Technical Specification

Transport and Main Roads Specifications
MRTS231 Provision of Road Weather Monitors

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1 Introduction
This Technical Specification defines the design, supply, installation, testing and commissioning, performance, documentation, training and maintenance requirements for road weather monitors. The data from road weather monitors shall be made available to STREAMS via the Principal's telecommunications network.

This Technical Specification shall be read in conjunction with MRTS01 Introduction to Technical Specifications, MRTS50 Specific Quality System Requirements and other Technical Specifications as appropriate.

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

2 Definition of terms
The terms defined in Clause 2 of MRTS01 Introduction to Technical Specifications and MRTS201 General Equipment Requirements apply to this Technical Specification.

3 Referenced documents
The requirements of the referenced documents listed in Table 3 of MRTS201 General Equipment Requirements and Table 3 below apply to this Technical Specification. Where there are inconsistencies between this Technical Specification and the referenced MRTS (including those referenced in MRTS201 General Equipment Requirements), the requirements specified in this Technical Specification shall take precedence.

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4 Quality system requirements
The quality system requirements defined in MRTS201 General Equipment Requirements apply to this Technical Specification. There are no additional quality system requirements for equipment provided under this Technical Specification.

5 Functional requirements
The road weather monitors shall measure the specified weather parameters. Measured data shall be transmitted to STREAMS via the Principal’s telecommunications network.

The road weather monitoring equipment shall interface with STREAMS for real time data monitoring remotely from the TMC. It shall also be capable of providing configurable alarms/events to alert the TMC operator and/or provide direct input to enable/disable other ITS systems.

The road weather monitors shall allow additional weather sensors (for other weather conditions) to be added to the installation in future, by others.
6 Equipment components

A road weather monitor shall consist of the following components:

a) specified road weather sensors (e.g. rain, wind, etc.)

b) all associated electronics

c) mounting structure

d) configuration and diagnostic software

e) STREAMS Field Processor and associated device driver, and

f) power supply, telecommunications field cabinet, and associated infrastructure and accessories.

7 Operational requirements

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.

7.2 Wind speed sensors

Unless otherwise specified, wind speed sensors shall consist of a 3-cup anemometer capable of measuring wind speed in units of metres per seconds (m/s) in the range 0 to 60 m/s with an accuracy of ± 0.2 m/s. The wind speed sensor shall be capable of operation when mounted up to 10 m above the roadway and/or bridge structure.

7.3 Wind direction sensors

Unless otherwise specified, wind direction sensors shall be of a vane type capable of measuring the wind direction as degrees (°) deviation from North (0°) with a resolution of 5° and an accuracy of ± 5°. The wind direction sensor shall be capable of operation when mounted up to 10 m above the roadway and/or bridge structure.

7.4 Rainfall sensors

Unless otherwise specified, rainfall sensors shall be of tipping bucket type. Bucket capacity shall be 0.2 mm unless otherwise specified. Rainfall data shall be provided real-time as discrete tipping events, peak and average precipitation rates, and accumulated rainfall over a period.

7.5 Temperature sensors

Unless otherwise specified, temperature sensors shall be of the dry / wet bulb type. The sensing element shall be a semiconductor integrated circuit. The response time shall be less than five minutes in air. Measurement range shall be from -20°C to +60°C, with an accuracy of +/- 0.2°C.

7.6 Humidity sensors

Unless otherwise specified, humidity sensors shall be of the dry / wet bulb type. The sensing element shall be a semiconductor integrated circuit. The response time shall be less than five minutes in air. Measuring range shall be from 0% to 100% RH, with an accuracy of +/- 2% RH.
7.7 Other sensors

The road weather monitor shall allow additional weather sensors (for other weather conditions) to be added to the installation in future, by others. Such weather parameters may include, but not limited to, pavement surface moisture, solar radiation and visibility.

8 Control system

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

8.1 General

a) It shall be possible to retrieve equipment data and status information remotely from STREAMS, via the Principal's telecommunications network.

b) It shall be possible to retrieve data and status 'on demand' via a STREAMS request, and automatically on a pre-determined interval.

c) Where the equipment performs local calculations based on sensor inputs, it shall be possible to extract both raw data and calculated data via STREAMS.

d) Unless otherwise specified, a minimum of two configurable digital outputs shall be provided for each weather sensor included in the road weather monitor.

8.2 STREAMS device driver

The contractor shall engage Transmax and provide a device driver compatible with interfacing with the STREAMS field processor.

8.3 Internal clock

An internal clock shall be provided in accordance with MRTS201 General Equipment Requirements.

9 Mechanical and physical requirements

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

In addition, the sensor equipment shall be capable of being installed on a post that is mounted onto a bridge structure or on to a concrete footing and rag-bolt assembly. The post shall be of the hinged type to allow ease of maintenance. The mounting structure shall comply with the requirements of MRTS201 and MRTS61.

10 Installation requirements

The sensors and associated infrastructure shall be installed at locations shown on the design documentation.

11 Electrical

The electrical requirements defined in MRTS201 General Equipment Requirements apply to this Technical Specification.
12 Telecommunications requirements

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

a) the equipment shall have at least one EIA/ RS-232 or EIA/ RS-422 serial port to connect the Principal’s Telecommunications System via a Field Processor, and

b) equipment shall be capable of sending weather data at a rate greater than one measurement of all sensors, within 10 seconds.

13 Testing and commissioning

The testing and commissioning requirements defined in MRTS201 General Equipment Requirements apply to equipment provided under this Technical Specification. In addition, a calibration certificate shall be provided prior to installation and verified at commissioning.

14 Documentation

The documentation requirements defined in MRTS201 General Equipment Requirements apply to work under this Technical Specification.

15 Training

The training requirements defined in MRTS201 General Equipment Requirements apply to work under this Technical Specification.

16 Maintenance

The maintenance requirements defined in MRTS201 General Equipment Requirements apply to equipment provided under this Technical Specification.

17 Handover

The handover requirements defined in MRTS201 General Equipment Requirements apply to work under this Technical Specification.