

CoPTTM Update Note – effective 23 December 2008

New requirements and recommendations for Truck Mounted Attenuator (TMA) appearance, mobile Advance Warning Variable Message Sign (AWVMS) and Light Arrow Systems

Introduction

Following a series of trials, detailed in *“Best practice for use and design of truck mounted attenuators (TMA) for New Zealand roads”* (RR301 2006), (A study funded by Land Transport New Zealand), the New Zealand Traffic Agency has set up a sub committee of the COPTTM Industry Review Group (IRG) to develop a strategy for introducing consistent best practice for the above on State Highways.

This amendment addresses a preferred TMA vehicle design. In the interest of consistency a move has been made to standardise TMA's and associated Traffic Management equipment. This will provide road users with an instantly recognisable traffic control vehicle be consistent with proven international best practice, increasing safety for work sites and road users. For this reason no advertising is to be used on the rear facing parts of the TMA in the attenuator deployed configuration. When the attenuator is in the closed or “up” position a logo of modest dimensions and contact details may be displayed.

Structure of Note

- Part A - Advanced Warning Variable Message Sign (AWVMS)**
- Part B - Light Arrow System (LAS)**
- Part C - Rear Panel of the Attenuator Vehicle**
- Part D - Xenon Warning Lights**

Timescale

The timescale for the implementation of the improvements is described in each of the sections.

Implications

The implications both financial and contractual have been considered.

The major contracting organisations have confirmed their support for this initiative, are committed to the recommendations of this note and have commenced updating their equipment as a best practice safety improvement.

Cost issues associated with the change are mitigated by the replacement of the current use of a Tail Pilot TMA vehicle with the new Advanced Warning Variable Message Sign unit. Benefits include an improvement in road safety, particularly in

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a reduction of TMA strikes. The implementation of many of the requirements will be phased in over time as contracts are re-tendered.

Part A - Advanced Warning Variable Message Sign (AWVMS)

Section A1

The new AWVMS replaces the tail pilot vehicle, resulting in one less TMA being required. The AWVMS is to be a stationary sign and can only be carried on either a small utility vehicle or small trailer and shall be located on the road shoulder and out of live lanes.

It is recommended that all RCAs adopt this policy for level 2 and 3 roads.

Section A2

Effective Dates

- AWVMS may be used on Level 2 and 3 State Highways from 1 December 2008
- Level 2 and 3 All new NZTA contracts awarded from 1 July 2010 will require this style of AWVMS.



Section A3

Specification:

The AWVMS display is divided into 4 main components

1: Xenon Warning Lights

Refer to specification in **Part D** of this note, for technical details.

2: Advance Warning Sign (Top Panel on board)

Minimum size of 1200h x 1200w (+ or – 50mm). VMS panel that can be configured to replicate existing approved temporary warning signs as

contained within Section B of CoPTTM. (Note Advance Warning signs are Orange on a Black background)

3: VMS Sign

Minimum size of 1500h x 1200w made up of 2 areas:

Graphics Area (lane use information) 1200mm height x 1200mm width (+ or – 50mm). This panel must be configured to replicate only existing approved temporary direction and protection signs contained within the signs information in Section B of CoPTTM.

Text Area (advisory information such as distance to hazard) 300h x 1200w, displaying capitals and numerals in 300 mm high text (+ or – 25mm), and lower case in 150mm high text (+ or – 25mm) in an equivalent font to that detailed for signs in Section B of CoPTTM. Note the text is to be in a static form and not to scroll.

4: Base Panel: 300mm high for the full width of the sign.

Height: The bottom of the text panel must be a minimum of 600mm above the pavement

Section A4

Specification:

Photometric values according to Specification EN Draft 12966

Display colour: Pixels shall be an amber colour clause 6.1.5 Guideline & Reference Manual for VMS (GRMVMS)
Hertz Not less than 100 Hz

Text Panel

1280 yellow LED 15-25mm spacing

Warning Sign

6400 yellow LED 15-25mm spacing

Matrix Symbol size 25

Section A5

Operational Principles

- The AWVMS may only be used within a works area, or on the left hand roadside shoulder or the centre median, where it can be established 2 metres clear of the edgeline.
- The AWVMS system must not be attended or operated from the traffic side of the apparatus. In situations where there is ample centre median and a median barrier the operator should attend the apparatus from the side that is protected by the median barrier.

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- There must be a minimum distance of 400m from AWWMS to the shadow vehicle
- The maximum allowable distance from AWWMS to the shadow vehicle is 1000m
- Where side roads intersect additional advanced warning must be provided as required by CoPTTM.
- Clear Sight Distance to the AWWMS must be maintained i.e. 3 x Posted Speed Limit
- AWWMS must not be located on sag curves. To avoid the lamps shining directly at drivers of approaching vehicles they must be located on a level surface for visibility performance and safety. The display must be positioned as specified. The height and orientation as specified is required to ensure that road users are not unduly affected by the operation of the Xenon warning lights. (see Part D Xenon specification for further information)
- If the AWWMS is used in any function other than as an advanced warning sign for temporary traffic management the **xenon lights must be turned off**. When used as a VMS sign only it must comply with all other relevant legislation and sections of CoPTTM.

Currently approved AWWMS models are:

Nissen LED Type Matrix 35, and

Horizont VWT-LED.

Other AWWMS signs may be used subject to NZTA approval.

Part B - Light Arrow System (LAS)

Section B1

The Light Arrow System (LAS) design follows European best practice which has been proven to be more effective than the current 'horizontal' arrowboard system.

CoPTTM compliant 'horizontal' arrowboards can to be retained for use on Level 1 and 2 roads after the implementation date of the LAS but should be modified in appearance as detailed in **Part C** (Level 1 roads) of this note.

It is recommended that all RCAs adopt this policy for Level 2 and 3 roads.

Section B2

Effective Dates

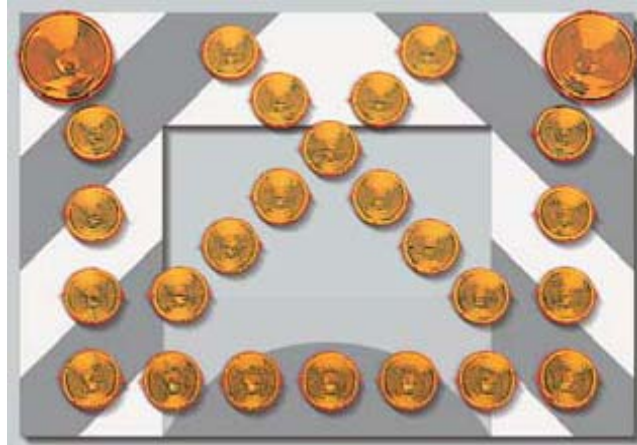
- It is recommended any new vehicle should, be fitted with the new Light Arrow System (LAS)
- Level 2 and 3 All new Transit NZ contracts awarded from 1 July 2010 will require this style of light arrow board.

Section B3

Specification:

The details of the number and layout of lamps are shown in the diagram.

The minimum number of lamps shall be 24 with a maximum of 25.



The arrow lamps shall comply with *European Standard EN12352:2006 Traffic control equipment - Warning and safety light devices* for Class L8H warning lights.

The following shows values for lights complying with EN12352:2006

Characteristic	Class of warning light
	L8H (Xenon)
Area of light emitting surface (cm ²)	>= 250

Diameter of light emitting surface (mm)	≥ 180
Angle range - horizontal	$+7.5^{\circ}$ to -7.5°
Angle range – vertical	$+5.0^{\circ}$ to -5.0°
Luminous intensity (cd) for nominal voltage	
I_{Rmin} [minimum effective luminous intensity measured on the reference axis]	1,500
I_{Amax} [maximum effective luminous intensity measured at any point within angle range]	5,000

The arrow lamps are required to pulse at a rate of 55 to 75 flashes per minute, with the on-period twice the length of the off-period. When the arrow lamps are operating the two synchronised xenon flashing lights shall only flash during the off-period of the arrow lamps.

The lens must be amber or yellow in colour.

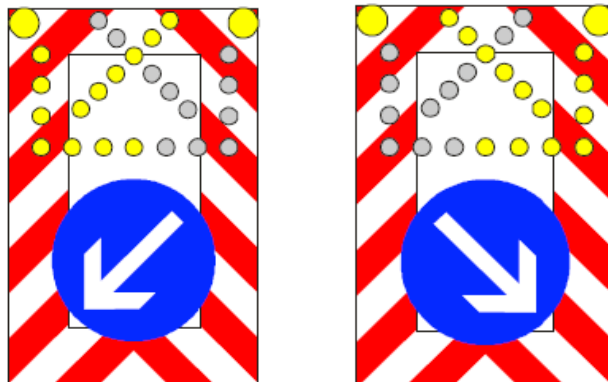
Adjustment of the light intensity of the lanterns for night-time operations shall be controlled by an automatic light-sensitive multistage light dimming device.

The light intensity during hours of darkness should not exceed a maximum value of 800 candelas since this may cause glare and make the sign difficult to read.

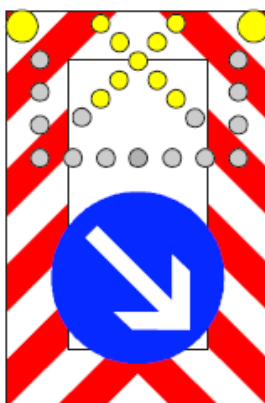
Note:

The LAS system is deemed to be a sign. An application has been lodged to have this correctly gazetted in order that it can become part of the road code. This will be notified when complete.

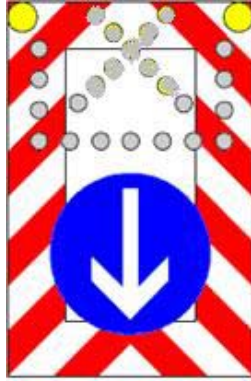
Section B4 Operational Principles



- **Arrow** ~ Lane change required (because a driving lane is closed)



- **Cross** ~ A part of the roadway which is not used for driving is closed (usually a shoulder) – it is safe to pass on the side indicated by the RG17 / 34 sign



- **Proposal only - Xenon Lamps with arrow down** A part of the roadway which is used for driving is closed road users to follow the TMA without overtaking – no overtaking.
- **Note** the white RG arrow must go either left or right while the TMA is stationary, the vertical down or up position is not an official sign and while the vertical down may be used by TMA's driving through a lane as a pilot vehicle, this must be used with caution.
- **Note ~** RG17 / 34 sign must not be visible when TMA is not engaged in traffic management.

Note:

The downward pointing arrow is currently not a gazetted sign and should not be used at present.

A comprehension survey has been undertaken and this system failed to reach an acceptable level of understanding amongst motorists.

Part C - Rear Panel of the Attenuator Vehicle

Section C1

TMA's need to be highly visible and recognisable due to their use in high speed and multiple lane environments. For this reason the red and white rear panel is to be adopted, based on proven performance, to highlight the vehicle relative to its surroundings such as amber flashing lights and temporary warning signage etc.

It is recommended that all RCAs adopt this policy for Level 3 roads.

Section C2

Effective Dates

- Any new TMA vehicle (all levels of road) should from the 1 July 2010 be fitted with the new colour and layout scheme.
- **Existing Level 2 & 3 TMA rear panels must be retrofitted to comply by 1 July 2012.**

Section C3

Specification

Colour:

Primary Strip – Red reflective class 1 retro reflective

Alternate Strip – White reflective class 1

Height: The overall height of the panel shall not exceed 4.25m above the road. The lower 500mm panel may need to be installed on the rear of the TMA to remain under the maximum height specified in law.

Light Arrow System (LAS): Refer to Part B of this note.

Enlarged RG17: 1500mm diameter (+or - 50mm). The sign shall be illuminated by the installation of white lighting with a minimum output of 50 watt.

Xenon Lights: Are to be installed in the top left and right hand corner of the panel as per the drawing.

Equipment Control: The rear panel shall have a device installed to ensure that the arrowboard and the RG17 are always aligned. A display must be visible to the operator to confirm orientation.

Deck Mounted Uplighting: An upright is to be attached to the deck to adequately illuminate the RG 17/34.

One preferably two amber rotating flashing beacons must be visible to the rear of the vehicle until such time as the Light Arrow system is fully deployed and the xenon lights are fully operational and at the correct height.

Organisations' signage or logos: must not be installed on the rear panel.

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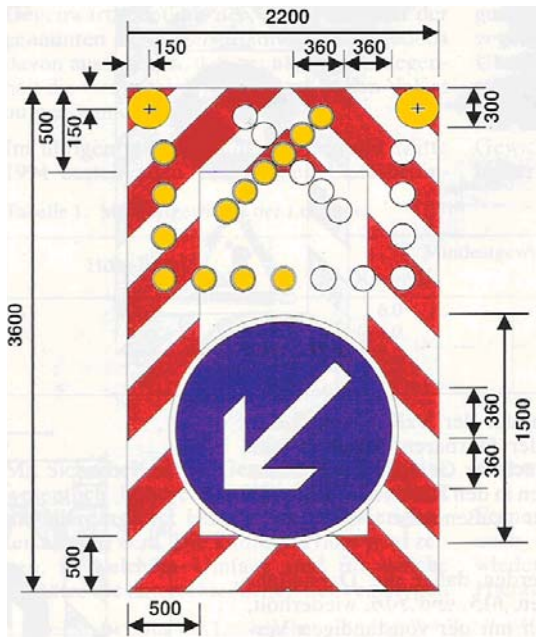
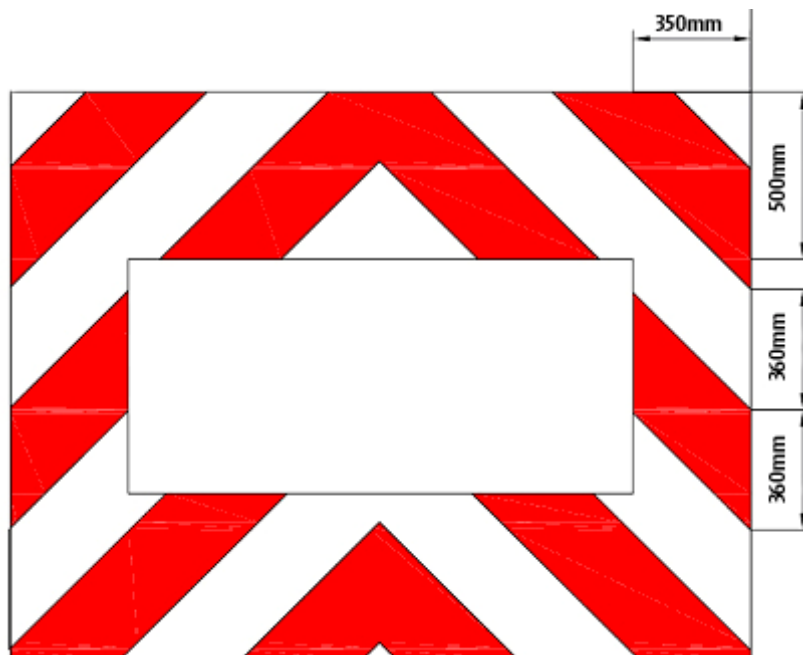


Figure C1 TMA for Level 2/3 roads

Maximum height to top of display from ground level must not exceed 4.25m

**Section C4
Level 1 Roads**

NZTA's long term vision is to create consistency within the New Zealand Network and would encourage the retrofitting of existing rear panels to match the same red/white pattern as used in the new panel display.



Section C5

Level 2 & 3 Existing Attenuator rear panels

In the interim, before the requirements for TMAs become compulsory on State Highways, existing rear panels must be retrofitted with the same red/white pattern as the new panel.

Section C6

Operational Principles

- Refer B4 of this note

Part D Xenon Warning Lights



Section D1

The purpose of the xenon warning lights is to give advance warning to alert approaching road users. Lights must be fitted in accordance with the specified height and alignment specifications.

Xenon warning lights are **not** intended be used on Level 1 roads, unless they are fitted to AWVMS signs or the latest TMA display in accordance with this document.

It is recommended that all RCAs adopt Xenon light for level 2 and 3 roads.

Section D2

Effective Date

All TMAs used on Level 2 and 3 State Highways shall be fitted with complying Xenon Warning Lights by 1 July 2012

- It is recommended any new vehicle should, be fitted with Xenon Warning Lights
- Level 2 and 3 All new Transit NZ contracts awarded from 1 July 2010 will require Xenon Warning Lights.
- L2/3 Full implementation on Level 2 and 3 State Highways by 1July 2012.

**Section D3
Specification**

The xenon warning lights shall comply with *European Standard EN12352:2006 Traffic control equipment - Warning and safety light devices* for Class L9M warning lights.

The following shows values for lights complying with EN12352:2006

Characteristic	Class of warning light
	L9M (Xenon)
Area of light emitting surface (cm ²)	>= 700
Diameter of light emitting surface (mm) minimum	>= 300 (340mm desirable)
Angle range - horizontal	+1.5° to -1.5°
Angle range - vertical	+1.5° to -1.5°
Luminous intensity (cd) for nominal voltage	
I _{Rmin} [minimum effective luminous intensity measured on the reference axis]	2,000
I _{Amax} [maximum effective luminous intensity measured at any point within angle range]	8,000

Height: Minimum height of 3.5m to the centre of the light and a maximum height of 4.25 m above the pavement.

Orientation: The reference axis of light emitted from each xenon warning lamp must not fall below a line parallel to the surface on which the vehicle is standing.

Note:

EN12352 uses terms ‘principal axis’ and ‘reference axis’ defined as:

Principal axis is the horizontal axis which lies on the vertical plane of symmetry of the lens and passes through the photometric centre of the warning light when it is in its normal operating position.

Reference axis, unless otherwise specified by the manufacturer, is the axis of maximum luminous intensity within 2° in any direction of the principal axis.

The specified height and orientation is required to ensure that road users are not unduly affected by the operation of the Xenon warning lights.