Specification (Measurement)

Transport and Main Roads Specifications
MRS260 Temporary Variable Speed Limit Signs

July 2016
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1 Introduction

This Specification applies to the requirements for the supply, installation, testing, commissioning and maintenance handover documentation (including the provision for operator training) of Temporary Variable Speed Limit (TVSL) Signs.

This Specification forms part of the Transport and Main Roads Specifications Manual and should be read in conjunction with MRS01 Introduction to Specifications and other Specifications as appropriate.

2 Measurement of Works

2.1 Standard Work Items

In accordance with the provisions of Clause 2 of MRS01 Introduction to Specifications, the Standard Work Items covered by this Specification are listed in Table 2.1.

Table 2.1 – Standard Work Items

<table>
<thead>
<tr>
<th>Standard Item No.</th>
<th>Description</th>
<th>Unit of measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>6944</td>
<td>Supply and installation of trailer-mounted Type [A</td>
<td>B</td>
</tr>
<tr>
<td>6945</td>
<td>Supply and installation of concrete block-mounted Type [A</td>
<td>B</td>
</tr>
<tr>
<td>6946</td>
<td>Supply and installation of a Type [A</td>
<td>B</td>
</tr>
<tr>
<td>6947</td>
<td>Supply and installation of a separate TVSL Solar Panel Array with Battery Bank Enclosure Extension utilising a post-mounted support structure and foundation each</td>
<td></td>
</tr>
<tr>
<td>6948</td>
<td>Supply and installation of a 10 metre connecting cable between the TVSL [Trailer</td>
<td>Concrete Block] and the [Type [A</td>
</tr>
<tr>
<td>6949</td>
<td>Supply and configuration of a handheld SRC device to control each TVSL sign each</td>
<td></td>
</tr>
</tbody>
</table>

TVSL External Cabling

<table>
<thead>
<tr>
<th>Standard Item No.</th>
<th>Description</th>
<th>Unit of measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>6951</td>
<td>Supply, installation and configuration of RSCS software on a [Laptop</td>
<td>PC] each</td>
</tr>
<tr>
<td>Standard Item No.</td>
<td>Description</td>
<td>Unit of measurement</td>
</tr>
<tr>
<td>------------------</td>
<td>-------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>6952</td>
<td>Supply, installation and configuration of configuration software on a [Laptop</td>
<td>Other Compatible Device]</td>
</tr>
</tbody>
</table>

**External Communications**

<table>
<thead>
<tr>
<th>Standard Item No.</th>
<th>Description</th>
<th>Unit of measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>6953</td>
<td>Supply and configuration of a [3G</td>
<td>4G] mobile phone service to allow communications between a TVSL site controller and [RSCS Software</td>
</tr>
</tbody>
</table>

**Static Signage**

<table>
<thead>
<tr>
<th>Standard Item No.</th>
<th>Description</th>
<th>Unit of measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>6954</td>
<td>Supply and installation of static MUTCD compliant default [100 km/h</td>
<td>80 km/h</td>
</tr>
</tbody>
</table>

### 2.2 Work operations

**Item 6944** Supply and installation of trailer-mounted Type [A | B | C | D] TVSL sign including, but not limited to, [with | without] solar panels, [with | without] battery bank, site controller, [with | without] LED sign display, [with | without] flashing alert light, [with | without] Gyroscopic sensor, [with | without] Directional Compass, wheels and tyres, stabilisers and [with | without] storage compartments

Work operations incorporated in the above item include:

a) Work operations listed in Clause 2.1.5 of MRS01 Introduction to Specifications

b) supply of fully integrated TVSL Sign components including, but not limited to:

i. site controller and associated components

ii. wireless UHF Communications transmitter/receiver

iii. wireless 3G / 4G Modem

iv. GPS Sensor

v. TVSL Trailer components including 2 x 185/14 tyres and 2 x 14” hubs, stabiliser struts/bars, standard trailer indicator lights, trailer cable/socket connections

vi. optional Solar Panel Array and associated mechanical support assembly and adjustment mechanism

vii. optional batteries, charge regulator and all associated components

viii. optional Gyroscopic Sensor

ix. optional Directional Compass

x. optional flashing yellow alert light

xi. optional Type [A | B | C | D] TVSL LED sign display component, and

xii. optional trailer storage compartments and accompanying keys.

c) installation of the components listed in ‘b)’ above fully integrated into a trailer, and
d) configuration of the trailer-mounted TVSL components listed in ‘b)’ above in accordance with the TGS, TRUM Volume 1 Part 10 and MRST260.

**Item 6945** Supply and installation of concrete block-mounted Type [A | B | C | D] TVSL sign including, but not limited to, [with | without] solar panels, [with | without] battery bank, site controller, [with | without] LED sign display, [with | without] flashing alert light, [with | without] GPS sensor, movement sensors and [with | without] storage compartments

Work operations incorporated in the above item include:

a) Work operations listed in Clause 2.1.5 of MRS01 Introduction to Specifications

b) supply of fully integrated TVSL sign components including, but not limited to:
   i. site controller and associated components
   ii. wireless UHF Communications transmitter/receiver
   iii. wireless 3G/4G Modem
   iv. optional GPS Sensor
   v. optional Solar Panel Array and associated mechanical support/assembly and adjustment mechanism
   vi. optional batteries, charge regulator and all associated components
   vii. optional Gyroscopic Sensor
   viii. optional Directional Compass
   ix. optional flashing yellow alert light, and
   x. optional Type [A | B | C | D] TVSL LED sign display component.

c) installation of the components listed in ‘b)’ above fully integrated onto the concrete block foundation, and

d) configuration of the concrete block-mounted TVSL components listed in ‘b)’ above in accordance with the TGS, TRUM Volume 1 Part 10 and MRST260.

**Item 6946** Supply and installation of a Type [A | B | C | D] TVSL LED sign display extension with flashing yellow alert light on a post-mounted support structure and foundation

Work operations incorporated in the above item include:

a) Work operations listed in Clause 2.1.5 of MRS01 Introduction to Specifications

b) supply of Type [A | B | C | D] TVSL LED Sign display enclosure

c) supply of Type [A | B | C | D] TVSL LED Sign display support posts

d) supply of foundation base to support the Type [A | B | C | D] LED Sign display enclosure, flashing yellow alert light and support posts

e) supply of flashing yellow alert light

f) installation of the flashing alert light on rear of the TVSL LED sign display enclosure, and
g) installation of Type [A | B | C | D] TVSL LED Sign display enclosure on support posts and foundation.

Item 6947  Supply and installation of a separate TVSL Solar Panel Array with Battery Bank Enclosure Extension utilising a post-mounted support structure and foundation

Work operations incorporated in the above item include:

a) Work operations listed in Clause 2.1.5 of MRS01 Introduction to Specifications

b) supply of solar panels

c) supply of solar panel array support brackets

d) supply of solar panel array support posts

e) supply of solar panel assembly foundation base

f) installation of the solar panels, array brackets, posts onto the foundation base

g) supply of the batteries, charge regulator and associated components, and

h) installation of the batteries, charge regulator and associated components within a weatherproof enclosure.

Item 6948  Supply and installation of a 10 metre connecting cable between the TVSL [Trailer | Concrete Block] and the [Type [A | B | C | D] TVSL LED sign display Extension | TVSL Solar Panel Array with Battery Bank Enclosure Extension]

Work operations incorporated in the above item include:

a) Work operations listed in Clause 2.1.5 of MRS01 Introduction to Specifications

b) supply of cabling options below:

i. supply of 10 metres of connecting ELV power and signal cables from the trailer or concrete block-mounted TVSL sign to the Type [A | B | C | D] TVSL LED Sign Display Extension, and/or

ii. supply of 10 metres of connecting ELV power cable from the trailer or concrete block-mounted TVSL sign to the TVSL Solar Panel Array with Battery Bank Enclosure Extension.

c) supply of 10 metres of sufficiently-sized corrugated steel conduit

d) installation of the connecting cable within corrugated steel conduit

e) supply of Utilux type round 7 pin plug and sockets for cable termination

f) termination of both ends of the connecting cables with Utilux type round 7 pin plug and socket arrangement, and

g) installation of the cable between the TVSL Sign Trailer/Concrete Block and the Type [A | B | C | D] TVSL LED Sign display Extension or TVSL Solar Panel Array with Battery Bank Enclosure Extension.
Item 6949  Supply and configuration of a handheld SRC device to control each TVSL sign

Work operations incorporated in the above item include:

a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*

b) supply of two x SRC handheld units with accompanying batteries, and

c) configuration of the SRC to comply with the TGS, TRUM *Volume 1 Part 10*, and MRST260.

Item 6951  Supply, installation and configuration of RSCS software on a [Laptop | PC]

Work operations incorporated in the above item include:

a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*

b) supply of a disk containing the RSCS software

c) installation of the RSCS software onto a compatible laptop or PC

d) configuration of the RSCS software for administration, user access management, diagnostics and alarm/event monitoring, GIS maps, etc. and

e) configuration of the RSCS software to comply with the TGS, TRUM *Volume 1 Part 10* and MRST260.

Item 6952  Supply, installation and configuration of configuration software on a [Laptop | Other Compatible Device]

Work operations incorporated in the above item include:

a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*

b) supply of a disk containing the configuration software

c) installation of the configuration software onto a compatible laptop or other compatible device

d) configuration of the configuration software for administration, user access management, diagnostics and alarm/event monitoring, GIS maps, etc.

Item 6953  Supply and configuration of a [3G | 4G] mobile phone service to allow communications between a TVSL site controller and [RSCS Software | Mobile Phone Alerts]

Work operations incorporated in the above item include:

a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*

b) supply a 3G or 4G mobile data (if required to suit designed TVSL sign data bandwidth requirements) and SMS communications through the engagement of a suitable mobile phone service provider, such as Telstra, Optus or Vodafone

c) configure the TVSL sign with the mobile phone service numbers requiring to receive the critical TVSL sign alarm or alert SMS-based notifications, and

d) configure the TVSL sign such that a secure wireless Ethernet communications channel, such as a Virtual Private Network (VPN), is established between the TVSL sign and the RSCS software.
Item 6954  Supply and installation of static MUTCD compliant default \([100 \text{ km/h}] \mid 80 \text{ km/h} \mid 60 \text{ km/h} \mid 40 \text{ km/h}\) speed limit sign ‘WHEN SIGN ABOVE IS BLANK’

Work operations incorporated in the above item include:

a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*

b) supply of a MUTCD compliant static default 100 km/h, 80 km/h, 60 km/h or 40 km/h speed limit sign for each TVSL Sign (TC1568), and

c) installation of the ‘WHEN SIGN ABOVE IS BLANK’ default speed static sign on the TVSL sign trailer immediately below the TVSL sign LED display.