ROADS AND MARITIME SERVICES

TRAFFIC SYSTEMS

SPECIFICATION NO. TSI-SP-066

VEHICLE ACTIVATED SIGNS (VAS)

Issue: 3.0
Dated: 6/5/2019
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### RECORD OF AMENDMENTS

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1 SCOPE

1.1 General
This specification covers the functional and operational requirements for fixed Vehicle Activated Signs (VAS). A fixed VAS, typically, consists of the following:

- Sign display consisting of a
  - diamond-shaped warning sign and
  - rectangular text sign,
- sign enclosure (of each above sign display),
- sign controller,
- light sensor,
- speed detector (typically a radar device),
- 3G/4G/5G wireless capability for remote communications,
- RS232 and Ethernet ports for local communications,
- solar panel, associated battery and power regulator/charger unit, and
- pole and associated mounts.

The primary function of the sign is to display a pre-determined warning message to the motorist when a vehicle exceeds a certain trigger condition (such as the local area speed limit), and to keep that message displayed for a pre-determined duration before blanking.

1.2 Exclusions
This specification excludes the following:

- Policy for sign dimensions, shape, and display content
  The determination of conformance and approval of sign face and display contents (see “Sign face and display contents” of “Approval” section of this specification);
- Policy of where a VAS is installed or the thresholds which are set to trigger it;
- Policy for sign locations;
- Signage where the display contains a variable message;
- Where the sign is not activated by speed, but by some other input; and
- Enforcement speed detection, relating to legality of vehicle speed.
1.3 Diagram

The diagram below shows a typical VAS installation and illustrative signage.

This is a typical sign where the speed detector is affixed on the same post as the sign. Alternative scenarios might be where the

(a) speed detector is on a separate post; where that post may be either leading or trailing the post on which the sign is mounted, depending on site requirements;

(b) sign display consists of a static warning sign and active “SLOW DOWN” sign;

(c) sign display consists of an active “your speed” sign and active “SLOW DOWN” sign;

(d) any alternative, as relevant to site-specific requirements.

NOTE:
The diagram above is for illustration purposes only, and is not representative of all VAS scenarios. See above sections for what is covered by this specification and its exclusions.

1.4 Sign Variants

The VAS may be constructed in either of two variants, at the manufacturer’s discretion.
The white graphic and text may be both in yellow, at the manufacturer’s discretion (see display area requirements of this specification).

However approval of these will be in accordance with Approval section of this specification.
Display contents above are examples for illustrative purposes only; refer to relevant specified standards for display content and dimensional requirements.

The above description defines a typical sign. Other functional variations to the above default sign might be the inclusion of add-ons, such as rain/snow/fog sensor for sites that require that facility, and sign face variations such as a speed limit sign with “SLOW DOWN” sign in lieu of the default diamond-shaped warning sign (and as per road rules [9]; for enquiries see “Sign face and display contents” of “Approval” section of this specification).

2 REFERENCES AND APPLICABLE DOCUMENTS

2.1 Australian and International Standards

[1] AS/NZS 1170.2 Structural design actions - Wind actions
[2] AS 1743 Road signs - Specifications
[3] AS/NZS 3820 Essential safety requirements for electrical equipment
[4] AS/NZS 4417.2 Regulatory compliance mark for electrical and electronic equipment - Part 2: Specific requirements for particular regulatory applications
[5] AS 60529 Degrees of protection provided by enclosures (IP Code)

2.2 RMS Documents

[8] IC-QA-TS201 Approval of ITS Field Equipment

2.3 Other Documents

[10] I.S. EN1966 Road vertical signs - Variable message traffic signs
3 DEFINITIONS AND GLOSSARY OF TERMS

For the purposes of this specification, the following definitions and abbreviations shall apply:

ACMA  
Australian Communications and Media Authority  

COTS  
Commercial off-the-shelf

Declaration of Conformity  
See ACMA website for current definition.

Display area  
The light emitting area of either the  
(a) diamond-shaped warning sign or  
(b) rectangular text sign.

Event log  
A log that lists events other than sign faults.

Fault log  
A log that lists sign faults.

ELV  
Extra-low voltage (up to 50 V AC r.m.s. or 120 V DC ripple-free)  
See “In-Scope Electrical Equipment” definition on ERAC website

EMC  
Electromagnetic compatibility;  
EMC has two aspects: emission and immunity.

ERAC  
Electrical Regulatory Authorities Council  

Manufacturer  
Manufacturer of a VAS  
(see the applicant as defined in IC-QA-TS201)

PHCS  
Product host control system

RCM  
Regulatory compliance mark (see AS/NZS 4417.2)

RMS  
Roads and Maritime Services, a NSW government agency.

sign controller  
The electronic unit that monitors speed detector and rain sensor inputs and operates the sign displays accordingly.

sign display  
The combined display areas of both the  
(a) diamond-shaped warning sign or  
(b) rectangular text sign (e.g. “SLOW DOWN”).

sign enclosure  
An enclosure that houses a sign display.

sign type  
A, B and C for corresponding sign size A, B and C, respectively, and their font sizes as per warning signs (W series) in AS 1743.  
This excludes size D as there is no corresponding sign size for two-line rectangular (capitalised) text signs (e.g. in AS 1743-2018 under Appendix A, W8-8 “WHEN FROSTY”, W8-7 “WHEN WET”, W8-9 “UNDER SNOW”, W8-16 “ONE LANE”).

Supplier  
Supplier of a VAS  
(see “Applicant” as defined in IC-QA-TS201)

VAS or sign  
Vehicle Activated Sign(s) consisting of all constituent parts, including pole, as described in the scope of this specification.
4 GENERAL REQUIREMENTS

4.1 Applicable standards and specifications
Where not otherwise specified, the sign shall be in accordance with Australian Standards or Specifications, and in their absence, with relevant IEC or ISO Standards or Specifications.
The term “submission for approval” refers to submission of a VAS in an application for approval evaluation to ITSHelpDesk under IC-QA-TS201 by a manufacturer/supplier.

4.2 Design life
The design life of the sign shall be as follows:
(a) 10 years minimum for the sign and all other parts,
(b) 10 years minimum for the solar panel, and
(c) 5 years minimum for the battery.
Where a part has a design life other than that specified, that information shall declared.

5 REGULATORY REQUIREMENTS

5.1 Work health and safety
The sign shall comply with the requirements of the NSW Work Health and Safety Act.

5.2 RCM and EMC Emission

5.2.1 Regulatory Compliance Mark (RCM)
For RCM, EMC emission (intentional and unintentional) and electrical safety as mandated by ACMA, the sign shall comply with AS/NZS 4417.2 requirements for compliance level 2/medium-risk device or higher. The sign’s compliance/risk level shall be stated in the declaration of conformity of submission contents for this requirement.
In addition to the information required by AS/NZS 4417.2, the supplier shall also include in the sign’s declaration of conformity the information required in “Pre-Submission: RCM-Related Submission Contents” clause of this specification.

NOTE: See Appending A NOTE.

5.2.2 EMC Emission: Unintentional
The sign, with all its intentional emitters set to non-emitting mode, shall comply with EMC emission in accordance with AS/NZS 61000.6.3.

5.2.3 EMC Emission: Intentional
The sign, with all its intentional emitters set to emitting mode, shall comply with EMC emission in accordance with their corresponding regulatory arrangements and requirements.
That information shall be provided in the RCM-related submission contents.

5.3 Electrical Safety
The sign shall comply with AS/NZS 3820 and relevant electrical safety requirements.
The supplier shall provide a declaration of conformity for the sign, for this requirement.
5.4 Pre-Submission: RCM-Related Submission Contents

For this requirement, the following contents shall be provided in a submission:

(a) RCM declaration of conformity for the sign as per AS/NZS 4417.2, showing
   (i) sign model number,
   (ii) regulatory arrangements that apply to each EM radiating part of the sign (see EMC Emission: Unintentional and EMC Emission: Intentional, and Electrical Safety requirements),
   (iii) identified standards applicable to each regulatory arrangement that the sign needs to be tested to, for demonstration of compliance,
   (iv) test report number for each identified standard, and
   (v) compliance verdict from each test report, and

(b) Dated evidence of listing of the sign on the ACMA/ERAC website.

6 FUNCTIONAL REQUIREMENTS

6.1 Detection Requirements

The detection zone to pole clearance distance shall be typically, and no less than, 10 m. The detection zone area shall be configurable between 10 m and 200 m in increments of 10 m.

The following shall be configurable:

   (i) Delay time to activate display following a trigger;
   (ii) Duration display stays active following (i); and
   (iii) Early deactivation of display when trigger is cleared.

The following shall be provided with the sign:

   (b) The VAS display shall be completely blank, with no message or pictorial display, either through active or passive illumination, unless activated by a passing vehicle;
   (c) The hardware (inherent)/physical detection zone shall be provided.

In addition the following information shall be provided:

   (i) The (software) detection zone shall be a configurable, site-specific area, able to cover at least two adjacent lanes approaching the VAS;
   (ii) It is not expected that the lanes be separately distinguished;
   (iii) The sign shall not be triggered by vehicles travelling in the opposite direction;
   (d) The speed detector shall have an inherent detection range of at least one-hundred (100) meters;
   (e) The speed detector shall have a detector accuracy/tolerance of better than ±2 km/h;

The supplier shall provide detector accuracy/tolerance in their submission for approval.

(f) The (software) detection zone shall be configurable to the following:

   (i) increments of no more than ten (10) meters,
   (ii) a minimum of ten (10) meters and
   (iii) a maximum of at least one-hundred (100) meters;

(g) The trigger speed shall be configurable as following:
(i) increments of 5 km/h or less,
(ii) minimum of ten (10) km/h and
(iii) maximum of at least hundred and ten (110) km/h, and
(h) The VAS shall operate autonomously.

6.2 Means to depower display
The sign shall provide a means to locally depower the display, in event of loss of control. This facility shall be accessible to maintenance technicians. This shall be in addition to any remote means to depower the display.

6.3 Fault Monitoring
The sign shall detect faults and events related to the sign display, sensors, speed detector, communication links and power supply. The sign shall be able to detect display area pixel failures when the display is either in an active or blank state.

In the event of a fault, the sign shall log the fault and send a fault notification

(a) to a designated host or maintenance technician or both,

(b) within no greater than 6 hours.

The sign shall log fault occurrences (ON) and fault clearances (OFF).
That logged fault information shall be obtainable by the host upon a status update poll.
The supplier shall provide the details of the designated host, in the event is a product host control system (PHCS), and how the sign communicates with it.

When a fault has been cleared or rectified, it shall be logged as cleared. Fault entries that are not cleared shall remain until manually rectified by a maintenance technician.

Examples of faults may include:

(a) Battery voltage falling below operational threshold;
(b) Battery voltage rising above operational threshold;
(c) Battery health status;
(d) Battery/power supply failure;
(e) Communications (with host) faults/failures;
(f) Rain sensor failures;
(g) Sign display driver failures;
(h) Sign display internal communications failures;
(i) Multiple pixel failures (showing pixel percentage failed);
(j) Radar/speed detector failures;
(k) Sign controller operational faults; and
(l) Erroneous speed displays.

The sign shall log and blank the sign display for critical faults or the following conditions:

(a) Multiple pixel failures (partial display of display contents);
For the purpose of this requirement, the configurable percentage of sign display shall be settable between 1% and 20% both inclusive, with a default of 2%. The aggregate of the two display areas of sign display shall apply to this requirement;

(b) Any other detected failure which significantly adversely impacts the display.

The supplier shall provide all faults and associated error conditions implemented by the sign, with their trigger/clear thresholds and show which of those blank the display.

NOTE: Critical faults are defined to be those that may compromise the sign display such that the display contents may be confusing to the public.

### 6.4 Fault Log and Event Log

The VAS shall log faults and related error conditions in a fault log, including the date and time of those events. Logging shall be on a first-in-first-out (FIFO) basis.

Speed detection events, and events other than faults, shall be logged in an events log.

The event log shall be separate from the fault log.

The logging capacity of the fault log shall be sufficient for the latest 200 entries. The logging capacity of the event log shall be at a minimum of the same capacity as the fault log. The maximum logging capacity for the event log shall be determined by the manufacturer. The capacity of the fault log and event log shall be provided by the supplier, when making a submission for approval.

The logged data shall be stored locally in the sign.

The fault log and event log shall be accessible remotely and locally.

### 6.5 Communication System

#### 6.5.1 Communication Links

The sign shall provide one or more of the following primary communication links:

(a) 3G wireless;

(b) 4G wireless;

(c) 5G wireless or other wireless communication types subject to prior approval by RMS.

In addition, as secondary/backup communication links, for local access and control, the sign shall have at least one RS232 communications port, and one Ethernet port.

The sign communication links shall provide the means for maintenance technicians to communicate with the sign for the purpose of sign control, maintenance, and diagnostics.

#### 6.5.2 Product Host Control System

The supplier shall provide a product host control system (PHCS) with the sign.

In the event of one or more faults, the sign shall report the primary fault to the PHCS.

The PHCS shall report a fault occurrence to maintenance personnel. It shall provide the means to look at the details of the fault. The reporting shall be in SMS or email form.

The sign shall be able to locally and remotely communicate at least its operational status, faults and related errors, fault log, and event log.

The communication of sign status information shall be web-based or any other relevant method accessible to RMS. The PHCS shall allow checking status of each sign and notify relevant maintenance technician/s if any sign is faulty, inoperative or non-responsive.
The supplier shall provide this information including the minimum and maximum applicable logging/polling frequencies of the sign/host, when making a submission for approval.

### 6.5.3 Remote Disabling of Display

It shall be possible to remotely disable the sign display.

# 7 DISPLAY AREA AND OPTICAL REQUIREMENTS

### 7.1 Display Area

#### 7.1.1 General

The front face of the sign shall be matt black.

The sign display shall consist of one or more display areas, the combination of which shall be activated simultaneously to present a complete sign message to the motorist.

The colour of the graphic and text shall be, simultaneously, white or yellow.

#### 7.1.2 Display Dimensions

The sign size shall be commensurate with the speed limit of the intended traffic site. The manufacturer/supplier shall provide the intended site speed limit and relevant intended sign size when making a submission for approval.

For signs that are not covered in AS 1743, the sign types and sizes in Table 6.1 shall apply.

<table>
<thead>
<tr>
<th>VAS/sign type</th>
<th>Sign size (mm x mm)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Diamond-shaped warning sign</td>
<td>Rectangular text sign</td>
</tr>
<tr>
<td>A</td>
<td>600 x 600</td>
<td>600 x 400</td>
</tr>
<tr>
<td>B</td>
<td>750 x 750</td>
<td>750 x 500</td>
</tr>
<tr>
<td>C</td>
<td>900 x 900</td>
<td>900 x 600</td>
</tr>
</tbody>
</table>

**NOTE:**

The following ((a) and (b)) are not requirements and listed for the purpose of guidance only:

(a) For determining sign type/size and font sizes, the VAS diamond-shaped warning sign display area and rectangular text sign display area may have at least the same dimensions as the respectively sized road signs as defined in AS 1743 under warning signs (W series). For that purpose, rectangular text signs may be at least the same dimensions as the two-line rectangular (capitalised) text signs (for example, AS 1743-2018 under Appendix A titled “Warning Signs (W Series)”, see W8-8 “WHEN FROSTY”, W8-7 “WHEN WET”, W8-9 “UNDER SNOW”, W8-16 “ONE LANE”),

(b) The default sign may display the colour-inverse of “warning signs” in AS 1743. For colour-inverted signs in AS 1743, the border diamond may be in yellow on a black display and centre graphic should be in white (preferred) or yellow on a black display with any red or white parts of the said graphic unchanged from those in AS 1743.

#### 7.1.3 Display resolution

The sign display resolution shall be sufficient to ensure clarity and legibility of display contents. The supplier shall provide photographs showing the display face for this purpose.
The supplier shall provide the design calculations and rationale that was used to meet this requirement.

Where two display colours meet, in order to compensate for fringe effects such as chromatic aberration, the display contents shall have an unlit gap at the interface of those two colours.

### 7.1.4 Display modes

Display modes shall be either ON or OFF based on trigger and display time status.

### 7.2 Optical requirements

#### 7.2.1 General

The supply shall at the time of submission for approval, provide photometric and colorimetric test report/s for the sign with the following information:

(a) Luminance and luminance ratio,
(b) Luminous intensity uniformity,
(c) Luminous intensity half angle, and
(d) Chromaticity coordinates for each LED of a pixel.

The entries for luminance and luminance ratio, and chromaticity coordinates shall be shown for each dimming level specified. In addition, the sign display shall present no noticeable flickering of the displayed contents or its background, when either active or inactive.

The sign shall deliver the specified optical requirements for its specified design life.

*NOTE: Tables 6.2, 6.3 and 6.4 are based on class L2, R2 and C2, respectively, as defined in EN 12966. Also see EN 12966 for photometric and colorimetric test procedures.*

#### 7.2.2 Display luminance and luminance ratio

The sign display area luminance and luminance ratio shall be within the levels for the colours Red, Yellow, and White as specified in Tables 6.2 and 6.3.

<table>
<thead>
<tr>
<th>Dimming level (or table entry number)</th>
<th>Sign illuminance (lx)</th>
<th>Sign luminance (cd/m²)</th>
<th>Red</th>
<th>Yellow</th>
<th>White</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>40000</td>
<td>1550</td>
<td>4650</td>
<td>3720</td>
<td>11160</td>
</tr>
<tr>
<td>2</td>
<td>4000</td>
<td>275</td>
<td>825</td>
<td>660</td>
<td>1980</td>
</tr>
<tr>
<td>3</td>
<td>400</td>
<td>75</td>
<td>225</td>
<td>180</td>
<td>540</td>
</tr>
<tr>
<td>4</td>
<td>40</td>
<td>50</td>
<td>150</td>
<td>120</td>
<td>360</td>
</tr>
<tr>
<td>5</td>
<td>≤ 4</td>
<td>15</td>
<td>45</td>
<td>36</td>
<td>108</td>
</tr>
</tbody>
</table>

**Table 6.2 — Sign luminance for colours Red, Yellow and White**
Table 6.3 – Sign luminance ratio (LR) for colours Red, Yellow and White

<table>
<thead>
<tr>
<th>Colour</th>
<th>Sign luminance ratio (LR)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>On reference axis</td>
</tr>
<tr>
<td>Red</td>
<td>2.5</td>
</tr>
<tr>
<td>Yellow</td>
<td>6</td>
</tr>
<tr>
<td>White</td>
<td>10</td>
</tr>
</tbody>
</table>

7.2.3 Luminous intensity uniformity

This requirement shall apply separately to each display colour.

For any individual pixel of the sign display area the following shall apply:

(a) the ratio of the average output from the highest 12% of the pixels, to the lowest 12%, shall be less than 3:1; and

(b) the ratio of the average output from the highest 4% of the pixels, to the lowest 4%, shall be less than 5:1.

The number of pixels in consideration shall be rounded to the next highest whole number.

Results shall be provided in accordance with the visual performance test methods defined in EN 12966 demonstrating whether requirements (a) and (b) above have been met across the full range of display colours and dimming levels.

7.2.4 Luminous intensity half-angle

The sign display area luminous intensity half-angles shall be as specified in Table 6.4.

Table 6.4 – Luminous intensity half-angle

<table>
<thead>
<tr>
<th>Luminous intensity half-angle θ°</th>
<th>Horizontal</th>
<th>Vertical</th>
</tr>
</thead>
<tbody>
<tr>
<td>+15°</td>
<td>0°</td>
<td></td>
</tr>
<tr>
<td>-15°</td>
<td>0°</td>
<td></td>
</tr>
<tr>
<td>0°</td>
<td>-10°</td>
<td></td>
</tr>
</tbody>
</table>

7.2.5 Display colours

The sign display area shall be able to implement the colours Red, Yellow and White in accordance with the chromaticity coordinates as specified in Table 6.5.

Table 6.5 – CIE 1931 chromaticity co-ordinates (x, y) for Red, Yellow and White

<table>
<thead>
<tr>
<th>Colour</th>
<th>Colour coordinates of corner points</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Red</td>
<td>x</td>
</tr>
</tbody>
</table>
VEHICLE ACTIVATED SI GNS (VAS) (Copyright RMS 2019)

7.2.6 Display dimming levels

The sign display shall provide a minimum of 5 dimming levels corresponding to illuminance levels of 40,000 lx, 4,000 lx, 400 lx, 40 lx and \( \leq 4 \) lx, as listed in Table 6.2.

The sign display dimming shall be seamless, and the sign shall not permit sudden changes in the luminance output intensity.

When the illuminance level changes, all display areas shall be adjusted simultaneously.

8 ELECTRICAL REQUIREMENTS

8.1 Power source(s)

The sign shall be standalone solar powered (with associated solar-battery power supply).

The solar-battery power system shall provide at least 99% availability. Following are some recommended minimum requirements to achieve the specified availability:

(a) The minimum storage capacity of the battery shall be able to support at least five (5) consecutive days of operation to the sign in the self-declared duty cycle, assuming heavily overcast conditions;

(b) The minimum solar panel capacity shall be sufficient to a ratio of 3:1 battery recharge to discharge rate in full sun (clear sky) conditions in winter, such that the battery recharge rate could catch-up to replenish the usage and discharge rate.

(c) The applicant shall cater for site specific requirements other than the above minima.

A submission for approval of the sign shall be accompanied with details of analysis performed and calculations of the solar panel output and battery energy storage capacity required to meet the above specified level of availability.

The solar-battery system shall provide over-current and over-voltage protection. The solar-battery system shall provide over-discharge protection as appropriate to the battery type used. The battery type used shall be provided in the sign submission information. The solar-battery system shall be protected against reversal of the polarity of the battery.

8.2 Electrical design/wiring standards

The sign shall comply with AS/NZS 3820.

The supplier shall provide a declaration of conformity to this requirement. Where any part of AS/NZS 3820 does not apply to this sign, the supplier shall declare those in said document.

8.3 EMC Immunity

The sign shall comply with EMC immunity in accordance with AS/NZS 61000.6.1.

The supplier shall provide an EMC immunity test report for the sign to this requirement.
9 MECHANICAL REQUIREMENTS

9.1 General
The default pole shall be able to withstand the sign static/dead loading and wind loading in accordance with wind loading requirements of the environmental section of this specification.

9.2 Sign Enclosure

9.2.1 Front face
The colour of the front face of the sign shall be matt black.

9.2.2 Removal of sharp edges
The sign construction, internal and external, shall be free from sharp edges.

9.2.3 Access to components
The sign shall provide a convenient means to access key components for maintenance purposes.

9.3 Pole, Mounting Brackets and Mounting Points
The sign shall be provided with a default pole.
The pole, mounting brackets and mounting points shall meet the static/mechanical loading and wind loading environmental requirements of this specification.

9.4 Nameplate
A nameplate shall be affixed to the exterior of the sign enclosure. The nameplate shall remain attached to the sign and legible for at the design life of “all other parts of the sign”.
The nameplate shall provide the following information about the Sign:
   (a) Product/model number and name;
   (b) Manufacturer's name;
   (c) Manufacturer's type number;
   (d) RCM approval number;
   (d) A unique serial number.

9.5 Vandal Resistance
The VAS shall be vandal resistant.
The supplier shall provide information on how the sign complies with this requirement.

9.6 Corrosion Resistance
The sign enclosure shall be treated for corrosion resistance to last the specified design life.
In the event COTS parts are used, the supplier shall demonstrate how the sign, all COTS parts used and their conjoining contacts and interfaces meet this requirement.
For example, one method may be sign constructed of marine grade aluminium alloy 5251 H32 to AS/NZS 1734 and treated with powder coating to a suitable thickness (typically 50 microns), and all steel works, fittings and fasteners hot-dip galvanized as per AS/NZS 4680.
The supplier shall provide the details of the corrosion resistance construction and treatment.
10 ENVIRONMENTAL REQUIREMENTS

10.1 Temperature and Humidity

The sign shall operate within temperature ranging from -15 °C to 60 °C and relative humidity of up to 100% (i.e. dew point), as applicable to the state of NSW.

The supplier shall provide information to demonstrate how the sign meets this requirement (e.g. evidence such as laboratory test reports or field data extrapolations, and associated design calculations explanations/rationale).

10.2 Enclosure Protection

The enclosure ingress protection for the sign shall be IP55 in accordance with AS 60529.

The supplier shall demonstrate how the electrical parts are protected from moisture such that the sign functions are not affected.

The supplier shall provide an enclosure protection test report for the sign, when making a submission for approval. The test report shall show the test results and compliance verdicts for both the diamond-shaped warning sign and the rectangular “SLOW DOWN” text sign, depending on the sign construction (e.g. Variant 1 or 2). In the event the sign is constructed of the integration of two or more separate parts (e.g. COTS equipment/parts), those constituent parts shall be listed in the enclosure protection test report with the overall compliance verdict for the sign shown.

10.3 Wind Loading

The sign, mounting brackets and mounting points and declared post shall withstand at least the wind loading conditions of Region B, Terrain Category 2 in accordance with AS/NZS 1170.2.

Wind loading certification by a qualified structural engineer shall be provided to demonstrate how the sign meets this requirement.

11 MANUALS

Manuals shall be provided to cover operation and maintenance, at an appropriate level of detail. A copy in PDF format is expected at approval stage.

All manuals shall be in accordance with TSI-SP-062. Each manual for the sign shall be provided with a compliance statement to that effect, if in a submission for approval.

12 QUALITY ASSURANCE

12.1 Quality Management System

The supplier and the manufacturer of the signs shall operate a quality management system complying with AS/NZS ISO 9001.

The supplier shall provide evidence of their quality certification by an accredited body, in a submission for approval.
12.2 Quality Plan
The supplier shall provide a quality plan for the sign, in a submission for approval.

Each sign shall be marked with a model number, batch code, serial number, and/or other marking to provide traceability under the sign manufacturer’s quality management system to all key manufacturing, inspection and test processes, including batch identifications of key components (e.g. sign controller, sign displays, power supplies, speed detector, etc.).

13 APPROVAL

13.1 Submission process
For submissions for approval of a sign, the supplier shall follow IC-QA-TS201.

In the event any contents are pending at the time of submission this shall be indicated in the compliance statement with an intended follow-on date where available, by the supplier.

Other approvals for an overall installation may apply, such as those that may be included in policy, but are excluded from the scope of this document.

13.2 Sign face and display contents
Approval for all sign face and display contents shall be by RMS’s Guidance and Delineation unit and sought by the supplier prior to or during a submission for approval via ITSHelpDesk.

13.3 Submission contents
When making a submission for approval of the sign, in addition to the submission evidence required in the relevant clauses of this specification, the following shall apply:

(a) Sign model number, sign type and serial number as a minimum clearly declared in all relevant documentation and supporting evidence.

   NOTE: Sign model number shall provide a means to limit the range of items and constituent parts associated with a VAS under submission for approval;

(b) In the event any supporting evidence (e.g. test reports, certifications, declarations of conformity, and so on) refer to requirements other than Australian standards and RMS specification (e.g. EN, IEC, etc.), a compliance traceability map showing rationale as to how those supporting evidences demonstrate how the sign meets the requirements in this specification, shall be provided by the supplier.

   See Appendix A guidance step 2;

(c) Technical design drawings for the sign including the following:
   (i) Block diagrams of electronic and power/electrical system of the sign;
   (ii) Any terminal block and wiring layouts;
   (iii) Structural drawings containing dimensions, components and assemblies,
   (iv) Display dimensional drawings all sign face and display contents;

(d) Display pixel (bit)map of all display contents;

(e) Photographs and/or video of the sign demonstrating the operation of the display.
13.4 Changes

If a design, material or manufacturing method change is made to an approved VAS, the supplier shall notify the ITS help desk (ITSHelpDesk@rms.nsw.gov.au) and the requirements of IC-QA-TS201 regarding changes shall be followed.
APPENDIX A – GUIDANCE

For regulatory requirements, the supplier may choose to follow the following checklist; it may also apply to other requirements in this specification that need similar supporting test or empirical evidence (from various test providers) for demonstration of compliance by the sign:

(1) Determine if the sign (with all its constituent parts including speed detector radar and 3G/4G/5G modem) is subject to regulatory compliance requirements.

This might include RCM, EMC (intentional and unintentional) emission and electrical safety requirements;

(2) Identify which standards and regulatory arrangements are applicable as listed by the relevant regulatory bodies (e.g. see ACMA, ERAC, NSW Fair Trading, etc.),

For any COTS or equipment certified external to Australia and NSW, determine how those map to applicable Australian standards and NSW requirements.
List those mappings in declarations of conformity documents;

(3) Test the sign for compliance in accordance with the identified standards in (2) by accredited test laboratories. If any parts of the sign is COTS (e.g. speed detector radar, 3G/4G model, etc.), identify which applicable EMC and electrical safety standards those have been tested to by their respective OEMs;

(4) Provide a declaration of conformity document confirming that the sign complies with each standard identified in (2), by way of the following information:

a. part of the sign is subject to regulatory compliance (if entire sign then this could be indicated as 'sign' insofar as all intentionally emitting parts are shown as included with the 'sign'),

b. regulatory arrangement/s applicable to each part in a.,

c. standard/s applicable to each part in a.,

d. regulatory body listing regulatory arrangement in b. and standard/s in c.,

e. test report number/s demonstrating compliance with standard/s in d.,

f. compliance verdict as extracted from the test report/s in e.

g. where there is more than one test report in f., the overall compliance verdict.

NOTES:

(1) Albeit the sign is solar-battery powered thus extra low voltage (ELV), the attachment of intentionally EM emitting radar and 3G/4G modem (whether COTS or not) could render the sign at compliance level 2/medium risk device or higher.

(2) For guidance, following are some reference websites relevant to this requirement:


