

Specification (Measurement)

**Transport and Main Roads Specifications
MRS93 Traffic Signals**

October 2017

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1 Introduction

This Specification applies to the supply and installation of traffic signals hardware, associated control equipment and cabling.

This Specification shall be read in conjunction with MRS01 *Introduction to Specifications* and other Specifications as appropriate.

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

2 Measurement of Works

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.

Table 2.1 – Standard Work Items

Standard Item no.	Description	Unit of measurement
Traffic signal equipment		
60401	Supply of traffic signal equipment, [description]	lump sum
60402	Installation of traffic signal equipment, [description]	lump sum
60403	Supply and installation of traffic signal equipment, [description]	lump sum
Traffic signal posts and mast arms		
60451	Supply of traffic signal post, [length] metres long, [with without] hinged baseplate	each
60452	Supply of traffic signal mast arm [with without] road lighting luminaire spigot, with a [length] metre long outreach arm, [with a [length] mm long luminaire transition piece]	each
60453	Supply of joint use traffic signal and road lighting pole, [length] metres long	each
60454	Supply of push button post, [length] metres long, [with without] hinged baseplate	each
60455	Installation of traffic signal post, [length] metres long, [with without] hinged baseplate	each
60456	Installation of traffic signal mast arm [with without] road lighting luminaire spigot, with [length] metres long outreach arm	each
60457	Installation of joint use traffic signal and road lighting pole, [length] metres long	each
60458	Installation of push button post, [length] metres long, [with without] hinged baseplate	each
60459	Supply and installation of traffic signal post, [length] metres long, [with without] hinged baseplate	each
60460	Supply and installation of traffic signal mast arm [with without] road lighting luminaire spigot, with [length] metres long outreach arm, [with [length] mm long luminaire transition piece]	each

Standard Item no.	Description	Unit of measurement
60461	Supply and installation of joint use traffic signal and road lighting pole, [<i>length</i>] metres long	each
60462	Supply and installation of push button post, [<i>length</i>] metres long, [<i>with</i> <i>without</i>] hinged baseplate	each
Traffic signal lanterns		
60501	Supply of traffic signal lantern, [<i>LED</i> <i>QH</i>], [<i>number of aspects</i>] aspect, [<i>diameter</i>] mm aspect diameter	each
60502	Supply of pedestrian lantern, [<i>LED</i> <i>QH</i>]	each
60503	Supply of target board, [<i>single</i> <i>double</i>]	each
60504	Installation of [<i>overhead mounted</i> <i>ground mounted</i>] traffic signal lantern, [<i>number of aspects</i>] aspect, [<i>diameter</i>] mm aspect diameter	each
60505	Installation of pedestrian lantern	each
60506	Installation of target board, [<i>single</i> <i>double</i>]	each
60507	Supply and installation of [<i>overhead mounted</i> <i>ground mounted</i>] traffic signal lantern, [<i>LED</i> <i>QH</i>], [<i>number of aspects</i>] aspect, [<i>diameter</i>] mm aspect diameter, and [<i>single</i> <i>double</i>] target board	
60508	Supply and installation of pedestrian lantern, [<i>LED</i> <i>QH</i>]	each
60509	Supply of traffic signal pedestrian push button, [<i>standard</i> <i>audio-tactile</i>]	each
60510	Installation of traffic signal pedestrian push button, [<i>standard</i> <i>audio-tactile</i>]	each
60511	Supply and installation of traffic signal pedestrian push button, [<i>standard</i> <i>audio-tactile</i>]	each
Detector loops		
60551	Supply and installation of vehicle detector loops, [<i>description</i>]	lump sum
60552	Supply of traffic signal controller	lump sum
60553	Installation of traffic signal controller, [<i>description of traffic signal site</i>]	lump sum
60554	Supply and installation of traffic signal controller, [<i>description of traffic signal site</i>]	lump sum
60555	Modification to existing traffic signal controller, [<i>description of traffic signal site</i>], [<i>location</i>]	lump sum
60556	Supply and installation of Personality EPROM	lump sum
60557	Commissioning and testing of Personality EPROM	lump sum
Removal of existing equipment		
60601	Removal of traffic signal equipment for salvage, [<i>description</i>]	lump sum
60602	Removal of traffic signal equipment for disposal, [<i>description</i>]	lump sum

2.2 Work operations

Item 60401 Supply of traffic signal equipment, [description]

Work operations incorporated in the above item include:

- a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*, and
- b) supply and fabrication of all traffic signal equipment listed in Clause 1 of Annexure MRS93.1.

Item 60402 Installation of traffic signal equipment, [description]

Work operations incorporated in the above item include:

- a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) installation and testing of all traffic signal equipment listed in Clause 1 of Annexure MRS93.1, and
- c) supply and installation of all cable, connectors, lugs, bolts, nuts, washers and other sundry items not specifically included above, but necessary for the satisfactory performance of the installation.

Item 60403 Supply and installation of traffic signal equipment, [description]

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 all traffic signal equipment listed in Clause 1 of Annexure MRS93.1, and
- c) supply and installation of all cable, connectors, lugs, bolts, nuts, washers and other sundry items not specifically included above, but necessary for the satisfactory performance of the installation.

Item 60451 Supply of traffic signal post, [length] metres long, [with | without] hinged baseplate

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 traffic signal post
- c) supply of finial cap and terminal assembly
- d) supply of hinged base plate if applicable
- e) supply of upper and lower mounting brackets, and
- f) supply of all fixing bolts, nuts and washers.

Item 60452 Supply of traffic signal mast arm [with | without] road lighting luminaire spigot, with a [length] metre long outreach arm, [with a [length] mm long luminaire transition piece]

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 traffic signal mast arm column, including road lighting luminaire spigot and cap if applicable
- c) supply and fabrication of mast arm outreach, including lantern mounting bracket, finial end cap if necessary and terminal assembly
- d) for a mast arm which includes a road lighting installation, supply and installation of luminaire transition piece, and
- e) supply of all fixing bolts, nuts and washers.

Item 60453 Supply of joint use traffic signal and road lighting pole, [*length*] metres long

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, and
- c) supply of all fixing bolts, nuts and washers.

Item 60454 Supply of push button post, [*length*] metres long, [*with* | *without*] hinged baseplate

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 push button post
- c) supply of hinged base plate if applicable, and
- d) supply of all fixing bolts, nuts and washers.

Item 60455 Installation of traffic signal post, [*length*] metres long, [*with* | *without*] hinged baseplate

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 traffic signal post on footing, and
- c) installation of finial cap, terminal assembly and mounting brackets.

Item 60456 Installation of traffic signal mast arm [*with* | *without*] road lighting luminaire spigot, with [*length*] metres long outreach arm

Work operations incorporated in the above item include:

- a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) assembly of traffic signal mast arm column and outreach arm
- c) installation of traffic signal mast arm column on footing
- d) setting rake of mast arm
- e) mortar grouting of base plate
- f) supply and installation of traffic signal junction box and terminal panel

- g) supply, installation and termination of traffic signal lantern cable from traffic signal junction box, and
- h) for a mast arm which includes a road lighting installation:
 - i. supply and installation of luminaire transition piece
 - ii. supply and installation of road lighting cable from pit to luminaire and supply and installation of road lighting fused junction box in pit, and
 - iii. testing of road lighting installation.

Item 60457 Installation of joint use traffic signal and road lighting pole, [*length*] metres long

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 on footing
- c) mortar grouting of base plate
- d) supply and installation of traffic signal terminal panel and road lighting terminal panel
- e) supply and installation of road lighting cable from pit to luminaire and supply and installation of road lighting junction box in pit, and
- f) testing of road lighting installation.

Item 60458 Installation of push button post, [*length*] metres long, [*with* | *without*] hinged baseplate

Work operations incorporated in the above item include:

- a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*, and
- b) installation of push button post on footing.

Item 60459 Supply and installation of traffic signal post, [*length*] metres long, [*with* | *without*] hinged baseplate

Work operations incorporated in the above item include:

- a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*, and
- b) supply, fabrication and installation of traffic signal post on footing, finial cap, terminal assembly, upper and lower mounting brackets, hinged base plate if applicable and all fixing bolts, nuts and washers.

Item 60460 Supply and installation of traffic signal mast arm [*with* | *without*] road lighting luminaire spigot, with [*length*] metres long outreach arm, [*with* [*length*] mm long luminaire transition piece]

Work operations incorporated in the above item include:

- a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply, fabrication and installation of traffic signal mast arm column, including road lighting luminaire spigot and cap if applicable
- c) supply, fabrication and installation of mast arm outreach, including lantern mounting bracket, finial and terminal assembly

- d) setting rake of mast arm
- e) mortar grouting of base plate
- f) supply and installation of traffic signal junction box and terminal panel
- g) supply, installation and termination of traffic signal lantern cable from traffic signal junction box, and
- h) for a mast arm which includes a road lighting installation:
 - i. supply and installation of luminaire transition piece
 - ii. supply and installation of road lighting cable from pit to luminaire and supply and installation of road lighting fused junction box in pit
 - iii. testing of road lighting installation, and
 - iv. supply and installation of all fixing bolts, nuts and washers.

Item 60461 Supply and installation of joint use traffic signal and road lighting pole, [*length*] metres long

Work operations incorporated in the above item include:

- a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) supply, fabrication and installation of pole
- c) mortar grouting of base plate
- d) supply and installation of traffic signal terminal panel and road lighting terminal panel
- e) supply and installation of road lighting cable from pit to luminaire and supply and installation of road lighting junction box in pit
- f) supply of all fixing bolts, nuts and washers, and
- g) testing of road lighting installation.

Item 60462 Supply and installation of push button post, [*length*] metres long, [*with* | *without*] hinged baseplate

Work operations incorporated in the above item include:

- a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*, and
- b) supply, fabrication and installation of push button post, hinged base plate if applicable and all fixing bolts, nuts and washers.

Item 60501 Supply of traffic signal lantern, [*LED* | *QH*], [*number of aspects*] aspect, [*diameter*] mm aspect diameter

Item 60502 Supply of pedestrian lantern [*LED* | *QH*]

Work operations incorporated in the above items include:

- a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*, and
- b) supply of lantern, including mounting straps and all accessories and fixings.

Item 60503 Supply of target board, [*single* | *double*]

Work operations incorporated in the above item include:

- a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*, and
- b) supply of target board, including all accessories and fixings.

Item 60504 Installation of [*overhead mounted* | *ground mounted*] traffic signal lantern, [*number of aspects*] aspect, [*diameter*] mm aspect diameter

Item 60505 Installation of pedestrian lantern

Work operations incorporated in the above items include:

- a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) installation of lantern, including mounting straps and all accessories and fixings
- c) supply, installation and termination of lantern cable to appropriate terminal assembly, and
- d) aiming of lantern.

Item 60506 Installation of target board, [*single* | *double*]

Work operations incorporated in the above item include:

- a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*, and
- b) installation of target board, including all accessories and fixings.

Item 60507 Supply and installation of [*overhead mounted* | *ground mounted*] traffic signal lantern, [*LED* | *QH*], [*number of aspects*] aspect, [*diameter*] mm aspect diameter, and [*single* | *double*] target board

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 lantern, including mounting straps and all accessories and fixings
- c) supply and installation of target board, including all accessories and fixings
- d) supply, installation and termination of lantern cable to appropriate terminal assembly, and
- e) aiming of lanterns.

Item 60508 Supply and installation of pedestrian lantern, [*LED* | *QH*]

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 lantern, including mounting straps and all accessories and fixings
- c) installation and termination of lantern cable to appropriate terminal assembly, and
- d) aiming of lantern.

Item 60509 Supply of traffic signal pedestrian push button, [*standard* | *audio-tactile*]

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 pedestrian push button, including fixings, and
- c) supply of audio-tactile driver unit if applicable.

Item 660510 Installation of traffic signal pedestrian push button, [*standard* | *audio-tactile*]

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 pedestrian push button
- c) installation of audio-tactile driver unit if applicable, and
- d) supply, installation and termination of cables to appropriate terminal assembly.

Item 60511 Supply and installation of traffic signal pedestrian push button, [*standard* | *audio-tactile*]

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 pedestrian push button
- c) supply and installation of audio-tactile driver unit if applicable, and
- d) supply, installation and termination of cables to appropriate terminal assembly

Item 60551 Supply and installation of vehicle detector loops [*description*]

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 loop wire and conduit
- c) supply of epoxy jointing kit, emulsion and sand
- d) cutting of slot
- e) installation of conduit to pit
- f) installation of loop cable
- g) filling of slot, and
- h) jointing of loop cable to detector feed cable.

Item 60552 Supply of traffic signal controller

Work operations incorporated in the above item include:

- a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*, and
- b) supply of traffic signal controller complete with all necessary components, including internal wiring.

Item 60553 Installation of traffic signal controller, [description of traffic signal site]

Work operations incorporated in the above item include:

- a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) mounting of controller on base
- c) earthing of installation, including supply of materials, and
- d) testing of traffic electrical installation.

Item 60554 Supply and installation of traffic signal controller, [description of traffic signal site]

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 traffic signal controller complete with all necessary components, including internal wiring
- c) mounting of controller on base
- d) earthing of installation, including supply of materials, and
- e) testing of electrical installation.

Item 60555 Modification to existing traffic signal controller, [description of traffic signal site], [location]

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 additional components as listed in Clause 2 of Annexure MRTS93.1, and
- c) testing of electrical installation.

Item 60556 Supply and installation of Personality EPROM

Work operations incorporated in the above item include:

- a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*, and
- b) supply and installation of personality EPROM.

Item 60557 Commissioning and testing of Personality EPROM

Work operations incorporated in the above item include:

- a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) testing the operation of the controller, all vehicle detectors and pedestrian detectors with the lamp circuits off
- c) testing the operation of all signal groups with lamp circuits on, and
- d) verifying time settings, phasing and sequencing of phasing.

Item 60601 Removal of traffic signal equipment for salvage, [*description*]

Work operations incorporated in the above item include:

- a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) de-energisation of circuits
- c) disconnection of cables
- d) dismantling and removal of components as appropriate, and
- e) transport of all components to the Principal's storage facility or designated site storage area for reuse.

Item 60602 Removal of traffic signal equipment for disposal, [*description*]

Work operations incorporated in the above item include:

- a) Work operations listed in Clause 2.1.5 of MRS01 *Introduction to Specifications*
- b) de-energisation of circuits
- c) disconnection of cables
- d) demolishing of components, and
- e) disposal of demolished materials.

2.3 *Method of measurement of traffic signal components*

This Specification provides Standard Work Items for:

- a) Supply only of individual components
- b) installation only of individual components
- c) supply and installation of individual components, and
- d) supply and installation of complete traffic signal sites on a lump sum basis.

Any combination of Standard Work Items relating to these methods of measurement may be used in the Schedule of Rates, however:

- a) 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, and
- b) Where a Standard Work Item for supply and installation of a complete traffic signal site on a lump sum basis is included in the Schedule of Rates, no supply only, installation only, nor supply and installation Standard Work Item shall also apply to that work.

2.4 *Removal of existing equipment*

The Superintendent will inspect the salvaged materials at the storage site and will reject any materials which, in the opinion of the Superintendent, have been damaged during the salvage operation. The Contractor shall be required to reimburse the Principal for materials damaged during salvage.

