

Technical Specification

**Transport and Main Roads Specifications
MRTS222 Enhanced School Zone Signs**

November 2025

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1 Introduction

This Technical Specification applies to the design, supply, installation, testing and commissioning, performance, documentation, training, maintenance and handover requirements for enhanced school zone speed limit signs.

These signs are intended to supplement an overall school environment safety treatment strategy to improve driver speed compliance in school zones.

This Technical Specification shall be read in conjunction with MRTS01 *Introduction to Technical Specifications*, MRTS50 *Specific Quality System Requirements*, TN218 *Enhanced School Zone Sign Interface* and other Technical Specifications, as appropriate.

This Technical Specification forms part of the Transport and Main Roads Specifications Manual.

A summary set of requirements for the Remote Sign Management System (RSMS) are defined in Clause 11. Detailed operationalisation and supplementary requirements of the RSMS may be defined outside of this Technical Specification.

2 Definitions of terms

The terminology defined in MRTS201 *General Equipment Requirements* apply to this Technical Specification. Additional terminology relevant under this Technical Specification are defined in Table 2.

Table 2 - Definition of terms

| Term | Definition |
|-------|--|
| 4G/5G | Fourth/Fifth generation mobile phone technology |
| ADSL | Asymmetric digital subscriber line, a broadband technology |
| CLSM | Controlled low-strength material |
| Event | Any operation of the sign signifying a change of state, occurrence of a fault or change in mode of operation of the sign |
| ESZS | Enhanced School Zone Sign |
| GPS | Global Positioning System |
| GUI | Graphical User Interface |
| IoT | Internet of Things |
| ITS | Intelligent Transport Systems |
| LED | Light Emitting Diode |

| Term | Definition |
|----------------|--|
| NATA | National Association of Testing Authorities, Australia |
| NTP | Network Time Protocol |
| Pixel | The smallest, discreetly-controlled light-emitting component of the sign display |
| Principal | Agency responsible for the contract (e.g., Transport and Main Roads / local government). Unless explicitly stated, this does not refer to the school Principal |
| QTDF | Queensland Traffic Data Format |
| RCM | Regulatory Compliance Mark |
| RPEQ | Registered Professional Engineer of Queensland |
| RSMS | Remote Sign Management System |
| Sign | Enhanced School Zone Speed Limit sign – R4-040-Q03 |
| Simultaneously | At the same time as apparent to the eye of an observer |
| Stroke width | The apparent width of active pixel(s) |
| Watchdog timer | An electronic or software timer used to detect and recover from computer malfunctions |

3 Reference documents

The requirements of the referenced documents listed in Table 3 of MRTS201 *General Equipment Requirements* and in Table 3 below, apply to this Technical Specification. Where there are inconsistencies between this Technical Specification and referenced Technical Specification documents, the requirements specified in this Technical Specification take precedence.

Table 3 – Referenced documents

| Reference | Title |
|--|--|
| Austrroads Guide to Road Design Part 6 | <i>Road Design, Safety and Barriers</i> |
| AS 1379 | <i>Specification and Supply of concrete</i> |
| AS 2898.1 | <i>Radar speed detection – functional requirements and definitions</i> |
| AS 2898.2 | <i>Radar speed detection – Operational procedures</i> |
| AS 5156 | <i>Electronic speed limit signs</i> |
| AS 60529 | <i>Degrees of protection provided by enclosures (IP Code)</i> |

| Reference | Title |
|--------------------------|--|
| AS/CA S042.1 | <i>Requirements for connection to an air interface of a Telecommunications Network - Part 1: General</i> |
| AS/CA S042.4 | <i>Requirements for connection to an air interface of a Telecommunications Network—Part 4: IMT Customer Equipment</i> |
| AS/NZS 1170.1 | <i>Structural Design Actions, Permanent, imposed and other actions</i> |
| AS/NZS 1170.2 | <i>Structural Design Actions, Wind Actions</i> |
| AS 1742 | <i>Manual of Uniform Traffic Control Devices</i> |
| MRTS14 | <i>Road Furniture</i> |
| MRTS78 | <i>Fabrication of Structural Steelwork</i> |
| MRTS91 | <i>Conduits and Pits</i> |
| MRTS201 | <i>General Equipment Requirements</i> |
| MRTS204 | <i>Vehicle Detectors</i> |
| MRTS263 | <i>Standalone Solar (PV) Power Systems</i> |
| Queensland MUTCD | <i>Queensland Manual of Uniform Traffic Control Devices</i> |
| QRSTUV | <i>Queensland Road Safety Technical User Volumes</i> |
| QTDF | <i>Queensland Traffic Data Format Version 1.04</i> |
| TN218 | <i>Enhanced School Zone Sign Interface</i> |
| TRUM Volume 3, Part 5 | <i>Traffic and Road Use Management Manual, Volume 3 – Signing and Pavement Marking, Part 5 Design Guide for Roadside Signs</i> |

4 Quality system requirements

The quality system requirements defined in MRTS201 *General Equipment Requirements*, apply to this Technical Specification. Additional quality system requirements relevant under this Technical Specification, are defined in Table 4.

Table 4 – Hold Points, Witness Points and Milestones

| Clause | Hold Point | Witness Point | Milestone |
|--------|--|-----------------------------|--|
| 4.1 | 1. Samples for acceptance (design) 2. Optical performance certification | | |
| 6.7 | 3. Location of mounting structure | | |
| 8.1 | | 1. Optical performance test | |
| 10 | | | Submission of civil works design documentation |

4.1 Samples for acceptance

Detailed designs of the sign, equipment layout, fabrication and assembly drawings, calculations, specifications of component parts and certifications shall be submitted and approved by the Principal or their delegate for verification prior to manufacture.

Drawings shall specify the sign face, enclosure, solar module(s), radar modules, if applicable, posts and mounting accessories. The sign face drawings shall detail pixel rings, Light Emitting Diode (LED) pixel arrangements showing horizontal and vertical pitch and character strokes as appropriate.

The Contractor’s specifications shall include the manufacturer and model of LEDs to be used, power supply (charge controller and batteries), modems, communication ports, cable termination, enclosure and mounting accessories and wig-wags, as appropriate.

Unless specified otherwise, a sample of the sign complete with software and hardware necessary for configuration, fabrication and assembly drawings, calculations, specifications, user manuals and certifications shall be submitted to the Principal for acceptance. **Hold Point 1**

NATA optical performance certificates shall be submitted before delivery to site.

Hold Point 2

5 Functional requirements

5.1 General

The sign shall only display the regulatory school zone speed applicable at the school zone where the signs are installed.

The signs shall be capable of autonomous operation and allow local and remote update of the clock and calendar.

5.2 Enhanced School Zone Speed Limit sign – R4-040-Q03

Figure 5.2 – Enhanced School Zone Speed Limit sign – R4-040-Q03



The enhanced school zone speed limit sign face shall be as outlined in R4-040-Q03. R4-040-Q03 is the same as R4-040-Q01, except that the enhanced sign has:

- a set of flashing lights or wig-wags above the 'school zone' wording, and
- has one or more LED-based rings located within the confines of the static annulus.

The annulus and wig-wag LEDs shall be red and yellow, respectively.

The speed limit shown in the static sign shall be as per the site specific requirements. The 40 km/h shown in Figure 5.2 is for illustration only and may be different.

6 Mechanical and physical requirements

6.1 General

The signs shall comply with the requirements of MRTS14 *Road Furniture*, and Part 5 of TRUM *Volume 3*.

Where required, pits and conduits to accommodate power and communication cables shall be supplied and installed according to the requirements of MRTS91 *Conduits and Pits*.

The mechanical and physical requirements defined in MRTS201 *General Equipment Requirements* apply to this Technical Specification.

Additional mechanical and physical requirements for equipment provided under this Technical Specification are described below.

The materials and methods of construction of the materials, equipment and enclosures shall be such that they have the strength and durability to withstand expected conditions of transportation, installation and operation when installed in the intended environment.

The equipment and enclosures shall be of suitable design to protect against vandalism and prevent infestation by vermin. Ingress Protection (IP) rating for enclosures, shall be no less than IP55 as defined in AS 60529 *Degrees of protection provided by enclosures (IP Code)*. This includes all cable penetrations and equipment that may be located external to the enclosure.

Physical LED protection shall be such that optical performance of the sign is unaffected. The signs shall be fitted with anti-vandal features, to reduce and deter vandalism to the sign and solar panel.

The sign face material shall be aluminium.

The flashing light assembly and accessories shall not cause the sign face to warp.

The diameters of the flashing lanterns associated with each sign of Sizes 'A', 'B' or 'C' shall be in accordance with R4-040-Q03.

If LEDs are used for the flashing lights, the luminance of the LEDs, when measured under laboratory conditions, shall comply with the requirements of AS 5156 *Electronic speed limit signs*.

6.2 Environmental conditions

The signs shall be capable of continuous, normal operation in the conditions described in MRTS201 *General Equipment Requirements*.

6.3 Sign placement

Sign placement shall be as directed by the Principal in accordance with requirements of QRSTUV *Guide to Speed Management* and Part 4 of the Queensland MUTCD.

6.4 Sign enclosures

Associated sign control electronics shall be housed in an enclosure and in a manner which allows access for maintenance. Doors shall be capable of being hinged from either the left or right but, unless specified otherwise, shall be hinged from the left. The enclosure shall be fitted with a door switch to indicate if the enclosure door is open or improperly closed. All doors accessible to the public shall be lockable.

Sign enclosures shall meet the requirements of Clause 13.2 of MRTS201 *General Equipment Requirements*, including supply of keys to the department's requirements.

Venting and air circulation arrangements shall be such that the thermal ratings of the electronics are not exceeded. Use of filters and forced cooling, such as by use of fans, is not allowed. Peltier devices or other similar means may be used for moisture control. Door seals are to ensure sustained ingress protection for the service life of the sign.

6.5 Design life

Unless otherwise specified, the design life of components shall be as follows:

- LEDs/pixels: a minimum of 10 years
- door switch: 50,000 operations
- other electrical systems: a minimum of 10 years
- sign enclosure: a minimum of 20 years, and
- structural supports: a minimum of 50 years.

6.6 Design loads

Static and wind design loads shall be in accordance with AS/NZS 1170.1 *Structural Design Actions, Permanent, imposed and other Actions* and AS/NZS 1170.2 *Structural Design Actions, Wind Actions*.

Wind pressure reduction factor (R=0.5) shall not be applied.

The calculation method referenced in Figure B.2 of TRUM Volume 3, Part 5 shall not apply.

6.7 Mounting structure

Each sign and associated equipment shall be capable of being pole-mounted.

Structures shall be suitable for a finished surface crossfall of up to 1 in 3.

Unless otherwise specified, the pole material and galvanised finish shall be as per MRTS78 *Fabrication of Structural Steelwork*. Poles shall be designed and approved by a structural Registered Professional Engineer of Queensland (RPEQ).

Frangible post or slip base construction may be used in high-speed environments. The decision to use slip base or frangible posts shall be made by an RPEQ.

Frangibility and crash worthiness design shall comply with Section 7.3 of the Austroads Guide to Road Design Part 6 – *Road Design, Safety and Barriers*.

Section 5.3.4 of TRUM Volume 3, Part 5 shall apply.

Structures shall have sufficient testing and engineering analysis to prove frangibility and crashworthiness to mitigate:

- breakaway structures that may harm children, parents and other pedestrians nearby
- the mass of the signs that may impact the compartment of the impacting vehicles, and
- the occupant risk to impact forces inside the errant vehicle depending on speed of impact.

For Size B ESZS signs, a single post structure is preferred.

Depending upon the roadside safety assessment, the system may use a separate support pole for the PV modules from that supporting the sign.

In programs with a large geographical footprint, precast concrete elements with integrated reinforcement help mitigate the risk of non-compliant footing dimensions due to their controlled manufacturing process. However, as a policy, the Department of Transport and Main Roads does not permit the use of precast footings for roadside furniture – including poles, signs, mast arms, and similar structures – due to concerns about the uncertainty in soil consolidation around precast elements. Footings must be designed to suit the actual soil conditions encountered on-site, which precast elements cannot easily accommodate without significant customisation. Nevertheless, given the low-risk profile associated with ESZS footings, this requirement is relaxed for those specific applications.

All footings shall be designed and approved by a structural RPEQ.

Sign footings shall be precast concrete elements with integrated reinforcement.

The annular spaces between the precast footing and surrounding soil shall be filled with Controlled Low-Strength Material (CLSM). The CLSM shall comply with AS 1379 *Specification and Supply of concrete*, achieving a 28-day compressive strength in the range of 1.5–2 MPa. Aggregate shall be graded to achieve sufficient flow without segregation. The recommended nominal slump is 200 mm.

Mounting hardware shall provide means to adjust the vertical and/or horizontal alignment of each sign and solar panel(s) during commissioning and subsequent maintenance activities.

Solar modules shall have a deterrent mechanism for stopping birds from resting on the module.

The location and type of mounting structure to be provided for each sign and solar panel, shall be shown on the design documentation.

Final footing, support structure design and locations as shown in design documentation, shall be submitted to the Principal's representative for acceptance before fabrication. **Hold Point 3**

6.8 Telecommunications field cabinets

Unless otherwise specified, no telecommunication field cabinets are required.

If specified in the design documents, provision for connection to field cabinets shall be made by way of ducts and pits. Pits and ducts shall be installed in accordance with MRTS91 *Conduits and Pits*.

6.9 Marking

Each sign shall be durably marked internally to show sign type, serial number, date of manufacture, and Regulatory Compliance Mark (RCM). The details shall allow traceability of the sign manufacture, according to the Contractor's quality system.

The rear of each sign shall be affixed with a unique identification number, as nominated by the Principal, and a telephone number to call in the event of a fault or damage to the sign. The label shall be designed to last 10 years in the range of environmental conditions described in MRTS201 *General Equipment Requirements*. The label shall be clearly legible from 1.5 metres above ground level, a distance of 5 metres from the base of the sign.

7 Operational requirements of sign display

7.1 General

The operational requirements defined in MRTS201 *General Equipment Requirements* apply to this Technical Specification. Additional operational requirements for equipment provided under this Technical Specification, are described below.

The apparent width of all displayed elements, including text, shall match the respective sign display defined in the Queensland MUTCD. The minimum legibility (sight) distance shall be sufficient for both the respective school zone speed and the default speed limit before the sign.

The sign shall display only the regulatory speed applicable during the school zone designated time period.

The calendar function shall be able to be programmed 3 years in advance. The school days shall be confirmed during the commissioning activities and retained as part of the non-volatile information stored in the sign.

7.2 Display technology

The display technology shall be LED. To achieve the required sign luminance levels, the display pixels may be formed by arranging one or more LEDs in a cluster.

7.3 LED output

Each individual LED shall be driven with a continuous current, with no peak and/or magnitudes exceeding 70% of the LED manufacturer's maximum continuous rating.

7.4 Character formats

Character formats shall be as specified in Clause 5.2.

The annulus shall not be less in size than that required for an equivalent static sign.

7.5 Sign display

There shall be no discernible flickering of the annulus. Background flickering as a result of checking the 'on' and 'off' pixel status shall not be visible.

7.6 Display colour

LEDs for the wig-wags shall be yellow in colour and LEDs for the annulus shall be red.

The LED colours shall fall within the chromaticity co-ordinates specified in AS 5156 *Electronic speed limit signs*.

7.7 Default display

Facilities shall be included to detect failures within the display control system, with the sign blanking the display when major faults are detected.

Loss of X% of the annulus LEDs or X% of either of the wig-wag lantern LEDs shall cause the respective component to blank. Percentage of failure shall be configurable in the diagnostic tool for each component (default = 50%, range = 1–99% and disable).

The sign shall be able to detect LED failure even if the LEDs may be required to be 'off' at the time of the periodic check.

The sign shall blank the display for the following conditions:

- a sign processor fault
- corruption of the calendar, time function, and
- whenever the battery voltage is lower than the set threshold. However, upon battery recharge, the sign shall resume normal operation.

Ambient light sensor failure should not result in blanking of the display. Upon failure of the ambient light sensor, the sign shall fall back to time-of-day brightness levels.

7.8 Watchdog timer

The sign shall automatically reset the controller and display on processor watchdog timeout.

7.9 Event logging

The sign shall log all operational and fault events, including the date and time that the event occurs.

The logging capacity shall be such that the logged data is of a minimum one-month duration.

These events include, but are not limited to:

Operational Logs:

- activation of the school zone period

Fault Logs:

- Lower Energy Alarm (sign will not work in 24 hours, if the battery does not receive charge in that time)
- loss of power (main and auxiliary)
- power restoration (main and auxiliary)

- high or low battery voltage occurrence
- door opening
- failure to communicate with the designated remote sign monitoring system
- LED failure
- light sensor failure
- dimming level
- loss of solar module
- high enclosure temperature

Status logs:

- Daily Power Consumption
- local or remote connection, commencement and termination
- sign enclosure temperature each minute

Logs shall be recorded in Australia Eastern Standard Time (AEST).

7.10 Red annulus

The annulus shall comply with the requirements of R4-040-Q03.

7.11 Display elements

During the school zone period, all the pixels constituting the annulus outermost ring(s) shall be activated. Selected inner rings of the annulus shall flash continuously until expiry of the school zone time period.

The inner annulus rings and wig-wags shall flash continuously during the designated school zone periods and at no other times.

The flash rate of the inner annulus rings and the wig-wags shall be the same; meaning that the annulus will flash simultaneously with one of the wig-wag LED lanterns. The wig-wags shall flash alternately.

The flash rate for elements of the sign that are required to flash, shall be configurable and shall initially be set to 50/50 (lit/unlit) with a cycle time of one second.

7.12 Internal clock

The sign shall be provided with a 24-hour internal clock.

The clock shall be configured to synchronise with one of GPS, Network Time Protocol (NTP) or by protocol command. The clock should ignore other time sources not configured to avoid conflicting time sources.

Time error of synchronised clock shall be no more than one second over a period of one week.

7.13 Local facility switch

A three-position key-operated facility switch, that complies with MRTS201 *General Equipment Requirements*, shall be provided to enable selection of the following 3 display functions:

- off: display blank, control via all communications ports inhibited, status and diagnostic commands via all communications ports remain functional
- test mode: display active, control via all communications ports inhibited, status and diagnostic commands via all communications ports remain functional, and
- normal: display active, displayed message selected via the maintenance communications port and/or the control communications port.

7.14 Radar unit

As of November 2025, radar functionality is a provisional item and is not a typical deployment of ESZS to date.

Where specified, signs shall be supplied with a radar unit for detecting vehicle volume and speed data.

Radar selection, operation and alignment for detection shall comply with the functional requirements and operational procedures of AS 2898 *Radar Speed Detection*.

Functionality and performance shall meet MRTS204 *Vehicle Detectors* for radar vehicle detectors. The radar unit shall be directional and it shall detect and record speeds of departing vehicles from the sign (arriving into the school zone).

The radar unit shall be mounted such that it is vandal-proof and able to be aimed in different directions independently of the sign face. The radar unit shall be adjustable, such that there is no interference with other radar units within the same carriageway.

Data captured from the detection of every vehicle by the radar unit shall consist of individual vehicle speed data, formatted in accordance with QTDF Version 1.04 (SV). The speed data shall be reported at the resolution of 1 km/h.

Traffic volume data shall be captured and formatted in accordance with QTDF Version 1.04 (VC).

Other QTDF data blocks may be supported.

7.15 Optical performance test procedures

The optical performance for all LEDs used shall be determined by measurement under laboratory conditions for:

- minimum luminance ratio
- minimum and maximum luminance and luminous intensity uniformity, and
- LED display colour as per AS 5156 *Electronic speed limit signs*.

The performance of the sign displays shall meet or exceed the requirements of AS 5156. **Witness Point 1**

The luminance and the luminance ratio of the lit areas of the sign, when measured under laboratory conditions, shall comply with the luminance and luminance ratio requirements of AS 5156.

7.16 LED intensity control

The LED intensity must be controlled to provide constant apparent brightness and maximum legibility distance for the range of the ambient light under which the sign must operate.

The light output intensity, the number of light sensors and the automatic dimming control functionality shall be in accordance with the display and optical requirements in AS 5156.

Signs shall be able to vary the display light output, based on the output of the light sensor(s) connected to it.

7.17 Luminance intensity half angle

The luminance intensity half angle shall be not less than 10°.

7.18 Sun phantom

The effect of sunlight or other light sources shining on the optical elements, shall be controlled such that inactive pixels do not appear active.

Provision shall be made for each lantern to be fitted with a visor to minimise sun-phantom and veiling illuminance effects, or to reduce the possibility of a flashing signal being seen by traffic for which it is not intended.

The visor shall be sufficiently rigid to withstand distortion due to wind and extreme temperatures.

The interior surface of visors shall be finished, so as to minimise reflections of the illuminated signal.

8 Sign control system

The control system requirements defined in MRTS201 *General Equipment Requirements*, apply to this Technical Specification. Additional sign control system requirements for equipment provided under this Technical Specification, are described below.

8.1 General

The sign shall be capable of autonomous operation and allow local, as well as remote, access by diagnostic software and remote sign management software, respectively.

Each sign shall be uniquely identifiable electronically and shall be able to create a character string for use by the remote sign management software for this purpose, as defined by the Principal.

8.2 Local control

The sign shall allow local control via a maintenance communications port using a laptop or a handheld device. Local control shall be gained using the diagnostic software.

Secure access to the signs shall be provisioned to prevent unauthorised access to the signs.

All sign diagnostics and configuration parameters able to be changed in the field, shall be accessible when the sign is selected for local control.

Disconnection of a laptop or handheld device shall cause the sign to revert to autonomous operation.

Ending of the maintenance session shall not require further interaction from the user, nor in any way interrupt operation or require rebooting of the sign but immediately let the sign revert to autonomous operation.

8.3 Sign remote control

Each sign shall be capable of being accessed remotely using cellular communications or other designed for a system or site and approved by the Principal.

The sign shall allow remote updates of the calendar and synchronisation of time with the remote sign management software.

The sign shall be able to service requests by the remote sign management software, including status reports and a log of events.

The sign shall be able to send unsolicited status message / alarm within a reasonable time to the remote sign management software, or alternative configured address, should an event or fault occur that requires blanking of the display, annulus, numerals, or lanterns (wig-wags).

The sign shall be supplied with communication equipment to establish a communication link to the remote sign management system.

On power restoration, after loss of power, the ESZS modem shall become available and resume communication with the remote sign management system without the need for manual reset.

The sign shall have the capability to receive and process software updates with store, validate, deploy and rollback on failure functionality.

9 Communication interface

For details about the communication interface, refer to TN218 *Enhanced School Zone Sign Interface*.

10 Diagnostic software

Diagnostic software shall be supplied with the sign for the purpose of sign configuration, commissioning and maintenance activities.

The diagnostic software shall fully implement all the sign functions required for the commissioning and maintenance of the sign.

The diagnostic software shall support remote (cellular based) or local communications.

The diagnostic software shall be configured to request passwords, as part of the sign access and configuration authorisation process.

The software shall be compatible with Microsoft Windows®, or a similar industry standard operating system environment currently available and supported by the software vendor. Any software provided, shall be capable of operating on all such operating systems.

The diagnostic software shall be capable of suggesting ranges for each parameter as applicable when programming and not allow these limits to be exceeded.

The diagnostic software shall have the capability to save and upload sign configurations to and from the respective school zone signs.

The diagnostic software shall have the capability to send software updates with store, validate, deploy and rollback on failure functionality.

The diagnostic software shall provide a test program. This shall facilitate testing of all the essential sign features, including the ability to activate, deactivate all pixels, select the annulus inner rings to flash and to vary LED brightness.

The software shall allow the request of a full log of events and querying of events according to set criteria, such as by sign(s), time, date, event type, or by duration.

11 Remote Sign Management System

A Remote Sign Management System (RSMS) shall support operation and monitoring of the signs.

The RSMS shall support deployment on on-premises servers or any cloud-based infrastructure.

The RSMS shall provide secured, password-protected access for various roles to support the operation, maintenance, and troubleshooting of the signs. Each role shall be defined and have a configurable privilege that can be defined by the System Administrator.

The Remote Sign Management Software shall:

- detail the location and current status of all signs (operational, idle, fault condition)
- show signs on a map-based GUI
- implement multiple levels of user access, such as:
 - i. Administrator
 - ii. maintenance
 - iii. standard user, and
 - iv. read only
- allow querying of events according to set criteria such as by sign(s), time, date, event type or by duration
- poll the signs in the field a minimum every 24 hours to verify the communications link and that the sign has not failed. Failure of the sign management system to gain a response from the sign, shall result in an event being logged in the system that highlights the sign status is unknown and possibly failed or damaged
- allow updating and programming of each sign calendar,
- back-up / export / import of sign configuration and calendar, and
- be able to generate weekly reports that include the current operational status of all the signs managed by the RSMS.

The RSMS shall support the functional requirements as defined in Technical Note for Enhanced School Zone Sign Interface.

The RSMS shall store and report traffic data from the radar unit. The radar data format shall follow Clause 7.14.

12 Installation requirements

The installation requirements defined in MRTS201 *General Equipment Requirements*, apply to this Technical Specification. Additional installation requirements relevant under this Technical Specification, are described below.

- a) The general layout, positions, reduced level for the footing (where applicable) and speed zones for the sign and details of the barrier and other mounting requirements, shall be as shown on the design documentation.
- b) The position of in-ground mounting structures shall comply with the requirements of the Queensland MUTCD.
- c) The positioning of sign shall provide sight distances as described in the TRUM.
- d) The sign location shall be verified by site inspection and shall be shown on the design documentation. The design documentation shall be submitted to the Verifier not less than 7 days prior to the commencement of civil works for the sign foundations. **Milestone**

Before installation, the Contractor shall confirm the final sign location and the size, location and positioning of the mounting arrangements and/or protection barrier, as shown in the design documentation to the Verifier.

13 Environmental

The environmental requirements defined in MRTS201 *General Equipment Requirements*, apply to this Technical Specification.

14 Electrical

Following a complete loss of power, upon power being restored, the sign shall continue normal operations without manual intervention.

14.1 Mains power

Where mains power is required, the relevant electrical requirements defined in MRTS201 *General Equipment Requirements* apply to this Technical Specification.

Where mains power is required, also provide a backup battery power supply in accordance with MRTS201 *General Equipment Requirements* for the real time clock and processor, to allow orderly power down in the case of loss of power supply.

14.2 Solar power

Where solar power is specified, the requirements defined in MRTS263 *Standalone Solar (PV) Power Systems* apply to this Technical Specification.

ESZS shall include an option to install a solar panel(s) with capacity double the standard design wattage used. This is to accommodate sign locations with reduced solar exposure.

15 Network telecommunications

The telecommunications requirements defined in MRTS201 *General Equipment Requirements* apply to this Technical Specification.

The sign's communication equipment shall support remote connectivity via cellular 4G/5G network, IoT, ADSL or the Principal's data communications network in accordance with AS/CA S042 *Requirements for connection to an air interface of a Telecommunications Network* standards.

A NATA accredited, or equivalent report showing compliance with the requirements of AS/CA S042 standards, shall be provided.

16 Testing and commissioning

16.1 General

The testing and commissioning requirements defined in MRTS201 *General Equipment Requirements*, apply to this Technical Specification. Additional testing and commissioning requirements, relevant under this Technical Specification, are described below.

16.2 Factory acceptance tests

Compliance with the optical performance requirements shall be determined by measurement under laboratory conditions of the parameters listed in AS 5156 for each batch of signs provided by the Contractor.

Type approved signs may not require repeated optical compliance testing subject to approval by the Principal.

16.3 Site acceptance test

All equipment shall be subject to production testing and each commission sign shall be functionally tested before the handover to customer.

The test shall, as a minimum, include the following procedures:

- simulation of all fault conditions, including:
 - i. total failure / sign knockdown
 - ii. removal of solar panel
 - iii. radar alignment, where applicable
 - iv. communications failure, and
 - v. LED fault – both annulus and wig-wags

The Contractor shall provide a test report with the results of the witnessed tests.

16.4 System acceptance test

After all sites pass a site acceptance test, the system shall be tested, by visual verification of each sign site, during and outside school zone periods. The Contractor shall verify the correct operation of each sign, with the parameters observed in the sign management system.

16.5 Sign configuration

Setting of the time, calendar functions and display duration shall be performed as part of the commissioning process.

17 Documentation

An Operations and Maintenance Manual shall be provided with each sign.

The documentation requirements defined in MRTS201 *General Equipment Requirements*, apply to this Technical Specification.

18 Training

The training requirements defined in MRTS201 *General Equipment Requirements*, apply to this Technical Specification.

19 Maintenance

The maintenance requirements defined in MRTS201 *General Equipment Requirements*, apply to this Technical Specification.

20 Handover

The handover requirements defined in MRTS201 *General Equipment Requirements*, apply to this Technical Specification.

21 Type Approval

Enhanced School Zone Signs shall be type approved to use as a traffic control device. The checklist for the type approval evaluation is on the [Intelligent Transport Systems and Electrical Approved Products and Suppliers](#) webpage.

