Specification (Measurement)

Transport and Main Roads Specifications
MRS206 Provision of Variable Speed Limit and Lane Control Signs

January 2015
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Measurement of works</td>
<td>1</td>
</tr>
<tr>
<td>2.1</td>
<td>Standard Work Items</td>
<td>1</td>
</tr>
<tr>
<td>2.2</td>
<td>Work Operations</td>
<td>2</td>
</tr>
<tr>
<td>2.3</td>
<td>Method of measurement of Variable Speed Limit and Lane Control Signs</td>
<td>8</td>
</tr>
<tr>
<td>2.4</td>
<td>Supply of materials</td>
<td>8</td>
</tr>
</tbody>
</table>
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 Variable Speed Limit and Lane Control 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><strong>VSL/LC mounting footings</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6871</td>
<td>Foundation Design for [Type A</td>
<td>Type B</td>
</tr>
<tr>
<td>6872</td>
<td>Installation of [Type A</td>
<td>Type B</td>
</tr>
<tr>
<td><strong>VSL/LC mounting structure and brackets</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6873</td>
<td>Supply of post-mounted support structure, [length] metres long, [with</td>
<td>without] cabinet brackets and [with</td>
</tr>
<tr>
<td>6874</td>
<td>Supply of [tunnel</td>
<td>gantry] mounting bracket, [length] metres long [with</td>
</tr>
<tr>
<td>6875</td>
<td>Installation of post-mounted mounting structure for [Type A</td>
<td>Type B</td>
</tr>
<tr>
<td>6876</td>
<td>Installation of [tunnel</td>
<td>gantry] mounted mounting bracket for [Type A</td>
</tr>
<tr>
<td>6877</td>
<td>Supply and installation of post-mounted support structure, for [Type A</td>
<td>Type B</td>
</tr>
<tr>
<td>6878</td>
<td>Supply and installation of [tunnel</td>
<td>gantry] mounted bracket for [Type A</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><strong>Variable Speed Limit Signs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6879</td>
<td>Supply of [Type A</td>
<td>Type B</td>
</tr>
<tr>
<td>6881</td>
<td>Installation of [Type A</td>
<td>Type B</td>
</tr>
<tr>
<td>6882</td>
<td>Supply and Installation of [Type A</td>
<td>Type B</td>
</tr>
<tr>
<td>6883</td>
<td>Supply of VSL/LC Controller</td>
<td>each</td>
</tr>
<tr>
<td>6884</td>
<td>Installation of VSL/LC Controller in an enclosure fixed to supporting structure or fixed to bridge structure or similar as detailed on referenced drawing</td>
<td>each</td>
</tr>
<tr>
<td>6885</td>
<td>Supply and Installation of VSL/LC Controller in an enclosure fixed to supporting structure or fixed to bridge structure or similar as detailed on referenced drawing</td>
<td>each</td>
</tr>
<tr>
<td><strong>Ancillary Items</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6886</td>
<td>Provision of [VSL/LC] Spares [as listed in the contract documents or on drawing reference]</td>
<td>item</td>
</tr>
<tr>
<td><strong>Removal of Existing VSL/LC Equipment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6887</td>
<td>Removal of Existing VSL/LC equipment for re-use</td>
<td>each</td>
</tr>
<tr>
<td>6888</td>
<td>Removal of Existing VSL/LC equipment for disposal</td>
<td>each</td>
</tr>
</tbody>
</table>

2.2 Work Operations

Item 6871 Foundation Design for [Type A | Type B | Type C] VSL/LC on a post-mounted support structure [with | without] an enclosure fixed to support structure to house VSL/LC controller on a [PAD or bored Pile Foundation]

Work Operations incorporated in the above item include:

a) Work Operations listed in Clause 2.1.5 of MRS01 Introduction to Specifications
b) design Drawings, Schedules, Calculations and TMR approvals in accordance with TMR standards.

Item 6872 Installation of [Type A | Type B | Type C] VSL/LC footing and including Anchor Cage for a PAD/PILED/PLANTED foundation [insert dimensions and/or referenced drawing]

Work Operations incorporated in the above item include:

a) Work Operations listed in Clause 2.1.5 of MRS01 Introduction to Specifications
b) excavation for footing
c) disposal of excavated material
d) provision of formwork where necessary
e) supply and installation of anchor cage or ragbolt assembly as appropriate
f) supply and installation of conduit to electrical and/or communications pit as appropriate
g) supply and installation of binding concrete to MRTS70
h) pouring, curing and finishing of concrete to MRTS70
i) stripping formwork, reinstatement of soil cover and general making good on site.

**Item 6873**  
Supply of post-mounted support structure, [length] metres long, [with | without] cabinet brackets and [with | without] an enclosure fixed to support structure to house VSL/LC controller for installation of [Type A | Type B | Type C] VSL/LC

Work Operations incorporated in the above item include:

a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
b) supply and fabrication of VSL/LC pole and pole adaptor
c) supply of all fixing bolts, nuts and washers as appropriate
d) for a pole to be fitted with a pole-mounted cabinet:
   i. supply and fabrication of pole-mounted cabinet brackets
   ii. supply of pole-mounted enclosure for VSL/LC controller

**Item 6874**  
Supply of [tunnel | gantry] mounting bracket, [length] metres long [with | without] an enclosure to mount VSL/LC controller [fixed to bridge structure or similar as detailed on referenced drawing] for installation of [Type A | Type B | Type C] VSL/LC

Work Operations incorporated in the above item include:

a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
b) supply and fabrication of tunnel/gantry-mounted VSL/LC bracket
c) supply of all fixing bolts, nuts and washers as appropriate
d) supply of mounting bracket for the enclosure
e) supply of enclosure cabinet

**Item 6875**  
Installation of post-mounted mounting structure for [Type A | Type B | Type C] VSL/LC [with | without] an enclosure fixed to support structure to house VSL/LC controller

Work Operations incorporated in the above item include:

a) Work Operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
b) supply and installation of spigot hatchway and ground access hatchway terminal strips if applicable
c) installation of pole, including pole adaptor on footing
d) for a pole to be fitted with a pole-mounted cabinet:
   i. installation of pole-mounted cabinet brackets
ii. Installation of pole-mounted enclosure

e) mortar grouting of base plate

f) supply of hinge pole operation instruction manuals

g) testing of installation.

Item 6876  Installation of [tunnel | gantry] mounted mounting bracket for [Type A | Type B | Type C] VSL/LC [with | without] an enclosure to mount VSL/LC controller [fixed to bridge structure or similar as detailed on referenced drawing]

Work Operations incorporated in the above item include:

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

b) installation of bracket to structure including masonry anchors

c) for an enclosure to be fitted to in the bridge structure or similar as detailed on the reference drawing

i. installation of cabinet brackets

ii. installation of the enclosure

d) Testing of installation.

Item 6877  Supply and installation of post-mounted support structure, for [Type A | Type B | Type C] VSL/LC [length] metres long, [with | without] mounting brackets and [with | without] an enclosure fixed to support structure to house VSL/LC controller

Work Operations incorporated in the above item include:

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

b) supply and fabrication of VSL/LC mounting structure and pole adaptor

c) supply of all fixing bolts, nuts and washers as appropriate

d) for a pole to be fitted with a pole-mounted cabinet:

i. supply and fabrication of pole-mounted cabinet brackets and enclosure cabinet

ii. installation of the enclosure cabinet

e) supply and installation of spigot hatchway and ground access hatchway terminal strips if applicable

f) installation of pole on footing

g) mortar grouting of base plate

h) supply of hinge pole operation instruction manuals

i) testing of installation.
Item 6878  Supply and installation of [tunnel | gantry] mounted bracket for [Type A | Type B | Type C] VSL/LC, [length] metres long [with | without] an enclosure to mount VSL/LC controller [fixed to bridge structure or similar as detailed on referenced drawing]

Work Operations incorporated in the above item include:
   a) Work Operations listed in Clause 2.1.5 of MRS01 Introduction to Specifications
   b) supply and fabrication of mounting brackets
   c) supply of all fixing bolts, nuts and washers as appropriate
   d) installation of bracket to structure, including masonry anchors
   e) for an enclosure to be fixed to bridge structure or similar as detailed on referenced drawing:
      i. supply and fabrication of cabinet mounting brackets and enclosure cabinet
      ii. installation of the enclosure cabinet
   f) testing of installation.

Item 6879  Supply of [Type A | Type B | Type C] VSL/LC [with | without] VSL/LC Controller

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 | Type B | Type C] VSL/LC complete with necessary mounting/installation accessories
   c) supply of communication and power cables between VSL/LC and VSL/LC controller
   d) supply of VSL/LC controller, complete with necessary mounting/installation accessories as applicable.

Item 6881  Installation of [Type A | Type B | Type C] VSL/LC and [with | without] VSL/LC Controller install in an enclosure [fixed to support structure] [and/or] [fixed to bridge structure or similar as detailed on referenced drawing]

Work Operations incorporated in the above item include:
   a) Work Operations listed in Clause 2.1.5 of MRS01 Introduction to Specifications
   b) installation of VSL/LC
   c) installation of VSL/LC controller as applicable
   d) installation and securing of cables and making necessary connections
   e) the setting out of the VSL/LC, including confirmation of horizontal alignment, headroom and set-back from edge of carriageway and working width from vehicle restraint systems
   f) testing of VSL/LC in accordance with MRTS206
   g) update necessary diagrams and supply of test results
   h) operator training if applicable
   i) supply of documentation in accordance with MRTS206.
Item 6882  Supply and Installation of [Type A | Type B | Type C] VSL/LC [with | without] VSL/LC Controller install in an enclosure [fixed to support structure] [and/or] [fixed to bridge structure or similar as detailed on referenced drawing]

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 | Type B | Type C] VSL/LC, complete with necessary mounting/installation accessories
c) supply of communication and power cables between VSL/LC and VSL/LC controller
d) supply of VSL/LC controller, complete with necessary mounting/installation accessories as applicable
e) installation of VSL/LC
f) installation of VSL/LC controller as applicable
g) installation and securing of cables and making necessary connection
h) the setting out of the VSL/LC, including confirmation of horizontal alignment, headroom and set-back from edge of carriageway and working width from vehicle restraint systems
i) testing of VSL/LC in accordance with MRTS206
j) update necessary diagrams and supply of test results
k) operator training if applicable
l) supply of documentation in accordance with MRTS206.

Item 6883  Supply of VSL/LC Controller

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 VSL/LC controller, complete with necessary mounting/installation accessories
c) supply of necessary documentation in accordance with MRTS206.

Item 6884  Installation of VSL/LC Controller in an enclosure fixed to supporting structure or fixed to bridge structure or similar as detailed on referenced drawing

Work Operations incorporated in the above item include:

a) Work Operations listed in Clause 2.1.5 of MRS01 Introduction to Specifications
b) installation of mounting accessories and VSL/LC controller
c) installation and securing of cables and making necessary connections
d) testing of VSL/LC in accordance with MRTS206
e) update necessary diagrams and supply of test results
f) supply of documentation in accordance with MRTS206.
Item 6885  Supply and Installation of VSL/LC Controller in an enclosure fixed to supporting structure or fixed to bridge structure or similar as detailed on referenced drawing

Work Operations incorporated in the above item include:

1. Work Operations listed in Clause 2.1.5 of MRS01 Introduction to Specifications
2. supply of VSL/LC controller, complete with necessary mounting/installation accessories
3. installation of mounting accessories and VSL/LC controller
4. installation and securing of cables and making necessary connections
5. testing of VSL/LC in accordance with MRTS206
6. update necessary diagrams and supply of test results
7. operator training if applicable
8. supply of documentation in accordance with MRTS206.

Item 6886  Provision of [VSL/LC] Spares [as listed in the contract documents or on drawing reference]

Work Operations incorporated in the above item include:

1. Work Operations listed in Clause 2.1.5 of MRS01 Introduction to Specifications
2. provision of Spares in accordance with the requirements of MRTS201 and as listed in the Scheme Documentation
3. transport of all components to the Principal’s storage facility.

Item 6887  Removal of Existing VSL/LC Equipment for Re-use

Work Operations incorporated in the above item include:

1. Work Operations listed in Clause 2.1.5 of MRS01 Introduction to Specifications
2. disconnection of Electrical Supply, including termination and ‘making safe’ of supply cable
3. disconnection of Telecommunications connection
4. removal of VSL/LC and supporting pole and associated cabinet enclosure
5. reinstatement of soil cover and general making good on site
6. transport of all components to Principal’s storage facility or designated site storage area for re-use.

Item 6888  Removal of Existing VSL/LC Equipment for Disposal

Work Operations incorporated in the above item include:

1. Work Operations listed in Clause 2.1.5 of MRS01 Introduction to Specifications
2. disconnection of Electrical Supply, including termination and ‘making safe’ of supply cable
3. disconnection of telecommunications connection
4. removal of VSL/LC and supporting pole and associated cabinet enclosure
5. reinstatement of soil cover and general making good on site
f) transport of all components and disposal.

2.3 Method of measurement of Variable Speed Limit and Lane Control Signs

This specification provides Standard Work Items for:

a) supply only
b) installation only, and
c) supply and installation of Variable Speed Limit Signs (VSL/LC).

Any combination of Standard Work Items relating to these methods of measurement may be used in the Schedule of Rates. However, where a Standard Work Item for supply and installation of a particular component or group of components is included in the Schedule of Rates, no supply only nor installation only Standard Work Item shall also apply to that component or group of components as applicable.

2.4 Supply of materials

Any materials to be supplied by the Principal will be as stated in the Principal Supplied Material List, Form C6827. All other material shall be supplied by the Contractor.

The responsibility for transport to the Site of materials supplied by the Principal shall be as stated in the Principal Supplied Material List, Form C6827. Transport to the Site of all other materials shall be the responsibility of the Contractor.