

TO:		ENGINEERING INSTRUCTION	
SUPERSEDED BY <u>EI 05-031</u> EFFECTIVE <u>01/17/06</u>		NEW YORK STATE DEPARTMENT OF TRANSPORTATION	
		SUBJECT: JUSTIFICATION FOR VARIABLE MESSAGE SIGNS	
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APPROVED:		Supersedes:	
 J. R. LAMBERT, Deputy Chief Engineer (Fac. Des. Div.)			

Variable Message Signs are highly visible aids to traffic maintenance and can be very effective when used appropriately. However, they cost many times the price of standard construction signs. Therefore, the use of these signs should be restricted to only the most appropriate applications. In addition, the effectiveness of these signs might be diminished if they are used too frequently. Any designer proposing a variable message sign should consider the following criteria and include this as justification when requesting the Final Plan Review Bureau to approve these signs for a particular contract:

1. **VARIABILITY** - Would the various messages proposed for this sign make it more cost-effective than an equivalent number of fixed message standard construction signs? Is "real time" information absolutely necessary? How often would the message be expected to change?
2. **PORTABILITY** - Is portability necessary or would conspicuity suffer if a portable standard construction sign is used?
3. **CONSPICUITY** - Can sufficient conspicuity be achieved using standard construction signs, even if flashing lights are utilized to augment conspicuity? What are the consequences of not noticing this sign? Would a standard construction sign be obscured at the needed location due to numerous other construction signs, poor geometrics, etc.
4. **COST-EFFECTIVE** - If several standard construction signs are viable alternatives to a single variable message sign, what is the cost difference? Average bids for variable message signs have been approximately \$18,000.
5. **OVERRIDING CONSIDERATIONS** - Are there any overriding considerations to warrant a variable message sign even if other warrants are not sufficient justification?

Variable Message Signs, being electromechanical devices, are more prone to failure than conventional construction signs. Therefore, the Variable Message Sign should never be used to replace the construction signs required by the MUTCD but only to supplement them.

A comprehensive Department policy on the effective use of Variable Message Signs has not yet been formulated. In the meantime, the above listed justification criteria, in conjunction with the attached outline on the use of Portable Variable Message Signs, will serve in the interim.

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The attached special specification for Portable Variable Message Display Units, item 14634.1002, may be used after justification has been approved. We will be evaluating the usage of this item, therefore, even though it has a "14" prefix, the designer is requested to insert a copy of this specification into the proposal as if it is a "one time only" specification.

Any questions concerning this Engineering Instruction may be addressed to Richard Stempel at 518 457-4093.

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PORTABLE VARIABLE MESSAGE SIGNS

I. Advantages/Uses

- A. Provides real time information. Some models have cellular phone connections which can allow for message design from remote locations.
- B. Portable for flexibility in placement. Can be moved as needs dictate.
- C. Increased visibility/legibility provides earlier advance warning and earlier lane shifting/merging.

II. Possible Applications of VMS

- A. Queueing in both urban and rural work zone approaches. VMS should be considered for double lane closures. VMS should be between 1500 feet and 1/2 mile upstream of the upstream end of the queue. As the queue lengthens or shortens, the sign should be moved accordingly. If the sign will not be moved in a timely fashion to maintain the advance posting distance, don't even bother using it. A "Be Prepared to Stop" sign will be of comparable value to a VMS which is not responsive to the queue length. The VMS should be either removed or display no message when there is no queue or other disruption in flow.
- B. Intermittent short term roadway or lane closures for Contractor operations such as bridge steel installation. VMS should be placed upstream of the appropriate off-ramp, if it is desired to provide a detour, and upstream of expected queue if traffic is being stopped. The frequency of the closures should be considered. VMS may be cost effective to redeploy and remove if the closures are frequent, especially if one is already being used in the Contract.
- C. The first several days of ramp closure on an urban expressway, provided that VMS is already in the contract and is available. A standard sign should provide warning of the closure at least two weeks in advance but a VMS, if already available, may be appropriate to advise motorists that the lane closure they have been reading about starts today. VMS should remain in place only long enough for motorists to become accustomed to the closure.
- D. Roadway or lane closure for the purpose of night time construction.
- E. Incident management for work zones on congestion prone (peak period level of service F during construction) urban expressways.
- F. Combination of weather/environmental conditions with construction activities which may be cause for concern.
- G. Abnormally severe geometrics or other factors requiring an unexpectedly strong driver reaction, especially on rural expressways.

PORTABLE VARIABLE MESSAGE SIGNS (Cont'd.)

- H. For high volume lane closures when normal signing is not inducing lane changing far enough in advance of the taper to maintain smooth flow.

III. Concerns/Disadvantages

- A. High cost \$30K to 50K to purchase, \$18K bid price on capital projects, for high tech signs
- B. Overuse will reduce their effectiveness
- C. Need for some standardization/control of messages displayed
- D. Inappropriate use will undermine their credibility and/or effectiveness

IV. Don't use VMS

- A. For signing applications which can be done just as efficiently and at lower cost with standard ground mounted signing.
- B. Non-critical speed reductions
- C. For conditions expected at a future date (ramp closures etc.)
- D. Long term applications of the same message in urban areas where most of the motorists will be familiar with the work zone.

Summary Sheet VARIABLE MESSAGE BOARD PRODUCTS Prepared by the Georgia Department of Transportation

Sign Manufacturer	Sign Type	Legibility (Feet)		Approximate Initial Cost	Estimated Annual Operation Costs
		Day	Night		
Sunshine ¹	B ²	800	750	\$26,000	\$4345
Winko-Matic ¹	B	800	750	\$26,000	\$4345
WAVS, Inc.	AB ³	1000	1000	\$47,000	\$2870
ADDCO ¹	F ⁴	900	650	\$26,000	\$1435
LTI ⁵	F	*	800 ⁶	\$26,000	\$1327
Tele-Spot ⁷	F	*	620	\$22,500	\$ 645
Winko-Matic	F	1100 ⁶	1100 ⁶	\$26,000	\$1137
Fiber Optic Sales ⁸	LED	950	750	\$45,000	\$5000

* To be determined

- 1 In current use by GDOT
- 2 Bulb-matrix
- 3 Automotive bulb-matrix
- 4 Flip-disc
- 5 Lake Technologies, Inc.
- 6 For double-stroke characters
- 7 Does not meet GDOT legibility specification
- 8 Display is L.E.D. and costs are in 1991 dollars

Costs are for the year 1988 except for Fiber Optic Sales

ITEM 14634.1002 - PORTABLE VARIABLE MESSAGE DISPLAY UNITS

DESCRIPTION:

Under this item the contractor shall furnish, install, maintain, relocate and remove variable message display units at locations shown on the plans and/or as ordered by the Engineer. The display units are intended for use as temporary warning devices for lane and roadway closures, and for conveying information to motorists about the construction.

MATERIALS:

Variable message display units shall meet the requirements of Sections 201.3 and 294.6 of the New York State Manual of Uniform Traffic Control Devices. Each unit shall have a three line display with a minimum of eight, 18-inch high, characters per line. The unit shall have a programmable memory with self-contained keyboard control, and shall be capable of displaying up to six messages in a cyclical sequence. The control console shall include a screen for the operator to preview message content, flash rate and message sequence. The control console shall be mounted in a lockable compartment.

Illumination intensity shall be automatically adjustable for various day and night time ambient conditions. The unit shall be trailer mounted, equipped with all necessary lights, fenders, reflectors, etc. for use on public highways in accordance with the NYS Vehicle and Traffic Law. The unit shall be capable of energizing the message display for a minimum of 72 hours, unattended.

CONSTRUCTION DETAILS:

The contractor shall furnish, install, maintain and program variable message display units at the locations shown and for the usage indicated in the contract documents. When in use, the units shall be set so that the base of the message display panel is at least seven feet above the pavement surface and properly aligned to provide optimum viewing by approaching motorists.

The contractor shall be responsible for maintenance, repair and continuous operation of the display units until progress of work no longer requires their use, as determined by the Engineer. These units shall also be made available for emergency incident management, within the project limits, for a period of up to five (5) work days, for each incident, at no additional cost to the State. If the emergency requires the use of these units for more than five (5) days, the additional time, starting from the sixth day, shall be paid for under force account work.

METHOD OF MEASUREMENT:

Portable Variable Message Display Units will be measured as the number of Portable Variable Message Display Units furnished, installed, maintained, relocated and removed in accordance with the plans, specifications and as ordered by the Engineer.

ITEM 14634.1002 - PORTABLE VARIABLE MESSAGE DISPLAY UNITS

BASIS OF PAYMENT:

The unit price shall include the cost of all labor, materials and equipment necessary to complete the work.

75% of the unit price shall be paid when each unit has been installed and is operational; the balance shall be paid upon completion of the project.