

Connecticut Department of Transportation

Portable Variable Message Signs Operations Guide

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1 Purpose

- The purpose of this manual is to present basic guidelines for the **correct, consistent and uniform usage** of Portable Variable Message Signs (PVMS) in the State of Connecticut.
- The State of Connecticut shall conform with the **PVMS standards in the *Manual on Uniform Traffic Control Devices (MUTCD)*** (see References for this manual).
- If there are any **questions** on this manual please contact the Connecticut Department of Transportation (ConnDOT) Bridgeport or Newington Highway Operations Center for further clarification.

2 Application of PVMS

- PVMS shall display messages about changing, dynamic, short-term conditions that are not practical to display using static signing.
- PVMS should be used to supplement conventional signs and pavement markings, but not to replace them.
- PVMS should display either real-time information or prior notification of events or conditions affecting transportation.
- PVMS may be used to alert and inform motorists about:

Roadwork	• Pre-Warning
	• Active
Special Events Pre-approved by ConnDOT	• Pre-Warning
	• Active

3 PVMS Message Composition Guidelines

3.1 Legibility and Visibility

3.1.1 General

- The visibility of the PVMS, the design of the message, and the visual capabilities of the motorists together determine whether **motorists can notice, see, read, and understand the PVMS message** within the short time it is in view.

3.1.2 Message Phasing

- The message should be as **brief** as possible:
 - **One-frame** messages are **ideal**.
 - **Two-frame** messages are **acceptable**.

- Messages **shall not have more than two frames**.
- A two-frame message shall be **clear** to motorists, **regardless of which frame is read first**.
- **Each frame** of a two-frame message shall be **displayed for 3.0 seconds**.

3.1.3 PVMS Legend

- The only acceptable color combination for PVMS shall be **amber characters on a black background**. Reverse coloring (i.e., black characters on an amber background) shall NOT be used.
- The letters on PVMS should be **at least 18 inches high**.
- **Single stroke fonts only** shall be used for letters, numbers and characters on PVMS. No double stroke fonts shall be used.
- PVMS messages shall use **all upper-case letters**. No lower-case letters shall be used.

3.2 Design Characteristics

3.2.1 PVMS Message Content

- Acceptable PVMS message content **answers one or more of the following questions**:
 - What is the happening ahead?
 - Where?
 - What is the impact on the roadway?
 - Who is the target audience?
 - What should the motorist do?
 - When?
- Message content that does not answer any of the above questions should not be used.
- Some guidelines for PVMS message content are:
 - Do not put **too much information** in the message;
 - Include only the **highest priority** information;
 - Ensure that the **words are grouped** so that motorists can easily understand the message. For example, don't split dates and times onto different frames.

- The messages below are examples of **correct message content**:

Active Roadwork:

**ROADWORK
EXITS
46 - 47**

Frame 1

**EXPECT
LANE
CLOSURES**

Frame 2

Roadwork Pre-Warning:

**NIGHT WORK
EXITS
25 - 28**

Frame 1

**8/19 – 8/26
6PM - 6AM**

Frame 2

3.2.2 Abbreviations

- Use of abbreviations should be **minimized**. Abbreviations should be used only where space limitations exist.
- **Acceptable abbreviations** are shown in **Appendix A**. Only these abbreviations should be used on PVMS messages.

3.2.3 Message Appearance

- The following message display techniques **should NOT be used**:
 - Fading;
 - Repeated flashing;
 - Exploding;
 - Dissolving;
 - Moving messages;
 - Scrolling in any direction;
 - Animation.
- PVMS messages **should not include graphics**.
- Each line of the message should be **centered**.

4 PVMS Location and Placement Guidelines

- When multiple PVMS are needed, they should be placed on the **same side** of the roadway and they should be **separated from each other** by a distance of **at least 1,000 feet** on all roadways.
- There should be **a distance of at least 1,000 feet** between:
 - A PVMS and an arrow panel;
 - A PVMS and a permanent Variable Message Sign (VMS);
 - A PVMS and a static sign.
- PVMS should be placed so that **motorists can see them clearly from far away**, and so they have enough time to respond to the PVMS message. Specifically, PVMS should be located:
 - **Far enough in advance of major route diversion points**, to give motorists a chance to change lanes, adjust their speed, or exit the highway;
 - **No further than one mile in advance of the decision point**. The message may not be as effective if the PVMS is too far away;
 - **Far enough in advance of known bottlenecks and high crash locations** to give motorists a chance to choose another route or to alert them to the conditions.
- PVMS should **NOT** be located:
 - Where static guide signs prompt many motorists to **change lanes**, or because of merging or weaving traffic;
 - Where motorists are **already distracted** by many guide signs and other items that grab their attention.
 - **Within an interchange**.
- Motorists should have a **clear line of sight to the PVMS from ½ mile away**. If curves or hills block the line of sight, the PVMS should be located further back.
- PVMS should not be installed where they would be **obstructed** by:
 - Other signs;
 - Structures;
 - Trees/vegetation;
 - Other large objects.
- PVMS should be placed **off the shoulder** of the roadway and **behind a traffic barrier**, if practical.
 - Where there is no traffic barrier to shield the PVMS, the PVMS should be placed off the shoulder and outside of the clear zone.
 - If a PVMS has to be placed on the shoulder of the roadway or within the clear zone, it should be delineated with **retroreflective Temporary Traffic Control (TTC) devices**.
- A PVMS should be **visible from all travel lanes**, giving motorists enough time to read the whole PVMS message.

- PVMS should be installed on **level surfaces**.
- PVMS should be **angled** 5 to 10 degrees toward oncoming traffic.
- The bottom of the PVMS shall be at least **7 feet above the roadway surface**.

5 PVMS Message Categories and Examples

5.1 Acceptable Message Content

- PVMS shall display only traffic operational, regulatory, warning, and guidance information.
- Acceptable PVMS applications are covered in Section 2. Section 3.1 provides guidelines for message composition and content, including examples of PVMS messages used by ConnDOT.
- **Appendix C** contains a **library of example messages** used previously by ConnDOT.
- The following formats should be used for **location information** within a PVMS message:

LOCATION TYPE	EXAMPLES
Numbered road	I-395, ROUTE 8, RT 15
Unnumbered road	MOUNTAIN ROAD, MOUNTN RD
Location along road (point or range)	EX 27, EXIT 30-31, I-84 WEST EX 48-46 (in the order seen by motorists)
Ramp	EXIT 47 RAMP, EX 10 RAMP
Direction of travel	EAST, N, E (for ramps and exits as in "EXIT 2E")

- For dates and times, use the "Month/Day" format for dates and the "12-hour clock times followed by an AM or PM" for times. The following examples show the **correct formats for date and time** within a PVMS message:
 - 7/15 – 7/17
 - WED 10/26
 - NIGHT SWEEPING 8PM-6AM

5.2 Unacceptable Message Content

- The following types of messages are **unacceptable** and shall **NOT** be displayed on PVMS:
 - Advertising;
 - Public Service Announcement (PSA);
 - Safety campaign messages, unless pre-approved by ConnDOT;
 - Special event messages, unless pre-approved by ConnDOT;

- Messages containing telephone numbers or web addresses;
- Time and date only (i.e., not as part of a scheduled event message);
- Holiday messages;
- Personal messages.

6 PVMS PROCEDURES

6.1 Message Development

- When there is a reason to display a message on a PVMS, **consult the PVMS sample messages** in Appendix C for guidance on content and format.
- A **sample worksheet** for your use in creating PVMS messages is contained in Appendix B.
- If there are any **questions about message content or format**, contact the ConnDOT Newington or Bridgeport Highway Operations Center.

6.2 Planned Event Pre-Warning

- PVMS may be used to provide **pre-warning for planned events** (i.e., roadwork, pre-approved special events).
- Pre-warning PVMS messages shall be different from active messages by **clarifying that the event will occur in the future**, e.g., using the wording “TO CLOSE” instead of “CLOSED”.
- The **display period** for pre-warning events **varies depending on the situation**, but generally pre-warning PVMS messages are displayed about one week before the start of the roadwork or special event.
- Please contact the Newington or Bridgeport Highway Operations Center if there are any **questions concerning the appropriate time period for running pre-warning messages**.

6.3 PVMS Not in Use

- A PVMS message shall be **immediately removed** from display when the event or condition described in the message **has terminated or is no longer valid**.
- When PVMS are not active, they should be **blanked or covered** with a secure covering.
 - As a last resort, they should be rotated to **face away from the road**.

6.4 PVMS Security and Contingency Measures

- PVMS **control boxes shall be locked** to prevent tampering and vandalism.

REFERENCES

Dudek, Conrad L., *Changeable Message Sign Operation and Messaging Handbook*. FHWA-OP-03-070. Washington D.C.: Federal Highway Administration. 2004.

Federal Highway Administration, U.S. Department of Transportation. *Manual on Uniform Traffic Control Devices*. 2009 Edition with Revisions 1 and 2, May 2012.

Federal Highway Administration, U.S. Department of Transportation. *Portable Changeable Message Sign Handbook*. FHWA-RD-03-066. 2003.

Appendix A – PVMS Abbreviations

PVMS ABBREVIATIONS

Word Message	Standard Abbreviation
Abnormal	ABNRML
Afternoon / Evening	PM
Ahead	AHD
Alternate	ALT
AM Radio	AM
And	&
Avenue	AVE, AV
Between	BTWN
Bicycle	BIKE
Blocked	BLKD
Both Directions	B/D
Boulevard	BLVD**
Bridge (with name)	BRDG*, BR*
Cannot	CANT
CB Radio	CB
Center (with lane)	CNTR, CTR
Center (as part of a place name)	CNTR
Closed	CLSD
Congested	CONG
Connecticut	CT, CONN
Consecutive Exits	A - B
Construction	CONST
Crossing (other than highway- rail)	XING
Date	5/18 – 7/1
Department	DEPT
Do Not	DONT
Downtown	DWNTN
Drive	DR**
East	E
Eastbound	E
Emergency	EMER, EMERG

Word Message	Standard Abbreviation
Entrance, Enter	ENT
Exit (e.g., next)	EX
Exit (with number)	EX, X-
Feet	FT
Friday	FRI
Hazardous Material	HAZMAT
Heavy	HVY
High Occupancy Vehicle	HOV
Highway	HWY**
Highway-Rail Grade Crossing	RR XING
Hour(s)	HR, HRS
Information	INFO
Interstate (with number)	I-*
It Is	ITS
January	JAN
Junction / Intersection	JCT
Lane (with roadway name)	LN*
Lane (with right/left/center)	LN
Left	LFT
Line	LIN
Maintenance	MAINT
Major	MAJ
Maximum	MAX
Mile(s)	MI
Miles Per Hour	MPH
Minimum	MIN
Minor	MNR
Minute(s)	MIN
Monday	MON
Morning / Late Night	AM

Adapted from MUTCD Table 1A-1 and Table 1A-2.

* This abbreviation, when accompanied by a prompt word, may be used on traffic control devices other than portable changeable message signs.

** This abbreviation shall not be used for any application other than the name of a roadway.

Word Message	Standard Abbreviation
Motorcycle	MTRCYCLE
North	N
Northbound	N
Numbers (e.g., 2 lanes)	1, 2, 3...
Open	OPN
Orange	ORNG
Oversized	OVRSZ
Overtaken	OT
Parking	PKING
Parkway	PKWY**
Pavement	PVMT
Pedestrian	PED
Pounds	LBS
Ramp	RMP
Right	RT
Road	RD**
Roadwork	RD WK, RD WRK
Route (e.g., best)	RT
Route (with number)	RT
Safety	SFTY
Saturday	SAT
Shoulder	SHLDR
Slow	SLO
South	S
Southbound	S
Speed	SPD
State Road	SR**
Street	ST**
Sunday	SUN
Temporary	TEMP
Through	THRU
Thursday	THURS
Tons of Weight	T
Traffic	TRAF
Truck	TRK

Word Message	Standard Abbreviation
Tuesday	TUES
Turnpike	TPK**
Two-Way Intersection	2-WAY
Two-Wheeled Vehicles	CYCLES
US Numbered Route	RT**
Vehicle(s)	VEH, VEHS
Warning	WARN
Wednesday	WED
West	W
Westbound	W
Will Not	WONT

Adapted from MUTCD Table 1A-1 and Table 1A-2.

* This abbreviation, when accompanied by a prompt word, may be used on traffic control devices other than portable changeable message signs.

** This abbreviation shall not be used for any application other than the name of a roadway.

UNACCEPTABLE ABBREVIATIONS

ABBREVIATION	INTENDED WORD	COMMON MISINTERPRETATION
ACC	Accident	Access (Road)
CLRS	Clears	Color
DLY	Delay	Daily
L	Left	Lane (Merge)
LT	Light (Traffic)	Left
PARK	Parking	Park
R	Right	-
RED	Reduce	Red
STAD	Stadium	Standard
WRNG	Warning	Wrong

Adapted from MUTCD Table 1A-3.

Appendix B – PVMS Worksheet

PVMS WORKSHEET

Location of board: _____

Used: from ____ - ____ - ____ at ____ : ____ am/pm

to ____ - ____ - ____ at ____ : ____ am/pm

Message programmed by: _____

MESSAGE 1

MESSAGE 2

Timing:

Message 1 will run ____ . ____ seconds.

Message 2 will run ____ . ____ seconds.

Appendix C – PVMS Sample Message Library

PVMS SAMPLE MESSAGE LIBRARY

Phase 1			Phase 2		
Line 1	Line 2	Line 3	Line 1	Line 2	Line 3
ROADWORK - ACTIVE - Stated Cause					
ROADWORK	EXIT 20	OFF RAMP	USE	CAUTION	
ROAD WORK	RT 34	WEST	RIGHT	LANE	CLOSED
ROAD WORK	AHEAD		RIGHT LANE	CLOSED	
ROADWORK - ACTIVE - Cause Not Stated					
ROUTE 1	CLOSED	MILFORD	FOLLOW	DETOUR	
LANE SHIFT	AHEAD		USE	CAUTION	
I-691 EAST	EXIT 4	CLOSED	USE	ALTERNATE	ROUTE
SINGLE	LANE	AHEAD	STAY	IN	LINE
ROADWORK - PRE-WARNING					
NIGHT WORK	8/19 - 8/26	6PM - 6AM	EXPECT	DELAYS	
SPECIAL EVENT - ACTIVE					
LIGHTHOUSE	PARK	CLOSED	PARK AT	FULL	CAPACITY
STADIUM	TRAFFIC		USE	NEXT	EXIT
SPECIAL EVENT - PRE-WARNING					
HARTFORD	MARATHON	OCTOBER 12	EXPECT	MAJOR	DELAYS