

Specification (Measurement)

**Transport and Main Roads Specifications
MRS225 Imaging**

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1 Introduction

This Specification applies to the supply installation, testing, commissioning and maintenance handover documentation of imaging equipment for ITS applications.

This Specification should be read in conjunction with MRS01 *Introduction to Specifications*, MRS263 *Standalone Solar (PV) Power Systems* and other Specifications as appropriate.

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

2 Measurement of Work

2.1 Standard Work Items

In accordance with the provisions of Clause 2.1.3 of MRS01 *Introduction to Specifications*, the Standard Work Items covered by this Specification are listed in Table 2.1.

For Standard Work Items relating to Solar Power and Battery power, refer to MRS263 *Standalone Solar (PV) Power Systems*. For Standard Work Items for Mains Connection, refer to MRS210 *Provision of Mains Power*.

Table 2.1 – Standard Work Items

Standard Item No.	Description	Unit of measurement
Image equipment cabinet and footings		
63801	Supply and installation of imaging equipment pole footing	each
63802	Supply of cabinet [<i>with</i> <i>without</i>] top-hat extension	each
63803	Supply of pole mounted cabinet	each
63804	Installation of cabinet [<i>with</i> <i>without</i>] top-hat extension	each
63805	Installation of pole mounted cabinet	each
Imaging equipment poles and brackets		
63831	Supply of imaging equipment hinge pole, [<i>length</i>] metres long, [<i>with</i> <i>without</i>] pole mounted cabinet brackets and cabinet	each
63832	Installation of imaging equipment hinge pole, [<i>length</i>] metres long, [<i>with</i> <i>without</i>] pole mounted cabinet brackets and cabinet	each
63833	Supply and installation of imaging equipment hinge pole, [<i>length</i>] metres long, [<i>with</i> <i>without</i>] pole mounted cabinet brackets and cabinet	each

Standard Item No.	Description	Unit of measurement
63834	Supply of [<i>building tunnel gantry</i>] mounted imaging equipment bracket, [<i>length</i>] metres long [<i>with without</i>] cabinet brackets and cabinet [<i>to be fixed into structure or similar as detailed on reference drawings</i>]	each
63835	Installation of [<i>building tunnel gantry</i>] mounted imaging equipment bracket, [<i>length</i>] metres long [<i>with without</i>] cabinet brackets and cabinet [<i>to be fixed into structure or similar as detailed on reference drawings</i>]	each
63836	Supply and installation of [<i>building tunnel gantry</i>] mounted imaging equipment bracket, [<i>length</i>] metres long [<i>with without</i>] cabinet brackets and cabinet [<i>to be fixed into structure or similar as detailed on reference drawings</i>]	each
Camera licences		
63861	Supply of Dvtel primary camera channel licence file for each camera	each
63862	Supply of Dvtel failover camera channel licence file for each camera	each
Imaging equipment		
63891	Supply of camera and ancillary components	each
63892	Installation of camera and ancillary components	each
63893	Supply and installation of camera and ancillary components	each
Ancillary works		
63921	Supply of imaging equipment pole adapter	each
63922	Installation of imaging equipment pole adapter	each
63923	Supply and installation of imaging equipment pole adapter	each
Removal of existing equipment		
63991	Removal of imaging equipment pole footing	each
63992	Removal of existing imaging equipment [<i>with without</i>] [<i>pole pole adaptor encoder</i>] for disposal	each
63993	Removal of existing imaging equipment [<i>with without</i>] [<i>pole pole adaptor encoder</i>] for reuse	each

2.2 Work Operations

Work Operations included in the Standard Work Items are specified in the relevant clause adjacent to each Standard Work Item listed in Table 2.1.

Item 63801 Supply and installation of imaging equipment pole footing

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, placement and finishing of concrete, and
- h) stripping formwork and cleaning up.

Item 63802 Supply of cabinet [*with* | *without*] top-hat 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 and fabrication of cabinet and top hat adaptor (in accordance with Clause 2.5), and
- c) supply of all fixing bolts, nuts and washers as appropriate.

Item 63803 Supply of pole mounted cabinet

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 pole-mounted cabinet (in accordance with Clause 2.5), and
- c) supply of all fixing bolts, nuts and washers as appropriate.

Item 63804 Installation of cabinet [*with* | *without*] top-hat extension

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 cabinet (concrete plinth-based) and top hat extension (if supplied), and
- c) installation of all fixing bolts, nuts and washers as appropriate.

Item 63805 Installation of pole mounted cabinet

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 pole-mounted cabinet (in accordance with Clause 2.5), and
- c) installation of all required brackets, fixing bolts, nuts and washers as appropriate.

Item 63831 Supply of imaging equipment hinge pole, [*length*] metres long, [*with* | *without*] pole mounted cabinet brackets and cabinet

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 imaging equipment pole and pole adaptor
- c) supply of all fixing bolts, nuts and washers as appropriate, and
- d) for a pole to be fitted with a pole mounted cabinet:
 - i. supply and fabrication of pole-mounted cabinet brackets, and
 - ii. supply of pole-mounted cabinet in accordance with Clause 2.5.

Item 63832 Installation of imaging equipment hinge pole, [*length*] metres long, [*with* | *without*] pole mounted cabinet brackets and cabinet

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 spigot hatchway and ground access hatchway terminal strips if applicable
- c) installation of pole-mounted surge/lightning protection equipment if applicable:
 - i. supply and installation of DIN rail-mounted communications lightning surge arrestors within the hatchway panel of the hinged pole, and
 - ii. supply and installation of DIN rail-mounted electrical lightning surge arrestors within the hatchway panel of the hinged pole.

- d) for a pole to be fitted with a pole-mounted cabinet:
 - i. supply and fabrication of pole-mounted cabinet brackets
 - ii. supply, fabrication and installation of the cabinet in accordance with Clause 2.5, and
 - iii. supply and installation of all internal cabling from pole-mounted cabinet to spigot hatchway terminal strip and all connectors, bushings, lugs, bolts, nuts and washers as appropriate
- e) installation of pole on footing
- f) mortar grouting of base plate
- g) supply of hinge pole operation instruction manuals, and
- h) testing of installation.

Item 63833 Supply and installation of imaging equipment hinge pole, [length] metres long, [with | without] pole mounted cabinet brackets and cabinet

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 imaging equipment pole and pole adaptor
- c) supply of all fixing bolts, nuts and washers as appropriate
- d) supply and installation of spigot hatchway and ground access hatchway terminal strips if applicable
- e) supply and installation of pole-mounted surge/lightning protection equipment if applicable:
 - i. supply and installation of DIN rail-mounted communications lightning surge arrestors within the hatchway panel of the hinged pole, and
 - ii. supply and installation of DIN rail-mounted electrical lightning surge arrestors within the hatchway panel of the hinged pole.
- f) for a pole to be fitted with a pole-mounted cabinet:
 - i. supply and fabrication of pole-mounted cabinet brackets
 - ii. supply, fabrication and installation of the cabinet in accordance with Clause 2.5, and
 - iii. supply and installation of all internal cabling from pole-mounted cabinet to spigot hatchway terminal strip and all connectors, bushings, lugs, bolts, nuts and washers as appropriate.

- g) installation of pole on footing
- h) mortar grouting of base plate
- i) supply of hinge pole operation instruction manuals, and
- j) testing of installation.

Item 63834 Supply of [*building* | *tunnel* | *gantry*] mounted imaging equipment bracket, [*length*] metres long [*with* | *without*] cabinet brackets and cabinet [*to be fixed into structure or similar as detailed on reference drawings*]

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 [*building* | *tunnel* | *gantry*] mounted imaging equipment bracket
- c) supply of all fixing bolts, nuts and washers as appropriate, and
- d) for an installation to be fitted with a cabinet:
 - i. supply and fabrication of pole-mounted cabinet brackets, and
 - ii. supply of pole-mounted cabinet and all ancillary components in accordance with Clause 2.5

Item 63835 Installation of [*building* | *tunnel* | *gantry*] mounted imaging equipment bracket, [*length*] metres long [*with* | *without*] cabinet brackets and cabinet [*to be fixed into structure or similar as detailed on reference drawings*]

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 [*building* | *tunnel* | *gantry*] structure including masonry anchors, and
- c) for imaging equipment installations with cabinet
 - i. installation of the bracket in the structure as detailed in the drawings
 - ii. installation of the cabinet in accordance with Clause 2.5, and
 - iii. supply and installation of all internal cabling from cabinet to spigot hatchway terminal strip and all connectors, bushings, lugs, bolts, nuts and washers as appropriate.

Item 63836 Supply and installation of [*building | tunnel | gantry*] mounted imaging equipment bracket, [*length*] metres long [*with | without*] cabinet brackets and cabinet [*to be fixed into structure or similar as detailed on reference drawings*]

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 building-mounted imaging equipment bracket
- c) supply of all fixing bolts, nuts and washers as appropriate
- d) installation of bracket to building structure including masonry anchors
- e) for an installation with structure mounted cabinet:
 - i. supply and fabrication of pole mounted cabinet brackets
 - ii. supply, fabrication and installation of the cabinet in accordance with Clause 2.5, and
 - iii. supply and installation of all internal cabling from pole-mounted cabinet to spigot hatchway terminal strip and all connectors, bushings, lugs, bolts, nuts and washers as appropriate, and
- f) Testing of the installation.

Item 63861 Supply of Dvtel primary camera channel licence file for each camera

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 Dvtel primary camera channel licence for each new camera delivered, and
- c) delivery the Dvtel primary camera channel licence to the Transport and Main Roads Project Representative such that it can be loaded into the Dvtel system to account for the new camera.

Item 63862 Supply of Dvtel failover camera channel licence file for each camera

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 Dvtel Camera failover channel licence for each new camera delivered, and
- c) delivery the Dvtel Camera failover channel licence to the Transport and Main Roads Project Representative such that it can be loaded into the Dvtel system to account for the new camera.

Item 63891 Supply of camera and ancillary components

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 camera, camera housing, camera power supply unit and other related accessories
- c) supply of hinge pole counterweights if required, and
- d) supply of all fixing bolts, nut and washers.

Item 63892 Installation of camera and ancillary components

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 camera, camera housing, camera power supply unit and other related accessories
- c) installation of hinge pole counterweights if required
- d) supply, installation and termination of camera cabling to appropriate terminal assemblies, and
- e) testing of camera.

Item 63893 Supply and installation of camera and ancillary components

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 camera, camera housing, camera power supply unit and other related accessories
- c) supply and installation of hinge pole counterweights if required
- d) supply, installation and termination of camera cabling to appropriate terminal assemblies
- e) supply and installation of all fixing bolts, nut and washers, and
- f) testing of camera.

Item 63921 Supply of imaging equipment pole adapter

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 imaging equipment pole adapter, and
- c) supply of all fixing bolts, nut and washers.

Item 63922 Installation of imaging equipment pole adapter

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 imaging equipment pole adapter on imaging equipment pole, and
- c) testing of the installation.

Item 63923 Supply and installation of imaging equipment pole adapter

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 imaging equipment pole adapter
- c) supply and installation of all fixing bolts, nut and washers, and
- d) testing of the installation.

Item 63991 Removal of imaging equipment pole footing

Work operations incorporated in the above item include:

- a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) removal of footing
- c) disposal of footing, and
- d) backfilling of hole.

Item 63992 Removal of existing imaging equipment [*with | without*] [*pole | pole adaptor | encoder*] for disposal

Work operations incorporated in the above item include:

- a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) disconnection of electrical supply, including termination and 'making safe' of supply cable
- c) disconnection of telecommunications connection
- d) removal of imaging equipment and supporting pole and associated cabinet enclosure as applicable
- e) reinstatement of soil cover and general making good on site, and
- f) transport of all components and disposal.

Item 63993 Removal of existing imaging equipment [*with* | *without*] [*pole* | *pole adaptor* | *encoder*] for reuse

Work operations incorporated in the above item include:

- a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) disconnection of electrical supply, including termination and 'making safe' of supply cable
- c) disconnection of telecommunications connection
- d) removal of imaging equipment and supporting pole and associated cabinet enclosure as applicable, and
- e) reinstatement of soil cover and general making good on site, and
- f) transport of all components to Principal's storage facility or designated site storage area for re-use.

2.3 Method of measurement of imaging equipment components

This Specification provides Standard Work Items for:

- a) supply only
- b) installation only, and
- c) supply and installation of imaging equipment components.

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 Form C7827.IC *Principal Supplied Material List*. 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 Form C7827.IC *Principal Supplied Material List*.

Transport to the Site of all other materials shall be the responsibility of the Contractor.

2.5 Supply of pole-mounted cabinets and ancillary components

The supply of the cabinet with or without a top hat adaptor shall include, but not be limited to, the following components:

- a) internal switchboard with all DIN rail-mounted switchgear as detailed in the electrical design drawings
- b) patch leads and associated connectors for all cables as detailed in the design drawings including CAT5, LV and ELV power, alarm signalling and earthing as detailed on the respective design drawings
- c) cabinet and switchboard bolts, nut, washers and cable entry glands/grommets
- d) cable management components
- e) DIN rail, and
- f) other equipment mounting hardware.

The installation of the cabinet should include the installation, testing and commissioning of all of the above mentioned ancillary components. *MRTS201 General Equipment Requirements* shall also apply to this Technical Specification.

