Specification (Measurement)

Transport and Main Roads Specification
MRS98 Standalone Solar (PV) Powered Lighting

April 2016
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1 Introduction

This Specification applies to the supply, installation, testing, commissioning and maintenance handover documentation (including the provision for operator training) of Standalone Solar (PV) Powered Lighting.

This Specification shall be read in conjunction with MRS01 Introduction to Specifications, MRS94 Road Lighting, MRTS98 Standalone Solar (PV) Powered Lighting 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 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>Standalone Solar (PV) Powered Lighting system</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6361</td>
<td>Supply of Standalone Solar (PV) Powered Lighting, with [fixed base</td>
<td>slip base</td>
</tr>
<tr>
<td>6362</td>
<td>Installation of Standalone Solar (PV) Powered Lighting, with [fixed base</td>
<td>slip base</td>
</tr>
<tr>
<td>6363</td>
<td>Supply and Installation of Standalone Solar (PV) Powered Lighting, with [fixed base</td>
<td>slip base</td>
</tr>
<tr>
<td><strong>Auxiliary devices</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6365</td>
<td>Supply of [Solar Panels</td>
<td>PV Charger/Controller</td>
</tr>
<tr>
<td>6366</td>
<td>Installation of [Solar Panels</td>
<td>PV Charger/Controller</td>
</tr>
<tr>
<td>6367</td>
<td>Supply and Installation of [Solar Panels</td>
<td>PV Charger/Controller</td>
</tr>
<tr>
<td><strong>Removal for salvage or disposal</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6371</td>
<td>Removal of Standalone Solar (PV) Powered Lighting equipment for salvage, [description]</td>
<td>Each</td>
</tr>
<tr>
<td>6372</td>
<td>Removal of Standalone Solar (PV) Powered Lighting equipment for disposal, [description]</td>
<td>Each</td>
</tr>
<tr>
<td>6373</td>
<td>Removal of Standalone Solar (PV) Powered Lighting luminaire</td>
<td>Lump Sum</td>
</tr>
</tbody>
</table>
2.2 Work Operations

Item 6361 Supply of Standalone Solar (PV) Powered Lighting, with [fixed base | slip base | impact absorbent] road pole, [height] mm vertical height, [with | without] road lighting outreach arm. Details of outreach arm, where applicable, single [length] mm 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 a Solar Panel in accordance with the requirements of MRTS98, sufficient for load
c) supply a PV charge controller and inverter where applicable in accordance with the requirements of MRTS98
d) supply batteries and associated protective devices in accordance with the requirements of MRTS98, sufficient for load
e) supply of luminaire and lamp.

Item 6362 Installation of Standalone Solar (PV) Powered Lighting, with [fixed base | slip base | impact absorbent] road pole, [height] mm vertical height, [with | without] road lighting outreach arm. Details of outreach arm, where applicable, single [length] mm 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 solar panels in accordance with the requirements of MRTS98, sufficient for load
c) installation of PV charge controller and inverter where applicable in accordance with the requirements of MRTS98
d) installation of batteries and associated protective devices in accordance with the requirements of MRTS98, sufficient for load
e) installation of luminaire and lamp.

Item 6363 Supply and Installation of Standalone Solar (PV) Powered Lighting, with [fixed base | slip base | impact absorbent] road pole, [height] mm vertical height, [with | without] road lighting outreach arm. Details of outreach arm, where applicable, single [length] mm 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 installation of solar panels in accordance with the requirements of MRTS98, sufficient for load
c) supply and installation of PV charge controller and inverter where applicable in accordance with the requirements of MRTS98
d) supply and Installation of batteries and associated protective devices in accordance with the requirements of MRTS98, sufficient for load
e) supply and Installation of luminaire and lamp.
Item 6365 Supply of [Solar Panels | PV Charger/Controller | Batteries | Luminaire] for retrofit on existing installation, or storage

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 Solar Panel in accordance with the requirements of MRTS98, sufficient for load, where applicable
c) supply a PV charge controller and inverter where applicable in accordance with the requirements of MRTS98, where applicable
d) supply, where applicable, batteries and associated protective devices in accordance with the requirements of MRTS98, sufficient for load, where applicable
e) supply, where applicable, of luminaire and lamp.

Item 6366 Installation of [Solar Panels | PV Charger/Controller | Batteries | Luminaire] on existing road lighting installation

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 Solar Panels in accordance with the requirements of MRTS98, sufficient for load, where applicable
c) installation of PV charge controller and/or inverter where applicable in accordance with the requirements of MRTS98, where applicable
d) installation, where applicable, of batteries and associated protective devices in accordance with the requirements of MRTS98, sufficient for load, where applicable
e) installation, where applicable, of luminaire and lamp.

Item 6367 Supply and Installation of [Solar Panels | PV Charger/Controller | Batteries | Luminaire] for existing road lighting installation

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 Solar Panels in accordance with the requirements of MRTS98, sufficient for load, where applicable
c) supply and installation of PV charge controller and/or inverter where applicable in accordance with the requirements of MRTS98, where applicable
d) supply and installation, where applicable, of batteries and associated protective devices in accordance with the requirements of MRTS98, sufficient for load, where applicable
e) supply and installation, where applicable, of luminaire and lamp.

Item 6371 Removal of Standalone Solar (PV) Powered Lighting equipment for salvage, [description]

Work Operations incorporated in the above item include:

Work Operations listed in Clause 2.1.5 of MRS01 Introduction to Specifications
a) de-energisation of circuits
b) disconnection of battery supply
c) removal of pole / outreach arm / outreach arm extension / luminaire headframe, as appropriate
d) removal of internal cabling and internal electrical components
e) dismantling of solar panels, pole and components, where appropriate
f) removal of batteries, and
g) transport of all components to Principal’s storage facility or designated site storage area for re-use.

Item 6372  Removal of Standalone Solar (PV) Powered Lighting equipment for disposal,
(description)

Work Operations incorporated in the above item include:

Work Operations listed in Clause 2.1.5 of MRS01 Introduction to Specifications
a) de-energisation of circuits
b) disconnection of battery supply
c) demolition of existing installation, as appropriate, and
d) disposal of demolished materials.

Item 6373  Removal of Standalone Solar (PV) Powered Lighting luminaire

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 luminaire
c) disconnection of luminaire control gear from lighting circuit, and
d) removal of luminaire.

2.3 Method of measurement of Standalone Solar (PV) Powered Lighting

This specification provides Standard Work Items for:
a) supply only
b) installation only, and
c) supply and installation
of Standalone Solar (PV) Powered Lighting. 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.