td>
<td>Upstream major crash</td>
</tr>
<tr>
<td>Major Crash Occurs Downstream of:</td>
<td>Give Message Priority to:</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>Crash (Major)</td>
<td>Upstream major crash</td>
</tr>
<tr>
<td>Crash (Minor)</td>
<td>Downstream major crash</td>
</tr>
<tr>
<td>Construction project</td>
<td>Downstream major crash</td>
</tr>
<tr>
<td>Construction project with temporary lane closure(s)</td>
<td>Downstream major crash</td>
</tr>
<tr>
<td>Disabled vehicle blocking a lane</td>
<td>Downstream major crash</td>
</tr>
<tr>
<td>Incident (Load spill, debris, etc.) requiring lane closure</td>
<td>Downstream major crash</td>
</tr>
<tr>
<td>Incident (Load spill, debris, etc.) requiring total freeway closure</td>
<td>Upstream incident requiring freeway closure</td>
</tr>
<tr>
<td>Maintenance operations with lane closure(s)</td>
<td>Downstream major crash</td>
</tr>
<tr>
<td>Maintenance operations requiring total freeway closure</td>
<td>Upstream maintenance requiring freeway closure</td>
</tr>
<tr>
<td>Special event exit</td>
<td>Downstream major crash</td>
</tr>
</tbody>
</table>

For example, if a major crash occurred and closed I-10 in Anthony, Texas, and a major crash occurred and closed I-10 in Las Cruces, New Mexico, the priority would be given to the major crash in-state. So, the DMS would notify motorists of the Las Cruces closure.
2.6 Event Documentation

Continuous record keeping of the use of DMSs during incidents, roadwork, inclement weather, special events, etc. will be useful in documenting the benefits of the DMS system. Documentation of when DMS messages are deployed and the specific message displayed is important to evaluate the effectiveness of the messages in the library and DMS locations. The logs are also important for possible tort defense.

- Records should be kept of the total number of messages displayed, as well as the types of messages (e.g., in incident; pre-planned, such as construction, maintenance, special event; emergency; and public information). In addition, documentation should be made of the date and time messages are activated, deactivated, changed, closed, duration, etc.

- Information regarding the DMS location; date and time of message activation, deactivation, duration; and responsible operator should be recorded.

- Any sign malfunctions and date of repair should be noted and kept on file for at least three years.

- Inventory of equipment replacement

- All information should be stored electronically in a database so that the information can be used for future analysis and evaluation.
3 DMS Operating Fundamentals

3.1 Determining the Purpose

DMSs should always be used with a specific purpose or objective in mind. To determine this purpose, the TMC Dispatch Lead Workers must fully understand six things:

<table>
<thead>
<tr>
<th>Determining the Purpose</th>
<th>Key Points</th>
</tr>
</thead>
</table>
| 1. What is the problem I am trying to address? | The TMC Dispatch Lead Workers must consider not only the basic type of problem that exists, but also the following:  
  - Location of problem (position within the roadway right-of-way as well as its relation to other freeways and major traffic generators);  
  - Scope (number and types of agencies that will likely need to be involved, whether police officers will be required to direct traffic at the scene or on a detour, whether a major incident response team will be activated);  
  - Potential duration of the situation; and  
  - Extent of impacts (number of lanes affected, location where lanes are affected, nearby ramps that are blocked or constrained by the traffic queue, etc.). |
| 2. What verified information do I have? | Credibility is very important in DMS operations. Although it is desirable to select and design messages based on complete and perfect information, situations often occur where an operator receives only limited information about a problem (particularly early in the timeline of an event). Furthermore, the information may be from an unknown or untrained source (i.e., a motorist) or may conflict with other information the operator has received. As a result, a TMC Dispatch Lead Workers must decide what information can be used, and how it can be best used to operate the DMS.  
  - Verified information is that which is obtained directly by the DMS operator via closed circuit television or other visual means, or is provided by approved personnel of selected agencies.  
  - Unverified information, on the other hand, is not obtained directly by the DMS operator or received from the sources above. Most common examples of unverified information are calls received from motorists about incidents that they have encountered. |

TMC Dispatch Lead Workers should only use verified information to operate DMS. Dispatch Lead Workers should not post messages until they:  
1) Visually confirm information via CCTV  
2) Receive a call from the state or local police  
3) Receive a call from patrol or state personnel on site  

Other sources of unverified information will often provide inaccuracies that if presented to the public and found to be false, degrade the credibility of the DMS system and the operating agency. However, unverified information can be useful to the operator in identifying information items that may need to be explored further.
### Determining the Purpose

<table>
<thead>
<tr>
<th>3. Who is the audience that I am trying to reach with the DMS message?</th>
<th><strong>Key Points</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>A component of establishing an objective for a DMS message is to decide who the audience will be for the message. The audience is the group of motorists that the TMC Dispatch Lead Workers want to respond to the message in some manner. In some cases, this may be all of the motorists who pass the DMS. In other cases, the message is intended for only some of the motorists (e.g., those who are traveling all the way downtown). Depending on the situation, it may be necessary to identify the intended audience as part of the DMS message itself. In other situations, the intended audience is implied.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. What type of motorist response is required?</th>
<th><strong>Key Points</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>The TMC Dispatch Lead Workers must first decide what he or she wants motorists to do in response to the message placed on a sign or group of signs. Messages will be most effective when they encourage some type of response from the motorist, such as to:</td>
<td></td>
</tr>
<tr>
<td>▪ Reduce speed,</td>
<td></td>
</tr>
<tr>
<td>▪ Move out of a blocked or closed lane, and/or</td>
<td></td>
</tr>
<tr>
<td>▪ Take an alternative route</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5. Where should the response take place?</th>
<th><strong>Key Points</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>The location where responses are desired will depend on</td>
<td></td>
</tr>
<tr>
<td>▪ Type of response desired</td>
<td></td>
</tr>
<tr>
<td>▪ The layout of the roadway system</td>
<td></td>
</tr>
<tr>
<td>▪ The type and severity of problem being addressed</td>
<td></td>
</tr>
<tr>
<td>▪ The availability of existing guide signs</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6. What degree of response is required?</th>
<th><strong>Key Points</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>The TMC Dispatch Lead Workers must continuously monitor traffic conditions and motorist response to the DMS messages. Suggested alternative routes must provide improved travel to motorists compared to remaining on the freeway. Remember, the messages on the DMSs can be changed when conditions on the alternative route(s) no longer are better than the freeway.</td>
<td></td>
</tr>
</tbody>
</table>
3.2  Determining Which DMS to Use

3.2.1 Proximity of DMS to Problem

Next, the TMC Dispatch Lead Workers must determine which DMS or DMS group within the overall DMS system should be used to address a particular situation or problem. TMC Dispatch Lead Workers should have a fairly good idea of current locations of permanent DMS or be able to quickly determine their location from maps or computerized databases. These signs should be located where it is most advantageous to provide information to motorists. For advance warning of future lane closures and special events, the messages displayed are typically of a general warning nature and can be displayed on DMS over a fairly wide area. When signing for a current incident or work zone lane closure, however, the TMC Dispatch Lead Workers must be careful to make sure that the DMS selected will reach the appropriate audience for the message to be displayed.

3.2.2 Characteristics of the DMS Hardware

The characteristics of the DMS have an effect on how far away the DMS can be read and, consequently, how much information can be presented to motorists. This information is generally determined prior to TMC operations of the DMS. Some of the characteristics of a DMS that affect legibility and message length include the type of sign, the number of lines available, and the number of characters on each line.

In locations where permanent DMS have not been installed or in situations where the amount of information that needs to be presented exceeds the motorists processing capabilities from a single sign, it may be necessary to deploy portable DMS to provide the necessary information to motorists. The TMC Dispatch Lead Workers must consider the time needed to deploy these devices in determining whether they are appropriate for a given situation. These DMS should also be deployed far enough away from other DMS, existing static signing, and complex roadway geometry such as weaving areas. The TMC Dispatch Lead Workers must ensure that motorists are not overloaded with information when choosing where to place the portable DMS.

Key Point

Two simple questions should be asked when determining which DMS should be activated:

1. Is the expected duration of the incident or lane closure longer than the expected travel time from that DMS to the incident or lane closure?
2. Are there a significant number of motorists traveling past the DMS who are destined for the incident or lane closure location?

If the answer to either of these questions is “no,” the DMS is probably not appropriate to activate for that situation.
3.2.3 Roadway, Traffic, and Environmental Characteristics in the Vicinity of the DMS

The TMC Dispatch Lead Workers also need to be familiar with the actual site characteristics in the vicinity of the DMS. These characteristics dictate the amount of information that can be displayed. Among the items of interest are the following:

- The operating speed of traffic on the roadway;
- The amount of trucks in the traffic stream.
- The presence and design characteristics of any vertical curves affecting sight distance;
- The presence of horizontal curves and obstructions such as trees, bridge abutments, or construction vehicles that constrain sight distance to the DMS around the curve;
- The location of the DMS relative to the position of the sun (for daytime conditions);
- The presence, number, and information on static guide signs in the vicinity; and
- Whether or not rain or fog is present to degrade visibility to the sign.
3.2.4 Other Design Considerations that Impact Usage

The legibility and usage of DMSs may be impacted by design considerations including the following:

- Structure type – Overhead (over road) DMS typically have better visibility than other mounting configurations. Center-mount DMS located on a tangent section may have poorer visibility. Consideration may be given to the following when selecting the DMS structure type:

<table>
<thead>
<tr>
<th>DMS Type</th>
<th>Pros</th>
<th>Cons</th>
<th>Other Considerations</th>
</tr>
</thead>
</table>
| Centermount    | ▪ Best benefit-to-cost  
▪ Easy to maintain                                                      | ▪ Visibility can be an issue on tangent sections  
▪ Visibility can be an issue if truck volumes are high       | ▪ Best if located on outside of curve  
▪ Can be used on any roadway type                             |
| Full-span      | ▪ Best for visibility  
▪ Good alternative when multiple signs (static or DMS) are required. | ▪ Highest in cost  
▪ Difficult to maintain                                      | ▪ Good alternative if there is not shoulder room for centermount  
▪ Can be used on any roadway type                             |
| Cantilever     | ▪ Alternative if centermount or full-span cannot be installed        | ▪ Structural issues have occurred in some states  
▪ Visibility can be an issue on tangent sections  
▪ Visibility can be an issue if truck volumes are high       | ▪ Consult with structural group  
▪ Alternative if there is not shoulder room for centermount  
▪ Can be used on any roadway type                             |
| Dual Sign Post Configuration | ▪ Good alternative for lower speed roadways  
▪ Low cost                                                      | ▪ Smaller display                                                  | ▪ Can be used on some arterial applications                |
| Portable       | ▪ Good temporary alternative                                         | ▪ Smaller display                                                  | ▪ Potential for higher rates of vandalism                   |

- Horizontal curve placement - Ideally, mount overhead DMS on tangent sections. Visibility of center-mount DMS can be improved by locating them on the outside of the horizontal curve,

- Viewing angle – Specify an appropriate DMS viewing angle based on the site conditions.
3.3 Determining What to Display

3.3.1 Basic Information Needs and DMS Message

DMSs are a transportation agency’s direct link to the motoring public. Displaying well designed messages on DMSs is critical to effectively managing traffic and to maintaining credibility with motorists.

Proper design begins with understanding the basic information needs of motorists. Motorists need several different types of information in order to make their driving decisions. These elements include the following:

- The type of problem (incident or road work descriptor)
- Location of the problem
- The lanes that are affected (closure description)
- Location of the lane closure
- The effect on travel
- The audience for the message
- Proper response or driving action by motorists
- A reason to follow the recommended driving action

3.3.2 Diversion Routes

Motorists must not be diverted to arbitrary routes. When a diversionary route is to be suggested, it is important that it results in a significant time savings compared to remaining on the primary freeway. In addition, it must be a route that motorists can travel on without getting lost. Therefore, before recommended diversion routes are displayed on a DMS, the TMC Dispatch Lead Workers must know the following about the route:

- Current traffic conditions,
- Current traffic capacity constraints, and
- Guide sign information.
When motorists are advised by the DMS message to divert and take a specific highway or route, it is essential that the destination names and routes used in the message are the same as those displayed on the existing guide signs. Inconsistency between the DMS message and the existing guide signs will lead to motorist confusion and cause some to take incorrect routes. Therefore, the TMC Dispatch Lead Workers must have full knowledge of the wording and route markers on the existing guide signs before diversion messages directing motorists to a specific highway or route are used in a DMS message.

The common requirement for diversion routes is the availability of surveillance on the diversion route. The DMS operator must know the conditions on the alternative route before messages advising drivers to use that route are displayed. Some state agencies divert traffic to specific routes but only if the routes are other interstates or state highways.

### 3.3.3 Message Options

The design of a safe, effective DMS message requires consideration of a number of different factors and interactions between factors. This design process is complex, as is shown in the following modules, and takes time to utilize properly. Fortunately, many situations require a message or group of messages that are identical to those used in other past situations or that have been developed in advance for a particular event. In other situations, a DMS message or message group can utilize a general template and modify an item or two prior to display on the DMS(s). Finally, an extremely complicated or unusual situation may necessitate following the complete design process in order to determine the best DMS message to display. Basic considerations under each of these approaches are discussed below.

<table>
<thead>
<tr>
<th>Selecting a Message from a Message Library</th>
<th>In the simplest case, TMC Dispatch Lead Workers may be able to select a proper message from an existing message library on the DMS operating system. This approach only requires that the DMS operator be able to verify that all of the information to be displayed on the DMS is correct (which lane or lanes are blocked, the location of the problem, etc.) Sample messages are presented in subsequent sections of this manual.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creating a New Message</td>
<td>If a message in the library does not properly address the particular situation of interest or cannot be modified to address the situation, a new message must be created. Principles and procedures illustrated elsewhere in this Manual should be followed to formulate the message. This requires the highest level of reasoning and decision making from the TMC Dispatch Lead Workers. Those operators who have responsibility for creating new messages must have adequate training in the message design process.</td>
</tr>
</tbody>
</table>
3.4 Determining Message Duration

3.4.1 General Approach

After messages have been selected and conflicts resolved, the TMC Dispatch Lead Workers must decide how long to display the message on the sign. For advance warning of upcoming work activity or special events, the message can be shown for several hours or even days prior to the event.

However, it is more difficult to determine an appropriate duration for incidents. Failure to deactivate messages that are no longer relevant can degrade the agency's credibility with the motoring public.

If the TMC Dispatch Lead Workers have responsibility for only a limited number of DMSs and the incident occurs during off-peak periods when demand for attention is lower, it may be acceptable to set an extremely long duration on the message and simply turn the message off when the incident clears. This means that the TMC Dispatch Lead Workers must constantly monitor the incident and then remember to deactivate the signs at its conclusion.

During periods of high operator workload or if the operator has a large number of DMSs to operate, it may be necessary to estimate the expected duration of the incident and set the message display time to that duration. This may require the TMC Dispatch Lead Workers to periodically adjust the time setting if the expected duration changes as more information about the incident is obtained. The advantage of such a procedure is that it ensures against TMC Dispatch Lead Workers forgetting that a message is being displayed long after an incident is cleared.

3.4.2 Before Congestion Clears

The signing responsibilities do not end when the incident is removed from the roadway lanes because congestion may still exist on the freeway, particularly following a major incident. The objectives of messages at this time are to:

- Inform motorists that the incident has been removed;
- Advise motorists that all lanes are open to traffic; and/or
- Advise motorists of the freeway congestion.

It is important to inform motorists who have seen a previous DMS message or have received information via radio or other media of a major incident that the incident has been removed from the lanes and all lanes are open to traffic. This is important for drivers to make informed decisions, particularly in light of the fact that most roadway drivers would prefer to use the roadway.

In regard to posting the limits of the congestion, there is a dilemma - the length of queue is continuously decreasing. Therefore, motorists who see a message with the limits of the
congestion (e.g., FROM EXIT 1 TO EXIT 3) on a DMS upstream of the queue will actually experience less congestion than that shown on the sign. Thus it may be best to display information that the incident has been cleared from the freeway and that all lanes are open. An example of this message is shown below.

```
CRASH CLEARED
ALL LANES OPEN
```

Ordinarily it is beneficial to display the location of the incident. However, since the queue is dissipating downstream (clearance wave moving upstream) the location where the drivers can begin traveling at higher speeds will be farther upstream of where the incident occurred. Therefore, it is preferred that the location of the incident not be displayed.

3.4.3 After Congestion Clears

After the congestion due to the incident dissipates, it is advisable to display a message for a short period of time to advise that all the lanes are open to traffic. Either the message shown above or a message that simply states ALL LANES OPEN can be displayed.
3.5 Resolving Message Conflicts

After determining which message or messages are appropriate for the situation, the fourth step in the process is to resolve any conflicts that may exist within the DMS system. For example, it is possible that two incidents may occur in adjacent sections of roadway. These incidents may each warrant several DMS messages in the vicinity, some on the same signs. In these cases, the operator must prioritize messages at each DMS and display the message that is most appropriate.

3.6 Display and Verification

Once the operator is satisfied with the accuracy of the information available, the information in the message and the message format, the selected message can be displayed. After the DMS message is activated, it is important that the operator validate that the correct message is displayed on the DMS. It would be desirable to be able to validate the message by viewing the messages via the closed circuit television (CCTV) system and electronically. If CCTVs are not positioned such that the messages can be viewed, the operator will have to rely solely upon electronic validation from the software/computer system. The implication is that DMSs should be part of a coordinated ITS system and each component must reliably work together.

Key Point

Generally speaking, message conflicts should be resolved based on:

1. Message prioritization
2. Severity
3. DMS proximity
3.7 Operational Modes

There are two basic modes for displaying messages on DMSs from a TMC:

- Manual signing
- Automated signing

3.7.1 Manual Signing

Manual signing is a process where all messages are typed in and displayed by the operators. Although well-trained and experienced DMS operators can perform effectively, there are many disadvantages to manual signing including the following:

- Difficulty in changing messages in a timely manner, particularly when there are several DMSs in the system or when more than one incident occurs;
- Increased chance of displaying inconsistent messages among the DMS operators and by individual operators;
- Inability to automatically display and update travel time information; and
- Increased chance of incorrect messages being displayed, particularly when the operators are inexperienced.

Canned (library) messages can be used to decrease the errors associated with manual operations.

3.7.2 Automated Signing

Current NMDOT DMS operational modes are limited to manual signing; however, many DMS systems can be configured to run in an automated mode. Automation can take two main forms:

- Intervention - In this mode, the operator receives an audible and visual prompt that the system has detected a need to place a message for a specific sign on the system. The system will display the proposed sign message. The operator
may then accept or reject the prompt. If the prompt is accepted, the message is sent out to the sign, after which all updates then occur automatically. This mode is frequently used for mainline signs in areas where delays are complex and difficult to analyze, and the system is less likely to generate an accurate message. The mode can be specified for any of the signs on the system.

- **Automatic** - In this mode, all sign messages are sent and updated automatically for all lines with no prompting.

Automated signing helps to circumvent the problems of manual signing. However, it is important that the software produces efficient and accurate results. A good deal of operational testing is needed to arrive at proper message display levels.

### 3.8 Distance and DMS Influence

Each event an operator encounters may require a different DMS response based on multiple existing conditions. Although pre-planning DMS response for usual or likely occurring events will realize TMC efficiencies, the operation of DMSs in comparison is dynamic and difficult to plan for all possible events. For this reason, operators will become more effective and efficient with experience. To help determine the most effective DMS response strategies, each event listed in these guidelines should, at a minimum, be assessed for:

- Severity and environment (rural, urban)
- Proximity to DMSs to the event
- Proximity of exits / alternate routes
- Location of the detour to the event
- Travel conditions along the posted detour
- The anticipated reopening of the freeway
- The added travel time along the detour route

If known, the message should include the location of the incident, how many miles away from the DMS and the number of lanes closed. “Soft messages” as detailed in these guidelines may be used to alert motorists if exact data is not known. However, the operator must continue to monitor the event and provide more specific messages on DMSs when conditions are known and/or change.

DMSs located on the freeways leading to other states should also display messages concerning verified incidents (all lanes closed, truck overturned, lane closures, etc) on connecting freeways depending on the location, severity, and duration of the incident. As
with any event requiring a DMS response, the operator shall post messages on DMSs that are closest in proximity to the event. Procedures and priorities for coordinating messages with neighboring states should be consistent with Section 2.5.
4 DMS Message Design Considerations

Knowledge of basic message design considerations is a necessary prelude to designing and displaying effective messages. Message design involves recognition of the basic principles for the following:

- **Message Content** refers to specific information displayed on a DMS. Essentially, what is wrong ahead and what the motorist should do about it are the key elements.

- **Message Length** refers to either the number of words or the number of characters and spaces in a DMS message. Generally speaking, messages should be less than 18 characters per line.

- **Unit of Information** (Informational Unit) refers to the answer to a question a motorist might ask. Stated another way, a unit of information is each data item in a message that a motorist could use to make a decision. Each answer is one unit of information. A unit of information typically is one to three words, but at times can be up to four words.

- **Message Load** refers to the amount of information in the total message, usually expressed in terms of units of information (informational unit).

- **Message Format** refers to the order and arrangement of the units of information on a DMS.

---

**Example:**

Message Content

- Panel 1 (or Phase 1): CRASH AT EXIT 20 ROAD CLOSED
- Panel 2 (or Phase 2): ALL TRAFFIC MUST EXIT

**Units of Information**

1. What happened?
2. Where?
3. What effect on traffic?
4. Who is advisory for?
5. What is advised?

**Message Load** = 5 Units

**Message Length** = 10 words or 46 characters/spaces

Section 6 combines these principles to show a number of examples for each of the 10 message priorities outlined in Section 2.3.
4.1 Message Content

If DMSs are to be read and believed by motorists, the content of the message must provide information relative to the wants of the motorist.

Above all, motorists want to know if something "ahead" has occurred on the roadway that requires some action on their part such as changing routes. If an incident did occur or roadwork is taking place, then the motorist wants to know the location. If the incident or roadwork is far away, it may not affect them because they planned to exit long before then. Motorists also want to know the effects of the incident or roadwork. Since it is difficult for agencies to accurately estimate delay, the effects of the incident or roadwork can be given in terms of the number of lanes closed (or open).

A DMS message should also present "advice." This appears at the end of the brief message. It may be REDUCE SPEED, EXIT AND TAKE OTHER ROUTES, or some other advice. Motorists will ignore advice unless a reason is offered for taking it. The "reason" in most cases is implied by the problem (e.g., CRASH, ROADWORK, etc.) or the number of lanes closed (blocked) (e.g., 2 LEFT LANES CLOSED).

Example:

```
Reason/Problem:
CRASH AT EXIT 20
ROAD CLOSED

Advice:
ALL TRAFFIC MUST EXIT
```
4.2 Long Message Considerations

Often, the DMS operator might still find that the message is too long to be displayed on one message panel. Additional principles and guidelines for splitting and reducing the length of messages are below:

- No more than two panels (phases) should be used
  - The MUTCD (2) in Section 2E.21 Changeable Message Signs specifies that “A three-line changeable message sign shall be limited to not more than two messages . . .”
  - Although the MUTCD states “two messages,” it most likely is referring to one message displayed on “two phases.”
- Each panel must be understood by itself
  - Each message panel must be understood by itself because either panel may be read first by the passing motorist. Typically, the problem and location appear on the first panel and the advisory and attention statement on the second panel.
- Compatible units of information should be displayed on the same panel.
- A message line should not contain portions of two different units of information.
  - Sometimes, two interrelated units of information are too long for each to fit on one line when it is desirable to display both in the same message panel. The temptation, at times, is to “squeeze” both units of information on the same panel by splitting each unit and displaying portions of each unit on the same line. This should be avoided because it confuses motorists and increases reading time.
- No more than three units of information should be displayed on a single panel at high freeway speeds.

### Examples

**Message Content**

- Panel 1 (or Phase 1)
  - MAJOR CRASH AT US-285
  - TEXAS USE US-60 EAST
- Panel 2 (or Phase 2)

**Good**

- MAJOR CRASH AT US-285
- TEXAS USE US-60 EAST

**Bad**

- MAJOR CRASH AT US 285 TEXAS TRAFFIC
- USE US 60 EAST
4.3 Message Timing and Limits

4.3.1 Message Timing

<table>
<thead>
<tr>
<th>Reading Time</th>
<th>The amount of time it takes to read a sign message</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure Time</td>
<td>The length of time a driver is within legible distance of the sign.</td>
</tr>
</tbody>
</table>

- About 85 percent of motorists can begin reading a message on a DMS with 18-inch characters at about 600 feet in front of the sign. This is based on a legibility of 33 feet per inch for older drivers.
- Reading time is about one word per second excluding prepositions such as “to” and “at”.
- Exposure time should be equal to or greater than the reading time.
- When two or three panel messages are used, two to four seconds per panel is recommended.
- The exposure time for blank screens between panels should be limited to 0.5 second or less.

At higher speeds, avoid longer messages that cannot be fully read:

- 8 words per panel at 55 mph
- 7 words per panel at 65 mph
- 6 words per panel at 70 mph

Longer messages should also be avoided because motorists will often reduce their speeds in order to read the message.

4.3.2 Font Size

Per the MUTCD, DMS should be capital letters and have a desirable letter size of 18 inches or a minimum letter size of 10.6 inches.
4.3.3 Units of Information Limits

DMS Messages should adhere to the following guidelines whenever possible.

- No more than 5 units of information (total all panels) for operating speeds less than 35 mph.
- No more than 4 units of information (total all panels) for operating speeds of 35 mph or more.

**Example (less than 35 mph):**

<table>
<thead>
<tr>
<th>Message Content</th>
<th>Units of Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel 1 (or Phase 1)</td>
<td>CRASH AT EXIT 20 ROAD CLOSED</td>
</tr>
<tr>
<td>Panel 2 (or Phase 2)</td>
<td>ALL TRAFFIC MUST EXIT</td>
</tr>
</tbody>
</table>

**Message Load** = 5 Units

**Message Length** = 10 words or 46 characters/spaces

**Example (35 mph or greater):**

<table>
<thead>
<tr>
<th>Message Content</th>
<th>Units of Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel 1 (or Phase 1)</td>
<td>CRASH AHEAD ROAD CLOSED</td>
</tr>
<tr>
<td>Panel 2 (or Phase 2)</td>
<td>ALL TRAFFIC MUST EXIT</td>
</tr>
</tbody>
</table>

**Message Load** = 4 Units

**Message Length** = 8 words or 42 characters/spaces
4.3.4 Panel Limits

Messages should be limited to two panels (or phases) unless approved by the District Traffic Engineer (or his designees). A panel should be limited to no more than 3 units of information.

The limitation to the number of message panels to use is twofold:

1. Motorists should be able to read the message twice while traveling at the posted speed.
2. When more than two screens (panels) are used, the message and its order become confusing to the motorist. The message shall be kept to two panels, except as described below:

Again, the average motorist at a high rate of speed can comprehend two message panels. If three panels are necessary, minimize driver confusion by showing complete phrases on each panel. Each phrase should be independent of the other. If the motorist begins reading the message at the 2nd or 3rd panel, the total message should make sense.

4.3.5 Other Considerations

In addition, lighting and environmental conditions change. For example, during part of the day the sun may not affect the legibility of the DMS. However, if the sun shines directly in the eyes of the motorist, then the legibility distance for the motorist can be greatly reduced. It may be necessary to reduce the length of the message to account for the reduced visibility. The DMS message designer should always look for ways to reduce the message length without losing the intent of the message. Reducing message length can sometimes be accomplished by using alternative phrases that are understandable by motorists and have the same meaning as the original.

Also, the percentage of truck traffic should be considered when deploying messages. On roadways with significant truck volumes, reducing message length is desirable. This will offset the impacts of blind spots created by large trucks blocking the view of messages.
4.4 Message Format

The DMS message must contain the proper information in the expected order to allow motorists to easily read and interpret the information and make rational decisions based on that information.

Placement of informational units on the wrong line or in the wrong sequence will result in driver confusion and will increase the time it takes drivers to interpret, and respond to messages. Conversely, consistent formatting of information enhances motorist expectations and reduces the time required to read and understand messages.

<table>
<thead>
<tr>
<th>Examples</th>
<th>Good</th>
<th>Bad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel 1 (or Phase 1)</td>
<td>CRASH AT EXIT 20 ROAD CLOSED</td>
<td>CRASH AT EXIT 20 ALL TRAFFIC</td>
</tr>
<tr>
<td>Panel 2 (or Phase 2)</td>
<td>ALL TRAFFIC MUST EXIT</td>
<td>MUST EXIT DUE TO CLOSED ROAD</td>
</tr>
</tbody>
</table>
4.5 Message Familiarity

Message familiarity is another aide for motorist ability to understand a message. When information displayed to motorists is unusual, longer comprehension time is required. Common language is necessary.

4.5.1 Word Phrases

Although the verbs USE, TAKE, and FOLLOW are basically synonymous words, they should be used based on the following criteria:

<table>
<thead>
<tr>
<th>Word</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>USE</td>
<td>The verb USE should be used when the suggested route will take the driver to his/her destination. USE is also a preferred word because it is slightly shorter.</td>
<td>USE NM 47 FOR BYPASS</td>
</tr>
<tr>
<td>TAKE</td>
<td>The verb TAKE should be used when the driver is informed to take the first segment or leg of a route.</td>
<td>TAKE NEXT EXIT</td>
</tr>
<tr>
<td>FOLLOW</td>
<td>The verb FOLLOW should be used when subsequent reference signs and trailblazers will guide the driver.</td>
<td>FOLLOW MARKED ROUTE</td>
</tr>
<tr>
<td>STAY</td>
<td>The verb STAY should be used when the driver is advised to continue traveling on a route.</td>
<td>STAY ON NM 47</td>
</tr>
<tr>
<td>EXIT</td>
<td>The verb EXIT should always be followed by the name of the freeway exit number or the cross-road.</td>
<td>USE EXIT 223</td>
</tr>
<tr>
<td>GO and TURN</td>
<td>The verbs GO and TURN should not be used.</td>
<td></td>
</tr>
<tr>
<td>BYPASS</td>
<td>The word BYPASS generally implies that the driver will eventually return to the primary route.</td>
<td>USE NM 47 FOR BYPASS</td>
</tr>
</tbody>
</table>
4.5.2 Common Abbreviations

If possible, words should be spelled out to provide clarity and understanding. However, because of the limitations associated with the DMS display (typically 18 characters per line and three lines per panel or phrase), the operator may occasionally need to shorten the message by using abbreviations so that relevant information can fit the allowable space.

It is important that meaningful and readily understood abbreviations be used so that the drivers are able to quickly comprehend the intended information. In some cases, abbreviations are acceptable only if they are accompanied by a “prompt” word. In all cases, abbreviations should be consistent with those presented in Section 1A.14 (Abbreviations Used on Traffic Control Devices) of the MUTCD.

Below is a list of common abbreviations.

<table>
<thead>
<tr>
<th>Word</th>
<th>Abbreviation</th>
<th>Prompt Word Required With Abbreviation</th>
<th>Typical Prompt Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
<td>ACCS</td>
<td>Yes</td>
<td>ACCS (ROAD)</td>
</tr>
<tr>
<td>Accident</td>
<td>ACCDT</td>
<td>Yes</td>
<td>ACCDT (AT)</td>
</tr>
<tr>
<td>Afternoon / Evening</td>
<td>PM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ahead</td>
<td>AHD</td>
<td>Yes</td>
<td>(FOG, ACCIDENT) AHD</td>
</tr>
<tr>
<td>Alternate</td>
<td>ALT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avenue</td>
<td>AVE, AV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bicycle</td>
<td>BIKE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blocked</td>
<td>BLKD</td>
<td>Yes</td>
<td>(LANE) BLKD</td>
</tr>
<tr>
<td>Boulevard</td>
<td>BLVD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bridge</td>
<td>BRDG</td>
<td>Yes</td>
<td>(bridge name) BRIDGE</td>
</tr>
<tr>
<td>Center</td>
<td>CNTR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemical</td>
<td>CHEM</td>
<td>Yes</td>
<td>CHEM (SPILL)</td>
</tr>
<tr>
<td>Circle</td>
<td>CIR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clear</td>
<td>CLR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial</td>
<td>COM</td>
<td>Yes</td>
<td>COM (VEHICLES)</td>
</tr>
<tr>
<td>Condition</td>
<td>COND</td>
<td>Yes</td>
<td>(TRAFFIC) COND</td>
</tr>
<tr>
<td>Congestion</td>
<td>CONG</td>
<td>Yes</td>
<td>(TRAFFIC) CONG</td>
</tr>
<tr>
<td>Construction</td>
<td>CONST</td>
<td>Yes</td>
<td>CONST (AHEAD)</td>
</tr>
<tr>
<td>Court</td>
<td>CT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crossing (other than highway-rail)</td>
<td>XING</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Word</td>
<td>Abbreviation</td>
<td>Prompt Word Required With Abbreviation</td>
<td>Typical Prompt Format</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>--------------</td>
<td>---------------------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Delay</td>
<td>DLY</td>
<td>Yes</td>
<td>DWNTN (TRAFFIC)</td>
</tr>
<tr>
<td>Downtown</td>
<td>DWNTN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drive</td>
<td>DR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>East</td>
<td>E</td>
<td>Yes</td>
<td>E (street name)</td>
</tr>
<tr>
<td>Eastbound</td>
<td>EB, EAST, or E-BND</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergency</td>
<td>EMERG or EMER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enter</td>
<td>ENTR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entrance</td>
<td>ENT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exit</td>
<td>EX or EXT</td>
<td>Yes</td>
<td>(NEXT) EXT</td>
</tr>
<tr>
<td>Express</td>
<td>EXP</td>
<td>Yes</td>
<td>EXP (LANE)</td>
</tr>
<tr>
<td>Expressway</td>
<td>EXPWY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freeway</td>
<td>FWY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td>FRI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frontage</td>
<td>FRNTG</td>
<td>Yes</td>
<td>FRNTG (ROAD)</td>
</tr>
<tr>
<td>Hazardous</td>
<td>HAZ</td>
<td>Yes</td>
<td>HAZ (DRIVING)</td>
</tr>
<tr>
<td>Hazardous Material</td>
<td>HAZMAT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Highway</td>
<td>HWY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information</td>
<td>INFO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interstate</td>
<td>I</td>
<td>Yes</td>
<td>I-(number)</td>
</tr>
<tr>
<td>Lane</td>
<td>LN</td>
<td>Yes</td>
<td>(LFT, RHT) LN</td>
</tr>
<tr>
<td>Left</td>
<td>LFT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local</td>
<td>LOC</td>
<td>Yes</td>
<td>LOC (TRAFFIC)</td>
</tr>
<tr>
<td>Maintenance</td>
<td>MAINT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major</td>
<td>MAJ</td>
<td>Yes</td>
<td>MAJ (ACCIDENT)</td>
</tr>
<tr>
<td>Mile(s)</td>
<td>MI</td>
<td>Yes</td>
<td>(number) MI</td>
</tr>
<tr>
<td>Miles Per Hour</td>
<td>MPH</td>
<td>Yes</td>
<td>(number) MPH</td>
</tr>
<tr>
<td>Minor</td>
<td>MNR</td>
<td>Yes</td>
<td>MIN (ACCIDENT)</td>
</tr>
<tr>
<td>Minute(s)</td>
<td>MIN</td>
<td>Yes</td>
<td>(number) MIN</td>
</tr>
<tr>
<td>Monday</td>
<td>MON</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morning / Late Night</td>
<td>AM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>NORM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>North</td>
<td>N</td>
<td>Yes</td>
<td>N (street name)</td>
</tr>
<tr>
<td>Northbound</td>
<td>NB, NORTH, or N-BND</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oversized</td>
<td>OVRSZ</td>
<td>Yes</td>
<td>OVERSZ (LOAD)</td>
</tr>
<tr>
<td>Parking</td>
<td>PRKG or PKING</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parkway</td>
<td>PKWY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pavement</td>
<td>PVMT</td>
<td>Yes</td>
<td>WET (PVMT)</td>
</tr>
<tr>
<td>Pedestrian</td>
<td>PED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Place</td>
<td>PL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prepare</td>
<td>PREP</td>
<td>Yes</td>
<td>PREP (TO STOP)</td>
</tr>
<tr>
<td>Right</td>
<td>RHT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>RD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roadwork</td>
<td>RDWK</td>
<td>Yes</td>
<td>RDWK (AHEAD)</td>
</tr>
<tr>
<td>Route</td>
<td>RTE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saturday</td>
<td>SAT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service</td>
<td>SERV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoulder</td>
<td>SHLDR</td>
<td>Yes</td>
<td>(ON) SHOULDER</td>
</tr>
</tbody>
</table>
## Word Abbreviation Prompt Word Required With Abbreviation Typical Prompt Format

<table>
<thead>
<tr>
<th>Word</th>
<th>Abbreviation</th>
<th>Prompt Word Required With Abbreviation</th>
<th>Typical Prompt Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slippery</td>
<td>SLIP</td>
<td>Yes</td>
<td>S (street name)</td>
</tr>
<tr>
<td>South</td>
<td>S</td>
<td>Yes</td>
<td>S (street name)</td>
</tr>
<tr>
<td>Southbound</td>
<td>SB, SOUTH, or S-BND</td>
<td>Yes</td>
<td>S (street name)</td>
</tr>
<tr>
<td>Speed</td>
<td>SPD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Street</td>
<td>ST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sunday</td>
<td>SUN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temporary</td>
<td>TEMP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terrace</td>
<td>TER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thursday</td>
<td>THURS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traffic</td>
<td>TRAF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Travelers</td>
<td>TRAVLRS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuesday</td>
<td>TUES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>US Numbered Route</td>
<td>US</td>
<td>Yes</td>
<td>US (number)</td>
</tr>
<tr>
<td>Vehicle(s)</td>
<td>VEH</td>
<td>Yes</td>
<td>(STALLED, EMER, COM) VEH</td>
</tr>
<tr>
<td>Warning</td>
<td>WARN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td>WED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>West</td>
<td>W</td>
<td>Yes</td>
<td>W (street name)</td>
</tr>
<tr>
<td>Westbound</td>
<td>WB, WEST, or W-BND</td>
<td>Yes</td>
<td>W (street name)</td>
</tr>
</tbody>
</table>

The abbreviations shown below shall not be used in connection with traffic control devices because of their potential to be misinterpreted by road users.

## Intended Word Abbreviation (DO NOT USE) Common Misinterpretations

<table>
<thead>
<tr>
<th>Intended Word</th>
<th>Abbreviation (DO NOT USE)</th>
<th>Common Misinterpretations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accident</td>
<td>ACC</td>
<td>Access (Road)</td>
</tr>
<tr>
<td>Clears</td>
<td>CLRS</td>
<td>Colors</td>
</tr>
<tr>
<td>Delay</td>
<td>DLY</td>
<td>Daily</td>
</tr>
<tr>
<td>Feeder</td>
<td>FDR</td>
<td>Federal</td>
</tr>
<tr>
<td>Left</td>
<td>L</td>
<td>Lane (Merge)</td>
</tr>
<tr>
<td>Light (Traffic)</td>
<td>LT</td>
<td>Left</td>
</tr>
<tr>
<td>Parking</td>
<td>PARK</td>
<td>Park</td>
</tr>
<tr>
<td>Reduce</td>
<td>RED</td>
<td>Red</td>
</tr>
<tr>
<td>Stadium</td>
<td>STAD</td>
<td>Standard</td>
</tr>
<tr>
<td>Warning</td>
<td>WRNG</td>
<td>Wrong</td>
</tr>
</tbody>
</table>
4.5.3 Other Considerations

To further message comprehension, the following are suggestions concerning messages drivers can comprehend the quickest:

- Drivers have difficulty corresponding calendar days to days of the week.
  - For example, “TUES – FRI” is preferred over “OCT 1 - OCT 4”. The advanced notice is only allowable within six (6) days of the start of roadwork.

- Drivers find the phrase “FOR 1 WEEK” ambiguous.
  - It is preferable to use “WED–TUES”.

- Most drivers felt the term “WEEKEND” meant the work would begin Saturday morning and be completed by Sunday evening.
  - It is recommended times and days be used if the work begins on Friday and extends to Monday.

- The highway or route numbers should be displayed with the route or interstate designation.

- The number alone can be confusing to both local and drivers from other areas.

- A unit of information may be displayed on more than one line on the DMS. A sign line should not contain more than two units of information.
4.6 Signing Approaches

Experience has shown there are three types of signing approaches to use when messages fall under the categories of incidents and traveler information:

4.6.1 Advisory Signs

The advisory signs display real-time information about freeway status and advisories concerning the best course of action. These will mostly be used for incidents. The advisory sign message should consist of the following:

- A problem statement (crash, road closure, construction, adverse weather, etc.)
- An effect statement (delay, congestion, etc.)
- An attention statement (addressing a certain group or audience)
- An action statement (what to do)

The minimum information is the problem and action statements. The location of the problem is also sometimes useful in a diversion decision.

4.6.2 Advance Signs

There are times to inform drivers of incidents that are farther ahead of the current location. This up-to-date information has the following basic elements that can be communicated:

- Information alert
- Nature of information (best route, traffic conditions, etc.)
- Destination for which information applies
- Location of the information (AHEAD or specific distance)

If there is a diversion situation with known alternative routes available:

4.6.3 Guide Signs

Guide signs are necessary if the traffic must be diverted due to an incident or construction. The guide signs must provide destination information and route affirmation and direction.
4.7 Dynamic Features and Graphics

4.7.1 Dynamic Features

Many DMSs have the capabilities to create dynamic features within a message. Two of the more common features being used by some TMCs are:

- Flashing a message or a line in a message, and
- Alternating lines in a two-phase message

Flashing Messages

Several state DOTs currently display DMS messages that flash or have one line that flashes in the belief that the features attract the attention of drivers and emphasize the importance of the message. Only a limited amount of research has been conducted on this topic, and the effects that flashing has on drivers while traveling on a freeway are not fully known. The results of the single-task study showed that in a laboratory setting, flashing one-phase, three-line messages did not adversely affect subject recall and comprehension to a significant degree in comparison to when the message was not flashed. However, the average reading times were significantly longer when the message was flashed. Flashing one line of three-line messages significantly increased average reading time during both the laboratory and the driving simulator studies. In addition, comprehension levels were lower during both studies. The results strongly imply that DMS messages should not be displayed with single flashing lines.

Examples:

Option 1
Flash Message

Good

CRASH
AT EXIT 220
USE NM 47

Bad

CRASH
AT EXIT 220-
USE NM 47

Option 2
Flash Line
Alternating Lines

Another operating practice of interest is formatting a message in such a way that the top two lines remain constant and a third bottom line is changed on the second panel of a message. In essence the DMS operates as it were a two-phase message, but with information on two lines constant and redundant between the two panels. An example of a message with alternating text on one line of a three-line DMS while keeping the other two lines of text the same (redundant) is shown below. The study results indicated that alternating one line of text and keeping the other two lines constant did not adversely affect message recall. However, average reading times increased significantly. The subject preferences were evenly split between having and not having redundant information in both panels of the message. The results strongly imply that alternating line messages should not be displayed.

4.7.2 Graphics

Graphics consistent with the MUTCD can be used on a full-matrix DMS with a pixel resolution that allows clear display of the graphics. The graphics can be displayed either in stand-alone fashion or as a supplement to text. When supplementing text, the graphic should be placed to the left of the text.

Graphics should not be used if the test size is compromised in order to do so. Graphics may be used in place of text-only messages if the same meaning is conveyed to motorists.
5 Usage of Semi-permanent and Portable DMS

The application and usage of semi-permanent DMSs and portable DMSs are the same as permanent DMSs unless otherwise noted below:

- Portable DMSs used for work zone and construction activities are exempt from the operational priorities.

- A third panel can be employed on semi-permanent DMSs and portable DMSs where the posted speed limit is 55 mph or less.
6  DMS Operating Examples

The following sections show message examples for each type of message priority. Each example shows messages for permanent and portable DMSs. Permanent DMSs allow for three lines with 18 characters per line. Portable DMSs allow for three lines with eight characters per line.

6.1  Road/ramp closures

DMS messages shall not divert motorists to specific alternative routes unless positive guidance is available along the alternative route in the form of a) guide signs and/or trailblazers to the major destination, or b) law enforcement or traffic control personnel positioned at critical locations along the alternative route to control and guide traffic. Furthermore, both of the following conditions must be met:

- The TMC Dispatch Lead Workers have current and continuously-updated knowledge of the traffic conditions on the alternative route; and
- The alternative route will result in a significant savings in time for the diverted motorists.

Messages giving specific alternative routes may be displayed when the route is another state route. Specific messages recommending that motorists divert to specific roadways and/or local streets that are not within the jurisdiction of the NMDOT are not permitted unless severe conditions exist and the appropriate agencies are involved. Messages supporting preplanned diversion routes established via written agreements with the local transportation agency are permitted at all times. “Soft” diversion messages (i.e., USE OTHER ROUTES) may be displayed when conditions warrant.
6.1.1 Example – Interstate Closure Use NM 314

This example may be used when a specific roadway closure has been verified and a secondary route has been identified. The secondary route, NM 314, runs parallel to I-25 in Belen, and could be used as an alternative route until I-25 reopens.

**Permanent DMS**

```
+----------------+-----------------+-----------------+-----------------+-----------------+-----------------+
|                | I - 2 5 NB      | C L O S E D     |                 |                 |                 |
| EXIT 1 9 1 TO  |                 |                 | USE NM 3 1 4    |                 |                 |
| 1 9 5          |                 |                 |                 |                 |                 |
+----------------+-----------------+-----------------+-----------------+-----------------+-----------------+
```

**Portable DMS**

**Panel 1:**

```
+----------------+-----------------+-----------------+-----------------+-----------------+
|                | I - 2 5 NB      |                 |                 |                 |
|                | C L O S E D     |                 |                 |                 |
|                | EXIT 1 9 1      |                 |                 |                 |
+----------------+-----------------+-----------------+-----------------+-----------------+
```

**Panel 2:**

```
+----------------+-----------------+-----------------+-----------------+-----------------+
| USE            |                 |                 |                 |                 |
| NM 3 1 4       |                 |                 |                 |                 |
+----------------+-----------------+-----------------+-----------------+-----------------+
6.1.2 Example – Interstate Closure use Alternate Route

This example may be used when a specific roadway closure has been verified and a signed alternate route (via one or more roadways) has been established.

**Permanent DMS**

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I - 10</td>
<td>WB</td>
<td>CLOSED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EXIT 116</td>
<td>TO 102</td>
<td>USE</td>
<td>ALT</td>
<td>ROUTE</td>
</tr>
</tbody>
</table>

**Portable DMS**

Panel 1:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I - 10</td>
<td>WB</td>
<td>CLOSED</td>
</tr>
<tr>
<td>EXIT 116</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Panel 2:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>USE</td>
<td>ALT</td>
<td>ROUTE</td>
</tr>
</tbody>
</table>
6.1.3 Example – Central Ave Closed Ahead

This example may be used when a specific roadway closure has been verified and a designated detour route has been established.

Permanent DMS

<table>
<thead>
<tr>
<th>C E N T R A L A V E C L O S E D</th>
</tr>
</thead>
<tbody>
<tr>
<td>A H E A D</td>
</tr>
<tr>
<td>D E T O U R N E X T L E F T</td>
</tr>
</tbody>
</table>

Portable DMS

Panel 1:

| C E N T R A L C L O S E D A H E A D |

Panel 2:

| D E T O U R N E X T L E F T         |
6.1.4 Example – Exit 223 Closed Ahead Follow Detour

This example may be used when a specific exit closure has been verified and a designated detour route has been established.

Permanent DMS

<table>
<thead>
<tr>
<th>EXIT 223</th>
<th>CLOSED</th>
<th>AHEAD</th>
<th>FOLLOW DETOUR</th>
</tr>
</thead>
</table>

Portable DMS

Panel 1:

<table>
<thead>
<tr>
<th>EXIT 223</th>
<th>CLOSED</th>
<th>AHEAD</th>
</tr>
</thead>
</table>

Panel 2:

<table>
<thead>
<tr>
<th>FOLLOW</th>
<th>DETOUR</th>
</tr>
</thead>
</table>
6.1.5 Example – Roadwork on Ramp

This example may be used when a specific exit closure due to roadwork has been verified and a secondary route has been identified.

**Permanent DMS**

```
ROADWORK EXIT 275
RAMP CLOSED
USE EXIT 277
```

**Portable DMS**

**Panel 1:**

```
ROADWORK
EXIT 275
CLOSED
```

**Panel 2:**

```
USE
EXIT 277
```
6.1.6 Example – Crash Use Lomas

This example may be used when a crash has been verified and a soft diversion may be preferable.

Permanent DMS

| CRASH | AT I - 40 | USE LOMAS |

Portable DMS

Panel 1:

| CRASH | AT I - 40 |

Panel 2:

| USE LOMAS |
6.1.7 Example – Right Lane Closed Past I-40 Use Caution

This example may be used when a right lane has been closed, and traffic has begun to queue.

**Permanent DMS**

```
RIGHT  LANE  CLOSED
PAST I-40
USE CAUTION
```

**Portable DMS**

**Panel 1:**

```
RHT LANE
CLOSED
PAST I40
```

**Panel 2:**

```
USE
CAUTION
```
6.1.8 Example – Right Lane Blocked Merge Left

This example may be used when a right lane has been blocked, and traffic has begun to queue.

Permanent DMS

<table>
<thead>
<tr>
<th>RIGHT</th>
<th>LANE</th>
<th>BLOCKED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 MILE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MERGE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LEFT</td>
</tr>
</tbody>
</table>

Portable DMS

Panel 1:

<table>
<thead>
<tr>
<th>RHT</th>
<th>LANE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BLKD</td>
</tr>
<tr>
<td>1</td>
<td>MILE</td>
</tr>
</tbody>
</table>

Panel 2:

<table>
<thead>
<tr>
<th>MERGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEFT</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
6.1.9 Example – Lane Closed Prepare to Merge

This example may be used when a right lane has been closed, and traffic has begun to queue.

**Permanent DMS**

```
<table>
<thead>
<tr>
<th>LEFT</th>
<th>LANE</th>
<th>CLOSED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1 MILE</td>
</tr>
<tr>
<td>PREPARE TO MERGE</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

**Portable DMS**

Panel 1:

```
<table>
<thead>
<tr>
<th>L F T</th>
<th>L A N E</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CLOSED</td>
</tr>
<tr>
<td></td>
<td>1 MILE</td>
</tr>
</tbody>
</table>
```

Panel 2:

```
<table>
<thead>
<tr>
<th>PREPARE</th>
</tr>
</thead>
<tbody>
<tr>
<td>TO</td>
</tr>
<tr>
<td>MERGE</td>
</tr>
</tbody>
</table>
```
6.1.10 Example – Lane Closed Merge Right

This example may be used when a left lane has been closed, and traffic has begun to queue.

Permanent DMS

<table>
<thead>
<tr>
<th>LEFT</th>
<th>LANE</th>
<th>CLOSED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1 MILE</td>
</tr>
<tr>
<td>MERGE</td>
<td>RIGHT</td>
<td></td>
</tr>
</tbody>
</table>

Portable DMS

Panel 1:

<table>
<thead>
<tr>
<th>LEFT</th>
<th>LANE</th>
<th>CLOSED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1 MILE</td>
</tr>
</tbody>
</table>

Panel 2:

| MERGE | RIGHT |
6.1.11 Example – Right Shoulder Closed Use Caution

This example may be used when a right shoulder has been closed. Drivers should use caution because of the change in normal conditions for the route.

**Permanent DMS**

```
RIGHT  SHLDR  CLOSED
AHEAD
USE  CAUTION
```

**Portable DMS**

**Panel 1:**

```
RIGHT
SHOULDER
CLOSED
```

**Panel 2:**

```
USE
CAUTION
```
6.2 Incidents and Crashes

The following constitutes the policy for displaying incident messages on DMSs.

- Messages should be displayed for all verified major incidents that occur on a roadway of a DMS. The message should include the location of the incident (or closure) and the number of lanes closed.

- Information concerning verified minor incidents and lane closures should be displayed for incidents, provided that information about the location and the number of lanes closed can also be given.

- Information concerning verified lane-blocking incidents that occur on an intersecting roadway may be displayed on DMSs that are located upstream of the interchange with that roadway depending on the location, severity and duration of the incident.
6.2.1 Example – Incident One Mile Ahead

This example may be used when a crash and lane closure has been verified, but alternate routes have not been verified.

Permanent DMS

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Portable DMS

Panel 1:

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Panel 2:

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<td><strong>C L O S E D</strong></td>
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</tr>
</tbody>
</table>
6.2.2 Example – Crash Prepare to Stop

This example may be used when a crash has been verified, and traffic has begun to queue.

Permanent DMS

```
CRASH AT CENTRAL AVE PREPARE TO STOP
```

Portable DMS

Panel 1:

```
CRASH AT CENTRAL
```

Panel 2:

```
PREPARE TO STOP
```
6.2.3 Example – Crash with Delay

This example may be used when a crash has been verified, and traffic delays are expected.

Permanent DMS

<table>
<thead>
<tr>
<th>CRASH</th>
<th>I - 10</th>
<th>WB</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT DEMING</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EXPECT DELAYS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Portable DMS

Panel 1:

| CRASH | I - 10 | WB |

Panel 2:

| AT |
| DEMING |
| EXP DLYS |
6.2.4 Example – Crash Cleared

This example may be used when a crash has been cleared, but delays still exist.

Permanent DMS

<table>
<thead>
<tr>
<th>CRASH AT CENTRAL</th>
<th>AVE CLEARED</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXPECT HEAVY DELAY</td>
<td></td>
</tr>
</tbody>
</table>

Portable DMS

Panel 1:

<table>
<thead>
<tr>
<th>CRASH AT CENTRAL</th>
<th>CLEARED</th>
</tr>
</thead>
</table>

Panel 2:

<table>
<thead>
<tr>
<th>EXPECT HEAVY DELAY</th>
</tr>
</thead>
</table>
6.2.5 Example – Disabled Vehicle with Minor Congestion

This example may be used when a disabled vehicle has been verified, and minor congestion exists.

**Permanent DMS**

```
DISABLED VEHICLE
I - 25 NB
MINOR CONGESTION
```

**Portable DMS**

**Panel 1:**
```
DISABLED VEHICLE
I - 25 NB
```

**Panel 2:**
```
MINOR CONG
```
6.2.6 Example – Crash near Frontage Road

This example may be used when a crash has been verified, and a frontage road is a preferable route.

Permanent DMS

![Permanent DMS Panel 1](image)

Portable DMS

Panel 1:

![Portable DMS Panel 1](image)

Panel 2:

![Portable DMS Panel 2](image)
6.2.7 Example – Crash at Montano Watch for Stopped Traffic/Stopped Traffic Ahead

This example may be used when a crash has been verified, and stopped traffic can be expected. The crash is on I-25 at Montano, and traffic traveling on I-25 should use caution and watch for stopped traffic.

Permanent DMS

Panel 1:

<p>| | | | | | | | | | | |</p>
<table>
<thead>
<tr>
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</table>

Panel 2:

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</tbody>
</table>

Portable DMS

Panel 1:

<p>| | | | | | | | | | | |</p>
<table>
<thead>
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</tr>
<tr>
<td>M</td>
<td>O</td>
<td>N</td>
<td>T</td>
<td>A</td>
<td>N</td>
<td>O</td>
<td></td>
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</tbody>
</table>

Panel 2:

<p>| | | | | | | | | | | |</p>
<table>
<thead>
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<td>A</td>
<td>H</td>
<td>E</td>
<td>A</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6.2.8 Example – Crash Ahead Exit and Seek Alternate Route

This example may be used when a crash has been verified, and a soft diversion may be preferred.

**Permanent DMS**

![Permanent DMS Diagram](image)

**Portable DMS**

Panel 1:

![Panel 1 Diagram](image)

Panel 2:

![Panel 2 Diagram](image)
6.2.9 Example – Crash Ahead Use NM XXX Next Right

This example may be used when a crash has been verified, and a soft diversion via a specific exit may be preferred.

Permanent DMS

<table>
<thead>
<tr>
<th>CRASH AHEAD</th>
<th>USE NM XXXX</th>
<th>NEXT RIGHT</th>
</tr>
</thead>
</table>

Portable DMS

Panel 1:

<table>
<thead>
<tr>
<th>CRASH AHEAD</th>
</tr>
</thead>
</table>

Panel 2:

<table>
<thead>
<tr>
<th>USE NM XXXX</th>
<th>NEXT RIGHT</th>
</tr>
</thead>
</table>
6.2.10 Example – Crash at Sunport Airport Traffic Use Gibson

This example may be used when a crash has been verified, and a soft diversion via another route may be preferred.

**Permanent DMS**

```
CRASH AT SUNPORT
AIRPORT TRAFFIC
USE GIBSON
```

**Portable DMS**

**Panel 1:**

```
CRASH AT
SUNPORT
```

**Panel 2:**

```
AIRPORT
TRAFFIC USE
GIBSON
```
6.2.11 Example – Crash at 12th Heavy Congestion

This example may be used when a crash has been verified, heavy congestion exists, and a soft diversion via another route may be preferred.

Permanent DMS

```
CRASH AT 12TH ST
HEAVY CONGESTION
USE 4TH ST
```

Portable DMS

Panel 1:

```
CRASH
AT
12TH ST
```

Panel 2:

```
USE
4TH ST
```
6.2.12 Example – Crash at Milepost 100

This example may be used when a crash has been verified at a specific mile marker, but only minor delays exist.

Permanent DMS

<table>
<thead>
<tr>
<th>CRASH AT</th>
<th>MILEPOST 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>MINOR DELAY</td>
<td></td>
</tr>
</tbody>
</table>

Portable DMS

Panel 1:

<table>
<thead>
<tr>
<th>CRASH AT</th>
</tr>
</thead>
<tbody>
<tr>
<td>MILEPOST</td>
</tr>
<tr>
<td>100</td>
</tr>
</tbody>
</table>

Panel 2:

<table>
<thead>
<tr>
<th>MINOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>DELAY</td>
</tr>
</tbody>
</table>
6.2.13 Example – Crash at MM 185

This example may be used when a crash has been verified at specific mile marker, and delays can be expected.

Permanent DMS

```
+----------------+----------------+----------------+----------------+----------------+----------------+----------------+----------------+----------------+
|                |                |                |                |                |                |                |                |                |
| CRASH AT       |                |                |                |                |                |                |                |                |
| MM 185         |                |                |                |                |                |                |                |                |
| EXPECT DELAY   |                |                |                |                |                |                |                |                |
+----------------+----------------+----------------+----------------+----------------+----------------+----------------+----------------+----------------+
```

Portable DMS

Panel 1:

```
+----------------+----------------+----------------+----------------+----------------+----------------+----------------+----------------+----------------+
|                |                |                |                |                |                |                |                |                |
| CRASH AT       |                |                |                |                |                |                |                |                |
| MM 185         |                |                |                |                |                |                |                |                |
+----------------+----------------+----------------+----------------+----------------+----------------+----------------+----------------+----------------+
```

Panel 2:

```
+----------------+----------------+----------------+----------------+----------------+----------------+----------------+----------------+----------------+
|                |                |                |                |                |                |                |                |                |
| EXPECT DELAY   |                |                |                |                |                |                |                |                |
+----------------+----------------+----------------+----------------+----------------+----------------+----------------+----------------+----------------+
```
6.2.14 Example – Crash at River Bridge

This example may be used when a crash has been verified along a specific river crossing in the Albuquerque area, and a soft diversion via another crossing may be preferred.

Permanent DMS

Panel 1:

```
CRASH
ON WB MONTANO
```

Panel 2:

```
USE ALT
RIVER CROSSING
```

Portable DMS

Panel 1:

```
CRASH
ON
MONTANO
```

Panel 2:

```
USE ALT
RIVER
CROSSING
```
6.2.15 Example – Crash at River Bridge

This example may be used when a crash has been verified along a specific river crossing in the Albuquerque area, and specific information is known about the incident.

Permanent DMS

Panel 1:

```
+----------------------------------+
| CRASH                            |
| ON WB MONTANO                    |
| LEFT LANE CLOSED                 |
+----------------------------------+
```

Portable DMS

Panel 1:

```
+----------------------------------+
| CRASH                            |
| ON MONTANO                       |
+----------------------------------+
```

Panel 2:

```
+----------------------------------+
| LEFT LANE CLOSED                 |
+----------------------------------+
```
6.3 Adverse Weather or Environmental Conditions

DMS messages may be used to warn of adverse weather or roadway conditions downstream that may impact the drivers' visibility or safety. These conditions may include snow, icy roadways, fog, dust storms, falling rocks, mudslides, high winds, etc. Messages related to icy conditions should be posted if conditions are unusual and not normally experienced on that section of roadway.

DMS messages may also be used to inform drivers a regulatory winter chain law is in effect.
6.3.1 Example – Dust Ahead Use Caution

This example may be used when a dust storm (or other weather event) occurs.

Permanent DMS

```
D U S T S T O R M
A H E A D
U S E C A U T I O N
```

Portable DMS

Panel 1:

```
D U S T
S T O R M
A H E A D
```

Panel 2:

```
U S E
C A U T I O N
```
6.3.2 Example – High Wind Advisory

This example may be used when high winds are present in a specific section of road.

Permanent DMS

```
HIGH WIND ADVISORY
USE CAUTION
```

Portable DMS

Panel 1:
```
HIGH WIND ADVISORY
```

Panel 2:
```
USE CAUTION
```
6.3.3 Example – Fog Ahead Reduce Speed

This example may be used when reduced visibility exists due to fog and reduced speed is suggested.

Permanent DMS

F O G  A H E A D
R E D U C E  S P E E D

Portable DMS

Panel 1:
F O G
A H E A D

Panel 2:
R E D U C E
S P E E D
6.3.4 Example – Reduced Visibility Ahead Drive Slowly

This example may be used when reduced visibility exists and the driver is advised to drive slowly.

Permanent DMS

| REDUCED | VISIBILITY | AHEAD | DRIVE | SLOWLY |

Portable DMS

Panel 1:

| REDUCED | VISION | AHEAD |

Panel 2:

| DRIVE | SLOWLY |
6.3.5 Example – Icy Bridge Ahead Use Caution

This example may be used when an icy bridge is expected.

Permanent DMS

<table>
<thead>
<tr>
<th>I C Y</th>
<th>B R I D G E</th>
</tr>
</thead>
<tbody>
<tr>
<td>A H E A D</td>
<td></td>
</tr>
<tr>
<td>U S E</td>
<td>C A U T I O N</td>
</tr>
</tbody>
</table>

Portable DMS

Panel 1:

<table>
<thead>
<tr>
<th>I C Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>B R I D G E</td>
</tr>
<tr>
<td>A H E A D</td>
</tr>
</tbody>
</table>

Panel 2:

<table>
<thead>
<tr>
<th>U S E</th>
</tr>
</thead>
<tbody>
<tr>
<td>C A U T I O N</td>
</tr>
</tbody>
</table>
6.3.6 Example – Flash Flood Warning

This example may be used when flash flood conditions may impact roadway operations, and highway advisory radio (or 511) is used to provide additional information.

**Permanent DMS**

Panel 1:

```
FLASH FLOOD WARNING
SANTE FE AREA
```

Panel 2:

```
TUNE TO # # # # AM
```

**Portable DMS**

Panel 1:

```
FLASH FLOOD WARNING
```

Panel 2:

```
TUNE TO # # # # AM
```
6.4 **AMBER Alerts**

DMS messages may be displayed for AMBER Alerts. Only credible real-time information, where it is crucial to the safety of the victim to disseminate the information to the public in the near term, will be displayed on these DMS signs. Law enforcement activates an AMBER Alert when circumstances meet the criteria established by U.S Department of Justice, Office of Justice Programs [http://www.amberalert.gov/guidelines.htm](http://www.amberalert.gov/guidelines.htm). At a minimum, it must include:

- The missing child is of a pre-determined age
- The law enforcement agency confirms the child has been kidnapped;
- The agency believes the missing child is under threat of serious bodily harm or death;
- Sufficient descriptive information on the child, the abductor, and the vehicle is available

NMDOT will only respond to AMBER alert requests from the New Mexico State Police. The District Traffic Engineer (or his designees) and local New Mexico State Police staff shall jointly agree upon the most appropriate DMS message content(s).

- The District Traffic Engineer (or his designees) shall confer with New Mexico State Police staff regarding the length of time to display messages and extent of roadway system to display the messages (i.e. radius and/or directions and specific routes).
  - Unless the Amber Alert is updated with additional vehicle information, or reissued, the message should be displayed for no more than eight hours or until the Amber Alert is officially called off, whichever occurs first. Exceptions are:
    - **Extension**: If the issuing agency requests an extension, two hours will be added to the remaining display time. If still needed, an additional 2 hour extension may be given at the request of the issuing agency.
    - **Update**: If an update is needed such as new color, make or model of the vehicle or license plate information, any VMS previously activated will be updated with the new information. If the update is within the first four hours of the Amber Alert, the message will continue to be activated for the original eight hour period. If the update occurs after the first four hours of an Amber Alert, the updated message will be extended two hours beyond the original eight hour period.
    - If the Amber Alert occurs between 8 PM and 1 AM, the Amber Alert will remain active until 9 AM the following morning or until the Amber Alert is officially called off, whichever occurs first.
The geographic area over which the information is to be displayed will be limited to a search distance that is reachable within a few hours.

- The District Traffic Engineer (or his designees) shall discuss with the requester the limitations on message content, the number of signs that can be deployed within a given time period, conflicts with other necessary sign messages etc.

The preferred action is to display a radio frequency (referring the public elsewhere for details) such as highway advisory radios (HAR) or appropriate commercial radio. Alternatively, the license plate number (or partial number), can be displayed along with a vehicle description (vehicle make, model, and color). The display of any contact phone number is discouraged, but not prohibited. If none of the fore-mentioned information is available, it is not appropriate to display an Amber Alert message on a DMS.

It may be necessary to turn off an AMBER alert sign that creates a traffic hazard.
6.4.1 Example – AMBER Alert with Vehicle Description

This example may be used when an AMBER Alert has been initiated.

Permanent DMS

Portable DMS

Panel 1:

Panel 2:
6.4.2 Example – AMBER Alert with Radio

This example may be used when an AMBER Alert has been initiated, and highway advisory radio is used to provide additional information.

Permanent DMS

---

Portable DMS

Panel 1:

---

Panel 2:
6.5 Emergency Security Messages

It is acceptable to post electronic security messages only if public agencies have developed policies and procedures that govern the messages to be displayed. The policy and procedures relating to displaying emergency or security alert messages on DMSs must address the following issues:

- The criteria under which DMSs will be used for emergency or security alert messages, including the necessary coordination with public safety or security agencies.

- The geographic area over which the information is to be displayed, to be determined in cooperation with public safety and security agencies.

The discontinuation of use is at the discretion of the District Traffic Engineer (or his designees) if the emergency or security alert message creates an adverse traffic impact such as queues, markedly slowing traffic, etc.
6.5.1 Example – Evacuation

This example may be used to notify drivers that the route should be used during an evacuation.

Permanent DMS

![Permanent DMS diagram]

Portable DMS

![Portable DMS diagram]
6.5.2 Example – Hazmat Spill

This example may be used when a hazmat spill has been verified and all traffic must exit.

Permanent DMS

Panel 1:

```
HAZMAT SPILL
I - 25 EXIT 284
```

Panel 2:

```
ALL TRAFFIC USE
EXIT 282
```

Portable DMS

Panel 1:

```
SPILL
I - 25
EXIT 284
```

Panel 2:

```
ALL TRAFFIC USE
EXIT 282
```
6.6 Special Events Traveler Information

If a special event is likely to impact traffic operations, a message may be displayed on DMSs to inform drivers about exit and parking location information. The message should avoid direct mention of a specific private establishment or event.

Traffic-related information that provides advance notice of upcoming special events that will adversely affect travel by generating major traffic or by requiring street or highway closures (e.g., parades, street auto races, etc.) may be displayed. The advance notification should not be given more than 7 days prior to the special event. Calendar dates should not be used in the message.
6.6.1 Example – Event Traffic Use Gibson

This example may be used to designate event traffic to a specific route to avoid (and minimize) delays.

Permanent DMS

EVENT TRAFFIC
USE GIBSON
AVOID MAJOR DELAY

Portable DMS

Panel 1:

EVENT
TRAFFIC

Panel 2:

USE
GIBSON
6.6.2 Example – Convention Traffic Thursday thru Sunday

This example may be used to warn motorists of upcoming special events so they can consider alternate routes or alternate modes.

**Permanent DMS**

```
CONVENTION TRAFFIC
THURS THRU SUN
USE EXITS 226/227
```

**Portable DMS**

Panel 1:
```
EVENT
TRAFFIC
```

Panel 2:
```
USE
EXITS
226/227
```
6.6.3 Example – Parking Info

This example may be used to provide information about parking.

Permanent DMS

```
RAIL RUNNER PARKING
TUNE RADIO TO
# # # # AM
```

Portable DMS

Panel 1:
```
RAIL -
RUNNER
PARKING
```

Panel 2:
```
TUNE
RADIO TO
# # # # AM
```
6.6.4 Example – Crash Ahead with Event Traffic

This example may be used when a crash has been verified and event traffic should use an alternate route.

Permanent DMS

| CRASH AHEAD | EVENT TRAFFIC | USE NM - 47 |

Portable DMS

Panel 1:

| CRASH AHEAD |

Panel 2:

| EVENT TRAFFIC |
| USE NM 47 |
6.6.5 Example – Rest Area Closed

This example may be used if a rest area is closed in the short-term. Long-term closures should use static signing.

Permanent DMS

```
REST AREA
CLOSED
```

Portable DMS

Panel 1:

```
REST
AREA
CLOSED
```
6.7 Construction or Maintenance Operations

Traffic-related information that provides advance notice of upcoming roadwork may be displayed, but should be replaced by current information whenever applicable. The advance notification should not be given more than 7 days prior to the roadwork; however, calendar dates should not be used in the message. DMSs may also be used to warn motorists of upcoming short-term or temporary construction activities that will impact traffic flow. This may include lane closures, lane shifts, two-way traffic, shoulder work, and construction traffic entering the highway, detours, etc. This will supplement normal roadwork signing as required by the MUTCD. Long-term changes should be signed using static signing.
6.7.1 Example – Lane Closures Scheduled

This example may be used when short-term lane closures will occur in the near future due to construction.

**Permanent DMS**

```
LANE CLOSURES SCHEDULED
MONDAY 9AM TO 5PM
```

**Portable DMS**

Panel 1:

```
ROAD WORK
MONDAY
```

Panel 2:

```
9AM
TO
5PM
```
6.7.2 Example – Road Closed Ahead

This example may be used when short-term road closures will occur in the near future due to construction.

Permanent DMS

<table>
<thead>
<tr>
<th>R O A D</th>
<th>C L O S E D</th>
<th>A H E A D</th>
</tr>
</thead>
<tbody>
<tr>
<td>M O N D A Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 A M T O 5 P M</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Portable DMS

Panel 1:

<table>
<thead>
<tr>
<th>R O A D</th>
</tr>
</thead>
<tbody>
<tr>
<td>C L O S E D</td>
</tr>
<tr>
<td>A H E A D</td>
</tr>
</tbody>
</table>

Panel 2:

<table>
<thead>
<tr>
<th>M O N D A Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 A M - 5 P M</td>
</tr>
</tbody>
</table>

6.7.3 Example – I-25 Closed Friday 11PM to Monday 5PM

This example may be used when short-term road closures will occur in the near future due to construction.

**Permanent DMS**

<table>
<thead>
<tr>
<th>F R I</th>
<th>1 1 P M</th>
<th>-</th>
<th>M O N</th>
<th>5 P M</th>
</tr>
</thead>
<tbody>
<tr>
<td>I - 2 5</td>
<td>N B</td>
<td>C L O S E D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N M - 4 7</td>
<td>T O</td>
<td>S U N P O R T</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Portable DMS**

**Panel 1:**

| F R I | 1 1 P M | T O | M O N | 5 P M |

**Panel 2:**

| I - 2 5 | N B | C L O S E D |
| 2 1 5 - 2 2 1 |
6.7.4 Example – Temporary Lane Shift

This example may be used when short-term lane shifts exist due to construction. Drivers should use caution because of the change in normal conditions for the route.

**Permanent DMS**

```
TEMP LANE SHIFT
NEXT 2 MILES
USE CAUTION
```

**Portable DMS**

Panel 1:

```
TEMP L N
SHIFT
NEXT 2 MI
```

Panel 2:

```
USE
CAUTION
```
6.7.5 Example – No Shoulder Next 3 Miles Use Caution

This example may be used when short-term shoulder closures exist due to construction. Drivers should use caution because of the change in normal conditions for the route.

Permanent DMS

Panel 1:

Permanent DMS

Panel 2:

Portable DMS

Panel 1:

Portable DMS

Panel 2:
6.7.6 Example – Two-Way Traffic Ahead Use Caution

This example may be used in an area where two-way traffic flow is required due to short-term construction. Drivers should use caution because of the change in normal conditions for the route.

**Permanent DMS**

```
T W O - W A Y   T R A F F I C  
A H E A D       
U S E   C A U T I O N
```

**Portable DMS**

Panel 1:

```
T W O - W A Y  
T R A F F I C 
A H E A D
```

Panel 2:

```
U S E  
C A U T I O N
```
6.7.7 Example – No Center Stripe

This example may be used in an area where traffic flow without a centerline is required due to short-term construction. Drivers should use caution because of the change in normal conditions for the route.

Permanent DMS

<table>
<thead>
<tr>
<th>NO</th>
<th>CENTER</th>
<th>STRIPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>KEEP</td>
<td>RIGHT</td>
<td></td>
</tr>
</tbody>
</table>

Portable DMS

Panel 1:

<table>
<thead>
<tr>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>CENTER</td>
</tr>
<tr>
<td>STRIPE</td>
</tr>
</tbody>
</table>

Panel 2:

<table>
<thead>
<tr>
<th>KEEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>RIGHT</td>
</tr>
</tbody>
</table>
6.8 Travel time and Travel Related Information

Travel time information may be displayed if travel times can be measured or calculated using the electronic sensor equipment on the freeway and in the TMC, and if the information can be displayed and updated on the DMS automatically by the system computers.

Travel related information directed at individual vehicles (example: YOUR SPEED, XX MPH) may be displayed if accurate information can be measured or calculated using the electronic sensor equipment on the freeway and if the site conditions allow for the information to be targeted to individual vehicles.
6.8.1 Example – Travel Time to Rio Grande Blvd XX Minutes

This example may be used when travel times are able to be displayed with accuracy.

Permanent DMS

<table>
<thead>
<tr>
<th>T R A V E L</th>
<th>T I M E</th>
</tr>
</thead>
<tbody>
<tr>
<td>T O</td>
<td>R I O</td>
</tr>
<tr>
<td>G R A N D E</td>
<td>B L V D</td>
</tr>
<tr>
<td>XX</td>
<td>M I N</td>
</tr>
</tbody>
</table>

Portable DMS

Panel 1:

| T R A V E L |
|            |
| T I M E    |

Panel 2:

<table>
<thead>
<tr>
<th>T O</th>
</tr>
</thead>
<tbody>
<tr>
<td>E X I T 1 5 7</td>
</tr>
<tr>
<td>XX</td>
</tr>
<tr>
<td>M I N</td>
</tr>
</tbody>
</table>
6.8.2 Example – Travel Time to Central Avenue X-X Minutes

This example may be used when a range of travel times are displayed.

Permanent DMS

<table>
<thead>
<tr>
<th>TRAVEL TIME</th>
<th>TO CENTRAL AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>X - X MINS</td>
<td></td>
</tr>
</tbody>
</table>

Portable DMS

Panel 1:

<table>
<thead>
<tr>
<th>TRAVEL TIME</th>
</tr>
</thead>
</table>

Panel 2:

<table>
<thead>
<tr>
<th>TO CENTRAL AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>X - X MINS</td>
</tr>
</tbody>
</table>
6.8.3 Example – Travel Time to Paseo Del Norte / Exit 232 X Miles XX Minutes

This example may be used when travel times and mileage are displayed.

Permanent DMS

<table>
<thead>
<tr>
<th>I - 25</th>
<th>TRAVEL TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>TO PASEO DEL NORTE</td>
<td></td>
</tr>
<tr>
<td>X MILES XX MIN</td>
<td></td>
</tr>
</tbody>
</table>

Portable DMS

Panel 1:

<table>
<thead>
<tr>
<th>TRAVEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIME</td>
</tr>
</tbody>
</table>

Panel 2:

<table>
<thead>
<tr>
<th>TO EXIT 232</th>
</tr>
</thead>
<tbody>
<tr>
<td>XX MILES XX MIN</td>
</tr>
</tbody>
</table>
6.8.4 Example – Road Info

This example may be used when 511 should be called.

Permanent DMS

```
FOR ROAD INFO
CALL 511
```

Portable DMS

Panel 1:

```
FOR ROAD INFO
```

Panel 2:

```
CALL 511
```
6.8.5 Example – Commercial Trucks Exit

This example may be used when commercial trucks must exit due to a short-term condition.

Permanent DMS

```
OVERSIZED
COMMERCIAL VEH
USE EXIT 162
```

Portable DMS

Panel 1:

```
OVERSIZED
COMM VEH
```

Panel 2:

```
USE
EXIT 162
```
6.8.6 Example – Local Traffic Use Alternate Route

This example may be used when local traffic should consider alternate (unspecified) routes.

**Permanent DMS**

```
LOCAL TRAFFIC
USE ALT ROUTE
```

**Portable DMS**

```
LOCAL TRAFFIC
USE ALT ROUTE
```

6.8.7 Example – Congestion Next 3 Miles

This example may be used when unexpected congestion occurs. Drivers should use caution because of the change in normal conditions for the route.

**Permanent DMS**

```
HEAVY CONGESTION
NEXT 3 MILES
USE CAUTION
```

**Portable DMS**

Panel 1:
```
HEAVY
CONG
NEXT 3 M I
```

Panel 2:
```
USE
CAUTION
```
6.9 Special Public Safety Messages

Messages related to driver safety campaigns will be allowed if other media is used, such as radio, TV, newspapers, billboards, etc. This is necessary since the message could be confusing to drivers if they have not been exposed to the information. In this case the DMS should be used randomly, and sparingly. The total duration of display in these cases should not exceed two hours per day on any one message board. Information related to changes in public law or traffic control, which is determined by the District Traffic Engineer to be necessary for the safety of the traveling public, is not considered to be a PSA.
6.9.1 Example – Click it or Ticket

This example may be used for “CLICK IT OR TICKET” campaigns.

Permanent DMS

```
CLICK IT
OR TICKET
```

Portable DMS

```
CLICK IT
OR TICKET
```
6.9.2 Example – Don’t Drink and Drive

This example may be used for “DON’T DRINK AND DRIVE” campaigns.

Permanent DMS

```
DON'T DRINK
AND DRIVE
```

Portable DMS

Panel 1:

```
DON'T
DRINK
```

Panel 2:

```
AND
DRIVE
```
6.10 Test Messages

Test messages are discouraged; however, during DMS system testing or during maintenance, test messages are permitted to test sign functionality. Test messages are for short durations.
6.10.1 Example – Sign under Test

This example may be used when a sign is tested.

Permanent DMS

Portable DMS
6.10.2 Example – Test Message

This example may be used when a sign or DMS software is tested.

Permanent DMS

Portable DMS
6.10.3 Example – New Mexico Department of Transportation Sign under Test

This example may be used when a sign is tested.

Permanent DMS

```
+---------------+---------------+----------------+---------------+---------------+
|               |               |                |               |               |
| NEW           | MEXICO        | DOT            | SIGN          | UNDER         |
| SIGN          | UNDER         | TEST           |               |               |
+---------------+---------------+----------------+---------------+---------------+
```

Portable DMS

Panel 1:

```
+---------------+---------------+---------------+---------------+---------------+
|               |               |               |               |               |
| NEW           | MEXICO        | DOT           |               |               |
+---------------+---------------+---------------+---------------+---------------+
```

Panel 2:

```
+---------------+---------------+---------------+---------------+---------------+
|               | SIGN          | UNDER         | TEST          |               |
+---------------+---------------+---------------+---------------+---------------+
```