Technical direction

For traffic and transport practitioners

POLICY – GUIDELINES – ADVICE

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Guidelines for the Location and Placement of Variable Message Signs

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For: Director, Road Network Infrastructure; Director, RSL&VM; Director, Operations & Services; Director, Motorways; Traffic Management personnel; Road Safety personnel.

Guidelines for the Location and Placement of Variable Message Signs

1. General

Variable Message Signs (VMS) are signs that display electronically generated messages. The messages can be changed manually, electrically, mechanically or electromechanically to display predefined or free text information, figures and symbols.

VMS are widely used in Australia and throughout the world to provide road users with information about road and traffic conditions. They have the ability to display a large number of individual messages for the purpose of directing, warning or guiding road users.

VMS may be used individually to treat a local area or issue, or as part of a system to manage traffic along a road or within an area. A common use is for the management of traffic during incidents on urban motorways and arterial roads. VMS may be permanent infrastructure or be provided as a temporary device mounted on a trailer or vehicle to meet a short-term requirement. Although these guidelines are specifically designed to be used when considering installations of permanent VMS, there is a sub-section (Appendix A) outlining the use/locating of portable VMS.

2. Purpose of the Guidelines

Due to the fact that the use of VMS for driver information systems is still a relatively new development, there is no single document that is accepted worldwide as a standard for VMS.

As such, the purpose of these guidelines is to provide guidance and specific criteria that should be assessed when determining suitable sites for the location and placement of VMS. These guidelines should be used as a pre-cursor to VMS design, installation, commissioning and maintenance considerations (all of which are covered in RTA Specification TSI-SP-008).

3. General Principles

The effectiveness of any road sign depends on three factors, these being conspicuity, legibility, and comprehension. (Note that the general principles listed in AS 1742 part 1 that apply to standard retroreflective static signs also apply to VMS).

Conspicuity refers to the ease with which a sign is first noticed and detected. It depends on the luminance, contrast ratio, size, and its location relative to a driver's line of sight. Having been able to read the sign, a driver must also be able to comprehend the intended meaning of the message and react accordingly.

However conspicuity should not be confused with intrusion. A balance is required so that sign placement does not block views, obstruct light or create a cluttered road environment.

Signs can be alpha-numeric (e.g. 'keep left') or symbolic. (The move to symbolic signs has increased as the use of VMS has increased worldwide).

The criteria and considerations outlined in the following sections are not in any priority order and should be assessed when determining a suitable site for a permanent VMS. Note that the following list of criteria are a guide only and each potential site must be assessed on its own merits.

If specific site conditions preclude compliance with these guidelines, advice should be sought from the General Manager, Traffic Management.

3.1. Incident Management

Permanent VMS are currently used extensively for incident management and for the provision of driver information. It is expected that as the use of ITS (Intelligent Transport Systems) technology increases (both within vehicles and traffic management systems), adequate data and system capability to provide incident management systems on the road network will become available.

It might be expected that with the deployment of VMS more broadly throughout the road network issues may be raised regarding the application of these devices. In this regard, the Transport Management Centre (TMC) will play a leading role in ensuring the RTA's overall strategy for VMS coverage/deployment is achieved.

As such, the VMS Project Manager or project team must ensure that the Manager Transport Operations Planning (from the TMC's Transport Operations Planning Section) is involved in the site selection process to ensure the chosen location/s fit in with the RTA's overall strategy for VMS deployment.

3.2. VMS Sign Face Characteristics

Matrix Characteristics

In general, permanent VMS should be capable of displaying a maximum of 4 lines of text with each line able to display up to a maximum of 18 characters (refer TSI-SP-008). Concessions to this include sites where the VMS are being installed for a specific incident management purpose (such as flood or fog warning systems) or where obvious physical constraints will be encountered (e.g. in tunnels where closely spaced single line VMS are more traditionally used).

Sign Dimensions

The type of VMS chosen will depend generally on the type of road, its speed environment and the location of the VMS within the road reserve. Higher speed areas obviously require larger character sizes in order to provide suitable legibility distances. A guide for various lateral offsets from the carriageway is provided in Table 1.

The generally higher speeds in rural areas and on urban freeways require larger characters and hence larger VMS signs (typically Type C VMS – refer Appendix B for details) than for arterial roads in urban areas (typically Type B VMS – refer Appendix B for details). Rural roads tend to have wider road reserves that can accommodate the larger signs. Type A VMS have been used in the past by the RTA but now have limited use.

3.3. Legibility of VMS

Legibility distance is primarily dictated by the size of characters, the type of alphabet and whether upper or lower case letters are used. Other factors include obstructions and observation angle. The sign legibility distance elements for a VMS are the same as those for normal retroreflective signs (as listed in AS 1742 – part 1), comprising the cumulative distances travelled whilst:

- observing or scanning the sign;
- reading the sign; and
- no longer being able to read the sign (i.e. too close, angle too great)

Assuming that the time needed to read and understand a relatively complex message screen is 3 seconds, and using the legibility formulae as established for normal retroreflective signs, the legibility/sight distances and VMS types are as shown in Table 1. The table provides combinations of various approach speeds, offsets and types of VMS.

For permanent VMS, the legibility distance should allow for the maximum practical message length (taken as 8 words per screen). (For mobile VMS, the above formula should be used for shorter messages if necessary).

Important note to Table 1. Whilst 2-screen messages are acceptable, every effort should be made to limit a message to a 1-screen display. The design legibility distances adopted in the table are based on 2-screen messages. (The use of 3-screen messages <u>must not</u> be used).

Table 1 – Legibility/Sight Distances Required for Laterally Offset VMS

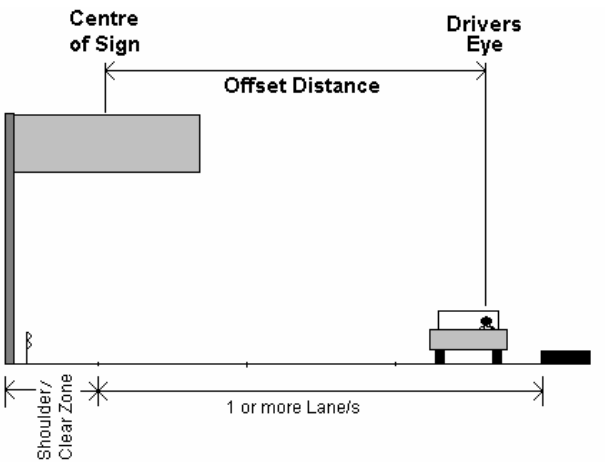
Offset from centre of sign to Drivers eye (metres)		Sight Distance (SD_{min}) & Type of VMS Req'd	Speed Zone (km/h)					
			60	70	80	90	100	110
	0 – 6 m	SD_{min}	180	200	220	240	260	280
		VMS TYPE	B	B	B	C	C	C
	6 – 9 m	SD_{min}	205	225	245	265	285	305
		VMS TYPE	B	B	C	C	C	C
	9 – 12 m	SD_{min}	230	250	270	290	310	-
		VMS TYPE	B	C	C	C	C	-
	12 – 15 m	SD_{min}	255	275	295	-	-	-
		VMS TYPE	C	C	C	-	-	-
	15 – 18 m	SD_{min}	280	300	-	-	-	-
		VMS TYPE	C	C	-	-	-	-
	18 – 21 m	SD_{min}	305	-	-	-	-	-
		VMS TYPE	C	-	-	-	-	-

Notes: i) $\mathbf{SD_{min}}$ = Minimum Sight Distance required to sign face (in metres).

ii) Where "- " is shown in the table do not use VMS at this offset for this speed.

iii) Type B VMS have 320mm character heights; Type C VMS have 400mm character heights.

iv) Offset definition as pictured below:



Therefore, in the diagram above, for typical lane widths of 3.5m and a clearance/footpath/shoulder width of 2m the offset would approximately be:

Drivers Eye + Lane + Lane + Shoulder - (half sign width)

(3.5 – 1.0) + 3.5 + 3.5 + 2.0 – 3.0 = 8.5m

v) Example:

If the chosen site is in an 80 km/h speed zone and the Offset Distance will be between 6 and 9 metres, then a TYPE C VMS should be installed. The minimum Sight Distance to the VMS must be 245 metres.

In the same example, if a lesser offset is possible say between 0 and 6 metres (e.g. by locating the VMS behind guardrail or other suitable protective structure) then a TYPE B could be used. In this case the minimum Sight Distance to the VMS must be 220 metres.

4. Specific Sign Location and Placement Considerations

Notwithstanding the legibility distance requirements mentioned above, all VMS should be placed so they are clearly legible to all road users and every effort should be made to reduce competition with other traffic signs, traffic control devices or roadside furniture. VMS should not be placed in locations where they will be partially hidden by any roadside objects, furniture or vegetation.

Specific items to consider include:

4.1. Longitudinal Placement / Alternate Route Diversion Points

The following items related to longitudinal placement should be considered:

- To ensure proper viewing of the VMS, sites should be located on straight roadway sections. The introduction of even minor curves along the roadway can impact visibility due to the limitations in current pixel technology. Where curves in the roadway are present on approach to the proposed VMS location, consideration should be given to the angle at which the VMS will be located. In this instance an angle other than 90° to the immediate roadway may be preferable.
- Signs must also be placed a sufficient distance from the point at which action is required to allow adequate time for reading and comprehension of the message and any subsequent action that drivers are required to take, which may include the need to brake and/or manoeuvre. The distance required will depend on the nature of the site and the ability to obtain a suitable site for the VMS.

  Where complex manoeuvres **are not** required the minimum distances provided between the VMS and a hazard, decision point, intersection, or any piece of roadside furniture that may take the road users attention should generally be:

  - 30-100 m in business and residential districts.
  - 80-120 m for 60 – 70 km/h zones.
  - 120-180 m for 80 – 90 km/h zones.
  - 180-250 m for 100 – 110 km/h zones

  Where possible the highest distance within the range should be aimed for.
- On urban arterial roads where traffic diversions are anticipated and will be frequently recommended, and where complex manoeuvres **are** required, it is desirable that the VMS be located 300 – 500 m in advance of the diversion point. On high-speed rural roads, motorways and freeways a greater distance will normally be necessary (Typically between 2 and 4km although this may be less in situations where interchanges or ramps are at relatively close spacings).
- VMS should not be permitted within an interchange area or in close proximity to an on-ramp where merging, frequent braking or weaving movements are common. The VMS location should also take account of the need for drivers to respond to other important static signs in the area (see 4.2 below).

4.2. Existing signs and traffic control Inventory

VMS should not compete with other existing signs or interfere with traffic control devices. When considering suitable locations an inventory of all signs and traffic control devices in the vicinity of the preferred location/s should be taken. Based on this inventory existing signs may need to be moved to accommodate proper VMS placement.

The following items related to existing signs and traffic control inventory should be considered:

- In general, it is desirable that VMS are located at least 200 – 300m from significant static signs (eg major directional signposting).
- However it is understood that this requirement is often difficult to achieve due to existing complexities associated with signposting schemes that have been introduced over time. As such

the following minimum distances between the VMS and other significant road signs (eg major directional signposting) should be adopted where possible:

- 30 m in business and residential districts
- 50 m for 60 – 70 km/h
- 60 m for 80 – 90 km/h
- 70 m for 100 – 110 km/h

4.3. Lateral Placement

Permanent VMS can either be placed in the verge of roads or overhead. VMS should be placed where they provide sufficient vertical and lateral clearances from the running lanes and will not create a hazard to road users (Note here that this includes pedestrians and cyclists). They should comply with the vertical and lateral clearances described/depicted in Appendix B as well as other general clear width and height requirements as described in Parts 13 (Pedestrians) and 14 (Bicycles) of the Guide to Traffic Engineering Practice.

VMS support structures should be located beyond the clear zone ('clear zone" as defined in the RTA's Road Design Guide) or be shielded by a suitable safety barrier.

The placement of permanent VMS in pavement medians should be avoided.

4.4. Vertical Alignment

Vertical alignment along the roadway also impacts the visibility of the VMS. If there are a limited number of potential locations available, an upward grade is desirable. Ideal site locations along roadway segments within 1% grade or less are desirable.

VMS should not be placed along grades exceeding 4%.

4.5. Location and Spacing of Sign Supports & Gantries on Freeways and Motorways

VMS on motorways must be positioned so that road users have time to respond to the messages provided, and therefore should be positioned an adequate distance in advance of major decision points. Major decision points on motorways and freeways are off ramps that will be used for diversions, freeway-freeway interchanges and in some instances purpose built median crossings.

4.6. Spacing between VMS on Motorways

There is a considerable range of recommended spacings suggested in research literature for VMS on motorways). For example:

Canadian research (DMR QLD 1992) suggests a minimum spacing of 3000m and maximum spacing of 5000m;

European tests (Transport RTD, 2001; cited DMR QLD 2003) found that 700m results in the safest behaviour by drivers;

Dudek, (1992) suggests that a VMS be located 900 – 1200 m prior to each freeway diversion point; and.

New Zealand (SKM, NZ, 2000) found that drivers were confused if messages were displayed too far upstream of an incident and that drivers tended to ignore messages closer to the incident.

In addition, legibility considerations suggest an absolute minimum spacing of 300 m between VMS on two-lane 100 km/h carriageways and of 400 m on four-lane 110 km/h carriageways.

The location of VMS for Motorway Management Systems (MMS) will depend on the extent of the system that is required to meet traffic management objectives, and the cost that a road authority is prepared to incur to meet the requirements for a particular site. However, based on available research it is considered that the spacings shown in Table 3 should be adopted.

Table 2: Spacing between VMS signs on Motorway Systems

Minimum Distance:	
Between gantries for lane control and diversion	1000 m
In advance of fixed sign (subject to check of sight lines)	200 m
Beyond an on-ramp including auxiliary lane	300 m

The location and hence the spacing of VMS may also be affected by structures over the freeway and local restrictions in verge or median widths.

4.7. Use of Gantries

On high-volume, high-speed freeways gantry mounted signs are a most effective way of conveying essential information to motorists. The need for a gantry or system of gantries will depend on geometry of the freeway and the level of traffic management required. The actual provision of gantries, in terms of physical characteristics, height clearances etc) should be done in accordance with the RTA's Road Design Guidelines and the appropriate structural design standards.

Typical situations in which gantries should be provided include:

- where a comprehensive MMS is provided (e.g. lane related messages required);
- on freeway carriageways that have 4 or more lanes; and
- where post mounted message signs would not provide viable signalling sequence between other gantry message signs;

Gantries should not be located less than 300m before the start of a change in the number of lanes.

Gantry mounted lane variable message signs may also be beneficial:

- where different restrictions over individual lanes are required to be displayed;
- when side mounted signs would be obscured for a significant proportion of a driver's "reading time";
- at traffic junctions where the number of lanes reduces after the junction;
- where junctions are closely spaced;
- on elevated roads where it is not possible to erect side mounted signs; and
- in other locations where mounting signs on the left hand side of the road is deemed to create difficult or hazardous situations for drivers.

As is the case with normal signing, gantry mounted VMS should be located so that they are not obscured by bridges over motorways or freeways. Where the location and structure is suitable, and it is practicable, the VMS should preferably be mounted on the over-bridge.

On the approaches to off ramps it is particularly important that the normal static advance exit and exit position signs are coordinated with any VMS signs and signals provided for traffic diversion or other purposes.

4.8. Location of power and communication facilities along the roadway segment

Locating existing power and communication lines along a roadway segment may help in determining how difficult it might be to power and communicate with a potential VMS. It is desirable to locate the cabinet and electrical service as close together as possible.

4.9. Safety Considerations

A site must be chosen/designed to allow for safe maintenance and operation of the VMS and its controller cabinet. To address safety the following issues must be considered:

- Does/will the site allow safe and easy access to the sign for maintenance crews/vehicles (e.g. paved footpath clear of vegetation, vehicular access and appropriate parking provided)?

- How exposed to live traffic will maintenance vehicles and personnel be while at the site?
- Can personnel access the controller cabinet without having to use the roadway shoulder?
- What is the proximity of the VMS to overhead power lines, are OH&S regulations/RTA policies able to be adhered to?

Notwithstanding the above, site considerations and VMS designs must allow for or consider provision of a work platform/gantry (with handrails & adequate meshing to avoid tools/small items accidentally falling off platform) with safe access (e.g. pull down ladder with safety cage, out-of-reach to public to avoid vandalism) for obvious safety and maintenance efficiency reasons (refer RTA Specification TSI-SP-008). Access requiring an EPV for maintenance will invariably involve lane occupancy (thus disrupting traffic or limiting the hours at which maintenance activities can take place) and hence result in more costly maintenance.

4.10. Environmental and Urban Design Considerations

Notwithstanding the above technical and operational requirements, the chosen location must also satisfy guidelines established by Environment/Urban Design sections within the RTA.

VMS are large signs and consideration must be given to the visual impact on an area, particularly when used on urban arterial roads, although in some rural situations interference with views can also be a consideration. In urban situations the sign size and location may often be constrained by lack of space or the existence of other infrastructure.

The best urban design policy for signs can be summed up as "The fewest possible signs of the smallest adequate size in the clearest and simplest form" Dame Sylvia Crowe, 1955.

In order to maximise the attainment of these principles, the project team should exploit the full flexibility of choice in locating variable message signs.

It may be clear that there is no better location possible, however assessing the sign against the following principles will at least confirm this fact.

<u>Urban design principles</u>

In no particular order the **principles** are as follows:

a) Variable message signs should not obscure or interrupt views of a valued landscape or landmark from properties and from the road.

For example obscuring views of public open space, coastline, and mountains can cause great offence and should be avoided. Likewise bridges, buildings and other structures ***of aesthetic or cultural merit*** should not be obscured.

The VMS in this example detracts from the aesthetic qualities of the bridge. Increasing the separation between bridge and sign would produce a better composition of road elements.

b) Variable message signs should minimise their silhouette effect against the sky in views from the road and from residential areas.

A sign viewed against a landscape or built backdrop is considerably less intrusive than a sign viewed against the sky. The contrast in light and form is greater and the sign more noticeable.

Signs in silhouette against the sky can be particularly intrusive and the effect should be minimised.

c) Variable message signs should not block important vistas in the landscape.

The experience of using a road is often enhanced by the presence of vistas or long distance 'corridor-like' views through trees, landform and built form, towards landscapes and landmarks. These can be recognised in urban design frameworks and planning documents. Where possible these vistas should be avoided.

This sign demonstrates the need to consider views in the placement of signage.

d) Variable message signs should not have a detrimental impact on important natural or cultural heritage elements and their curtilages.

Signs can be highly intrusive when located near places and items of natural and cultural heritage. Consequently they should be located at an appropriate and respectful distance.

e) Variable message signs should be located to minimise clutter.

Signage proliferation can be a concern for the public and road users. In city centres significant amounts of signage are inevitable and may be appropriate, however it is important to consider relief from this where the road passes public open space or is situated in suburban and rural locations.

Urban design process

In order to address these principles a landscape architect **or** other professional with qualifications in assessing visual matters should be consulted. Suitable experts can be found on the RTA Internet site in Registered Contractors under '*Doing business with us'* and '*Tenders*'.

It is important that the visual expert is acquainted with the natural and built character of the area and the nature of the VMS proposed.

The key landscape and visual characteristics of the area should be recorded as well as the approximate view shed of the VMS (in drawing or written form). Recommendations to address each of the 5 urban design principles should be set down and considered by the VMS project manager.

If more than one VMS is proposed the visual expert must consider the location of all signs and their cumulative impact.

Review of Environmental Factors (REF)

The RTA has a statutory responsibility under the NSW Environmental Planning and Assessment Act (EP&A Act) to consider the impacts of its activities on the environment. The environmental impact assessment helps the RTA fulfil this responsibility.

Most RTA projects require some form of environmental assessment and one should consider this to be the case when considering the construction and installation of a permanent VMS. To fulfil the RTA's general duties under the EP&A Act for the installation of permanent VMS the following should be carried out by the VMS project Manager:

- Prepare a Review of Environmental Factors (REF) in accordance with the RTA's Environmental Impact Assessment Guidelines, which can be found on the RTA's intranet site.
- Assess the REF,

- Decide, on the basis of the assessment, whether an Environmental Impact Statement (EIS) or Species Impact Statement (SIS), or both are required. If an EIS or SIS is not required, the VMS Project Manager decides whether the proposed activity proceeds and subject to what conditions of approval.

In addition to the above, the project manager must carry out appropriate community consultation with regards to the proposed VMS installations.

5. Sign Location and Placement Checklist

Appendix C contains a checklist that is a broad summary of the major items for consideration presented in these guidelines.

VMS project managers, project teams and practitioners should attempt to satisfy these criteria when determining VMS locations. ***It is important to note/clarify however, that there will be instances where all of the criteria in the guidelines cannot be met. This is inevitable due to the nature of this type of work. Reasons for deciding to go through with an installation, despite not being able to meet all criteria should be detailed by the VMS project manager/project team.***

However, going through the process will provide practitioners with some guidance as well as providing the RTA some consistency of approach with respect to VMS installations.

APPENDIX A

PORTABLE VARIABLE MESSAGE SIGN CONSIDERATIONS

A1. Portable VMS Signs

Portable VMS are trailer-mounted signs that should only be used when they are necessary to improve traffic management relating to an incident or major event. They can also be used for the display of road safety messages related to specific campaigns (Refer to TDT 2002/11a).

Portable VMS are used for traffic management purposes in the following circumstances:

- at road construction and maintenance sites;
- in the areas surrounding major events;
- for incident management where permanent VMS are not available or are inoperative, or where the spacing of permanent VMS is unable to give adequate warning of a major incident; and
- to encourage lower speeds in local streets.

Portable VMS are generally used at roadworks sites or in association with major events to:

- pre-warn motorists of road construction or maintenance activities, or events, that may cause delay during some future period;
- advise motorists of likely delays and suitable alternate routes during the duration of the works or event.

This information enables motorists to plan their trips during the works event so that they use other routes and do not contribute to congestion or other problems in the area immediately surrounding the works or event.

The use of traffic control devices for works on roads is covered in AS 1742.3 and its associated handbooks. AS 1742.3 includes vehicle mounted flashing arrow signs, however, no other electronic signs are included. It is important that VMS used at roadworks sites complement the standard signing arrangements provided in Australian Standards.

The following conditions apply to the deployment of portable VMS:

- drivers are required to do something in response to the VMS message (e.g. change travel speed or lane, divert or be aware of a change in current or future traffic or road conditions);
- static signs that can effectively convey the required message are not readily available;
- information can be confirmed from a reliable source;
- the portable VMS should not tell drivers something they already know; and
- traffic conditions can be monitored so that the mobile VMS can be removed or the message changed as soon as necessary.

The principles for legibility, location, sign and message design that apply to permanent VMS also apply to portable VMS. However the following aspects require consideration in using and locating portable signs:

- adequate reading distance should be available, allowing for any obstructions;
- the lateral placement should be such that the sign is easily read;
- where practicable, they should be placed on the verge behind any shoulder that may exist;
- where possible, they should be placed outside of the clear zone corresponding to the prevailing traffic speed;
- the signs should be located clear of any roadside furniture, side streets and driveways, so that required visibility to permanent signs, and sight distances for entering drivers, are not compromised;
- at least 300 m from the nearest permanent VMS;
- when placed in footways, adequate horizontal and vertical clearance should be provided for cyclists and pedestrians, including those persons in wheelchairs;
- they should not be placed on both sides of a carriageway at the same location. If separate signs are needed for each side of the road (e.g. different messages or visibility problems);
- signs should be turned 3 to 5 degrees away from the perpendicular to the edge of the carriageway to reduce glare;
- if use is intermittent throughout the duration of an incident or event, the sign should be turned away from drivers when it is not being used for messages; and
- the sign trailer should be anchored to prevent it moving under wind loading;

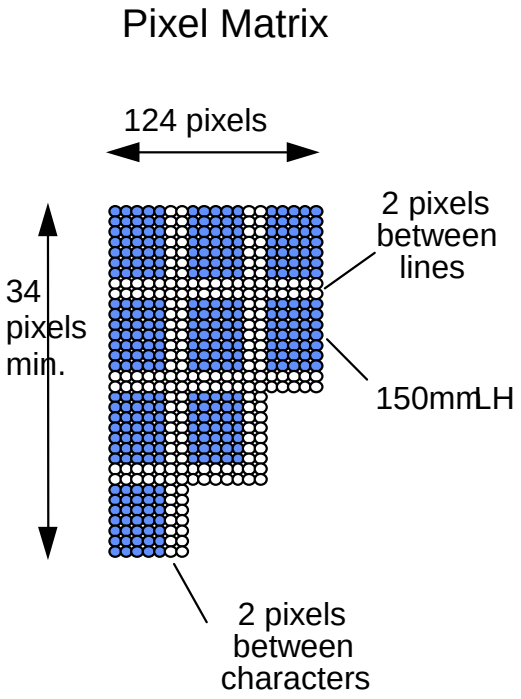
APPENDIX B

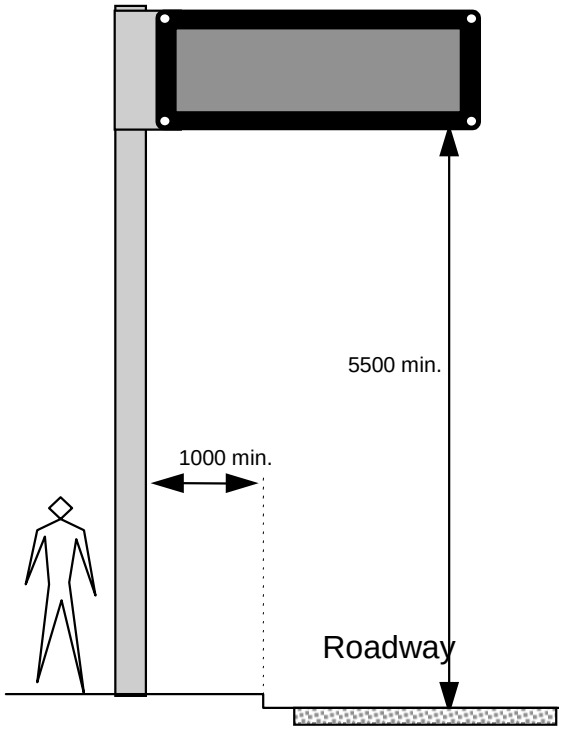
VMS CONFIGURATIONS AND CLEARANCES FOR TYPE A, B AND C VMS USED BY THE RTA

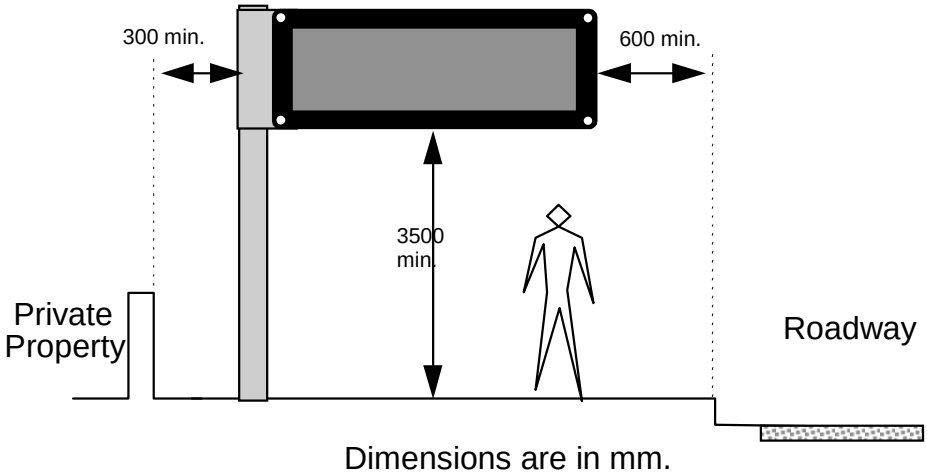
(Refer to RTA Specification TSI-SP-008 – Variable Message Signs for full details.

Details in TSI-SP-008 may supersede following diagrams)

In addition to the vertical and lateral clearances described/depicted in this Appendix, clear width and height requirements as described in Parts 13 (Pedestrians) and 14 (Bicycles) of the AustRoads Guide to Traffic Engineering Practice Series must also be maintained when considering a location that will affect pedestrians and cyclists.





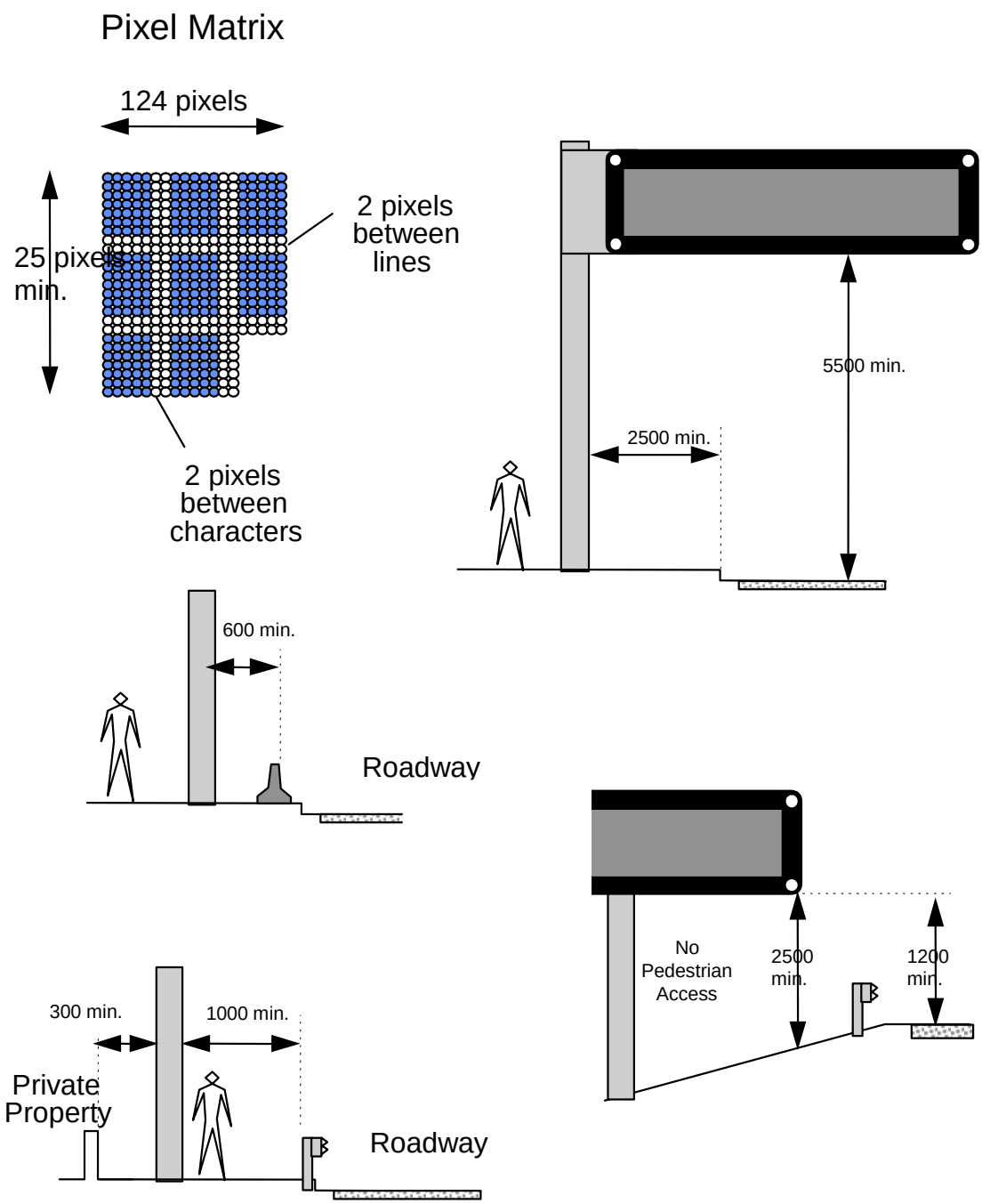


VMS Configurations & Clearances

TYPE A

Details

1) Full graphics capability
2) Dimensions = 124 pixels x 34 pixels
3) Capable of displaying 4 lines of 18
4) Characters of Letter Height 150mm



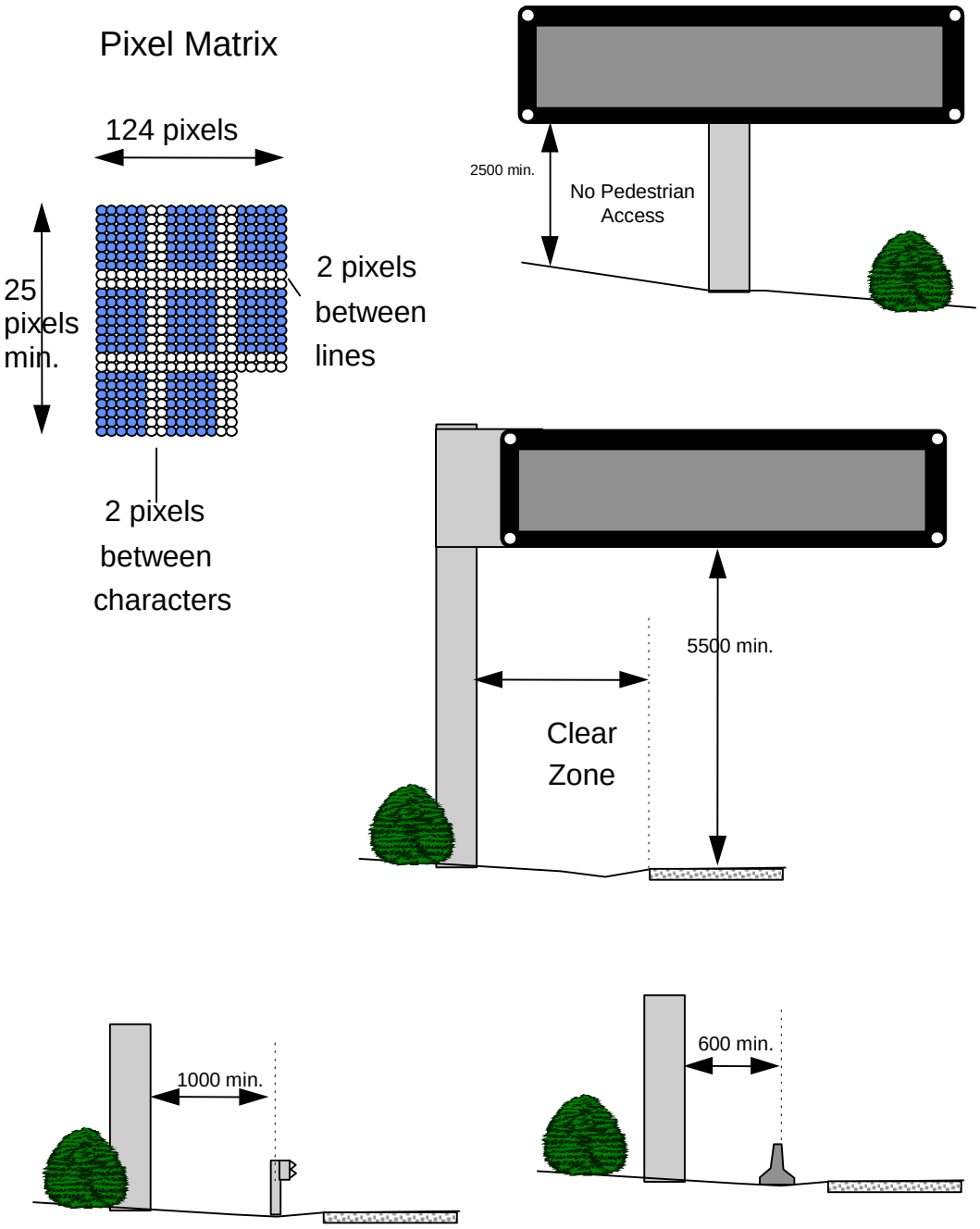
Dimensions are in mm.

Details

VMS Configurations & Clearances

TYPE B

1) Full graphics capability
2) Dimensions = 124 pixels x 25 pixels
3) Capable of displaying up to 4 lines of 18
4) Characters of Letter Height 320mm



Dimensions are in mm.

Detail

VMS Configurations & Clearances

TYPE C (Freeway)

1) Full graphics capability
2) Dimensions = 124 pixels x 25 pixels
3) Capable of displaying up to 4 lines of 18 char
4) Characters of Letter Height 400mm.

APPENDIX C

LOCATION AND PLACEMENT OF VMS CHECKLIST

CHECKLIST - LOCATION AND PLACEMENT OF PERMANENT VMS

This checklist is to be used in conjunction with the "Guidelines for the Location and Placement of Variable Message Signs". Reasons for deciding to go through with an installation, despite not being able to meet all criteria must be detailed by the VMS project manager/project team.

Proposed VMS Location:_____ _____	**Yes, No or N/A**	**Comments / Reasons for not being able to comply**
Longitudinal Placement / Alternate Route Diversion Points • Will proposed VMS location/s be on a straight roadway section? • Will proposed location/s be suitable for incident management / traffic diversions? • Are chosen location/s such that legibility, comprehension and any subsequent manoeuvres will be easily achieved? • Can distances between chosen VMS locations and other roadside furniture (section 4.1) be achieved?		
Existing Signs and Traffic Control Inventory • Are the proposed VMS located at least 200-300m from significant static signs? • If not will the minimum distances in section 4.2 be maintained?		
Lateral Placement/Legibility & Sight Distance • Has Table 1 been used to determine minimum sight distances and Type of VMS required for the chosen location. • Will the vertical/lateral clearances outlined in appendix B be adhered to? • Are the requirements related to clear width and height as described in Parts 13 (Pedestrians) and 14 (Bicycles) of the Guide to Traffic Engineering Practice able to be met? • Are VMS support structures to be located beyond the clear zone or shielded by a suitable safety barrier? • The chosen locations do not require placement of VMS/structure in the median?		
Vertical Alignment • Can the VMS be sited along a roadway segment with a grade less than 4%? (Ideally looking for roadway segments with 1% grade or less)		
Spacing of VMS on Motorways Can the spacings outlined in Table 2 be achieved for proposed motorway VMS?		
Use of Gantries • Where gantries are proposed are they to be located more than 300m before the start of a change in the number of lanes? • On the approaches to off ramps are normal static advance exit and exit position signs coordinated with any proposed VMS signs provided for traffic diversion or other purposes		

Location of power and communication facilities • Have existing power and communication lines along a roadway segment been located? • Are these suitable for the proposed VMS locations ? • Will the cabinet and electrical service be located as close together as possible?		
Safety Considerations • Will the proposed site allow safe and easy access to the sign for maintenance crews/vehicles? • Will maintenance vehicles and personnel be exposed to live traffic while at the site? • Can personnel access the controller cabinet without having to use the roadway shoulder? • Are OH&S regulations/RTA policies able to be adhered to with respect to proximity of the proposed VMS to overhead power lines?		
Environmental and Urban Design Considerations • Has an effort been made to ensure the proposed VMS site does not obscure or interrupt views of a valued landscape or landmark from properties and from the road? • Has an effort been made to ensure the proposed VMS site has a minimised silhouette effect against the sky in views from the road and from residential areas? • Has an effort been made to ensure the proposed VMS site does not block important vistas in the landscape? • Has an effort been made to ensure the proposed VMS site does not have a detrimental impact on important natural or cultural heritage elements? • Has an effort been made to ensure the proposed VMS site is located such that clutter is minimised where possible? • If more than one VMS is proposed has consideration been given to the location of all signs and their cumulative impact?		
Review of Environmental Factors (REF) • Has the VMS project Manager prepared a Review of Environmental Factors (REF) in accordance with the RTA's Environmental Impact Assessment Guidelines? • Has the project manager carried out appropriate community consultation with regards to the proposed VMS installations?		
Involvement of TMC Transport Operations Planning (TOP) Staff • Has the Manager Transport Operations Planning, from the TMC, been involved in the site selection process to ensure the chosen locations fit in with the RTA's overall strategy for VMS deployment?		

Checklist Completed By:_____ Date:_____