20.1.1 Introduction

The guidance in Chapter 20 is intended for the placement of *new* dynamic message signs (DMS) as part of new constructions projects only. The STOC must be contacted if retrofitting a dynamic message sign to an existing system or in any other circumstance where the addition of a DMS is being considered.

Dynamic message signs (DMS) are traffic control devices used to provide motorists en-route traveler information. They are commonly installed on full span overhead sign bridges; post mounted on roadway shoulders, and overhead cantilever structures. The information is most often displayed in real-time and can be controlled either from a remote centralized location or locally at the site. DMS are designed to affect motorist behavior to improve traffic flow and operations. Traveler information displayed on DMS may be generated as a result of a planned or unplanned event, which is programmed or scheduled by operations personnel. Examples of traveler information include:

- Incidents affecting traffic
- Emergency situations requiring diversion
- Amber Alerts
- Recurrent traffic congestion
- Current roadwork
- Future roadwork (up to 10 days in advance)
- Special events
- Current travel times
- Static travel times
- Weather information specific to travel conditions

By State policy, DMS should not be used to display the following information:

- Advertising products or slogans, whether WisDOT related or not
- Safety messages
- Weather reports or temperature
- Time of day or date
- Directions for specific user groups

The objective of providing the information is to allow the motorist time to avoid an incident, prepare for unavoidable conditions, or to give travel directions. For all information displayed the goal is to have a positive impact on the motorist's travel time. Additional guidelines for when and how to use DMS, see TGM 17-1-1.

20.1.2 Needs Assessment

DMS can be located on stretches of highway to inform motorists traveling at high speed or along heavily traveled arterial roadways leading to the freeway system to be seen by motorist traveling at slower speeds. Refer to the Transportation Operations Infrastructure Plan for when DMS are needed.

20.1.2.1 Data Collection

Data collection required for DMS deployment is broken into two areas: preliminary data collection, and site-specific data collection. Under preliminary data collection, the following information will need to be obtained to determine the area, corridor and type of changeable message sign.

- Intended purpose of DMS
- Type of information to be displayed on DMS
- Alternate route diversion points

Under site-specific data collection, the following information will need to be obtained to determine the exact location of the changeable message sign.

- Base mapping with local roadway network linked to the segment under review for the DMS
- Existing roadway horizontal alignment
- Roadway vertical information
- Existing sign inventory
- Location of power facilities along roadway segment

20.1.2.2 Types

There are multiple types of DMS technology currently deployed, such as flip disk, fiber optic and light emitting diode (LED); however, LEDs have become the dominant DMS technology choice.

20.1.2.3 Determination of DMS Type

Prior to locating DMS along a roadway segment some engineering decisions need to be made, and DMS type selected. The five types DMS on the Statewide Procurement include:

- OVERHEAD FREEWAY DYANMIC MESSAGE SIGN, FULL MATRIX (3 LINES, 18-INCH)
- SIDE MOUNTED FREEWAY DYNAMIC MESSAGE SIGN, FULL MATRIX (3 LINES, 14-INCH)
- ARTERIAL DYNAMIC MESSAGE SIGN, FULL MATRIX (3 LINES, 12-INCH)
- ARTERIAL DYNAMIC MESSAGE SIGN, FULL MATRIX (2 LINES, 10-INCH)
- PORTABLE DYNAMIC MESSAGE SIGN (3 LINES, 18-INCH, FULL MATRIX)

The MUTCD requires a minimum character height of 18 inches for any DMS that is placed on a roadway where speeds exceed 55 MPH as stated in MUTCD 2E.21. While DMS larger than the minimum size may be acceptable from the perspective of the MUTCD, the larger signs can have negative impacts on the surrounding area depending on the characteristics of existing surrounding area. Particularly, they can contribute significantly to light pollution near residential areas.

Freeway and arterial DMS are used for permanent applications. These signs require an engineered concrete base and structure. A State Licensed structural engineer must design the sign structure and foundation. WisDOT Central Office reviews and approves all DMS structure and foundation plans. Portable CMS are used for temporary applications (see Chapter 35 PCMS).

DMS Matrix Displays

Messages are limited by the type of DMS used and its display space configuration or matrix. There are three typical types of matrix displays, which are Character, Line, and Full. In a character matrix a separate display space is made available for each letter of the text message. A character matrix of 8 horizontal by 3 vertical has only 24 display spaces available. In a line matrix there is no physical separation between the characters in a single line of text. However, in a line matrix there still remains a separation between different lines of text. In a full matrix no physical separations exist between individual characters or lines in the message. A message can be shown at any size and location as long as it is within the display space. The exhibit below demonstrates the differences between the matrix types.

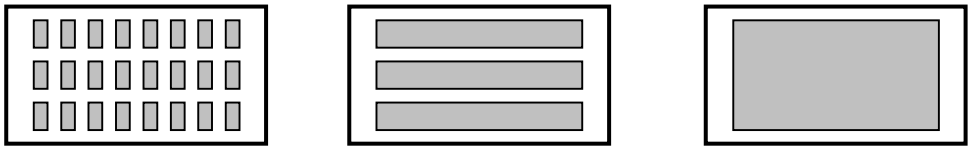

Figure 5-2: Dynamic Message Sign Matrix Displays

Messages displayed on a DMS are done by using one or two phases. A phase is defined as the limits of the display area available for text, bitmaps, or animation. According to WisDOT TGM policy 17-1-1, DMS shall have no more than two phases per sign.

For specific procurement product information, see Chapter 70.5 State Supplied List. Contact the STOC for product information.

Follow the DMS Design Process checklist shown in Table 20.1

Table 20.1 DMS Design Process Checklist

1. Collect preliminary data required for the proposed dynamic message sign location	
2. Determine DMS type	
3. Determine corridor placement for DMS implementation	
4. Collect site-specific data required for the proposed DMS location	
5. Select the DMS site required for design	
6. Determine cabinet placement for the DMS	
7. Perform underground infrastructure	
8. Determine the communications medium used for the proposed location	
9. Revisit steps 4 through 8 until final design is complete	
10. Begin the process to establish electrical service for the proposed location with the local power company. This should be done early in the design process to establish an acceptable electrical service location.	
11. Determine the construction details needed for the proposed design, details which need to be modified, and new details which need to be created to provide a complete construction plan.	
12. Determine the special provisions needed for the proposed design, special provisions that need to be modified, and new special provisions, which need to be created to provide a complete construction plan.	
13. Determine the standard specification bid items and procurement items that will need to be included in the estimate and miscellaneous quantities to provide a complete construction plan.	