Technical Specification

Transport and Main Roads Specifications
MRTS92 Traffic Signal and Road Lighting Footings

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Queensland Government

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1 Introduction

This Technical Specification applies to the construction of concrete footings and related works required for the installation of traffic signal controllers, traffic signal mast arms, traffic signal posts and Rates 2 and 3 road lighting installations.

This Technical Specification shall be read in conjunction with MRTS01 *Introduction to Technical Specifications*, MRTS50 *Specific Quality System Requirements* and other Technical Specifications as appropriate.

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

In this version:

The existing Clause 8.3.3 has been modified and Clause 9 added to this Technical Specification to allow conformance and as constructed survey requirements for the installation of road lighting, ITS and traffic signals footings during construction of road infrastructure projects. The added sections also allow for surveying requirements for any existing underground assets that may be fully or partly exposed during construction works;

The inclusion of design life requirement for poles, post and mast arm footings.

2 Definition of terms

The terms used in this Technical Specification shall be as defined in Clause 2 of MRTS01 *Introduction to Technical Specifications*. Further definitions are as defined in Table 2.

Table 2 - Definition of Terms

Term	Definition
Act	*Electrical Safety Act 2002* and associated Regulations and Codes of Practice
Administrator	Principal's Representative or Superintendent as defined in Clause 14 of MRTS01 *Introduction to Technical Specifications*
Conduit	Parts of a closed wiring system used to enclose cables in an electrical or telecommunications installation, which allows the cables to be drawn in or replaced. Conduits shall have a circular cross-section. Conduits shall include couplers, elbows, junction boxes, tees and fixings
Conduit Bends	Prefabricated curved lengths of conduit designed to join two conduits in accordance with sub-clause titled "Changes in level and direction of conduit" in MRTS91 *Conduit and Pits*
Elbow	A conduit bend of shorter combination of length and angle than defined in sub-clause titled "Changes in level and direction of conduit" in MRTS91 *Conduit and Pits*
Electrical Works	As defined in the Act
Electrical Entity	As defined in the Act
Licensed Electrical Contractor	Holder of an Electrical Contractor License under the Act
QTC	Queensland Transmission and Supply Corporation
Rate 2 Lighting	Public lighting owned and maintained by the Electricity Entity

Term	Definition
Rate 3 Lighting	Public lighting supplied, installed, owned and maintained by Transport and Main Roads

3 Referenced documents

3.1 Standards

Table 3.1 lists documents referenced in this Technical Specification.

Table 3.1 - Referenced documents

Reference	Title
AS/NZS 3000	Australian / New Zealand *Wiring Rules*
MRTS01	*Introduction to Technical Specifications*
MRTS04	*General Earthworks*
MRTS50	*Specific Quality System Requirements*
MRTS70	*Concrete*
MRTS91	*Conduits and Pits*
-	QTSC Group – *Standard Conditions for the Provision of Public Lighting Services*
	TMR Surveying Standards, published by Transport and Main Roads

3.2 Standard Drawings

Table 3.2 lists the Standard Drawings referenced in this document.

The reference table is updated to include all current Technical Specifications and manuals.

Table 3.2 - Referenced Standard Drawings

Standard Drawing Number	Title
1328	*Road Lighting - Anchor Cage Fabrication Details*
1380	*Road Lighting - Slip Base Pole and Footing Installation details for no Crossfall*
1381	*Road Lighting - Slip Base Pole and Footing Installation details for Crossfalls up to and including 1:6*
1382	*Road Lighting Pole - Slip base pole and Footing Installation details for Crossfalls greater than 1:6 up to and including 1:3*
1392	*Road Lighting - Base Plate Mounted Pole and Footing Installation details for Crossfalls up to and including 1:2*
1393	*Road Lighting - Base Plate Mounted pole and Footing Installation details for Crossfalls greater than 1:2*
1395	*Road Lighting -. Base Plate Mounted Pole and Footing in Concrete Median Barrier Installation details*

Standard Drawing Number	Title
1396	*Traffic signals/Road lighting - Joint Use Traffic Signal and Road Lighting Pole and Footing Installation details*
1403	*Traffic signals - Mast Arm Footing Installation details*
1404	*Traffic signals - Mast Arm Anchor Cage Fabrication details*
1421	*Traffic signals - Traffic Signals Post and Footing Installation details*
1422	*Traffic signals - Ragbolt Sub-Assembly Fabrication details*
1423	*Traffic Signals -. Traffic Signal Controller Base Installation details*
1429	*Road lighting - Slip Base Pole and Footing Installation details for Crossfalls greater than 1:6 up to and including 1:3 using Concrete Step Tread*
1437	*Traffic Signals - Hinged Base Plate for Traffic Signal Post Fabrication details*
1680	*Traffic Signals/Road Lighting - Extension to Light Pole and Mast Arm Anchor Cages*

4 Hold Points, Witness Points and Milestones

General requirements for Hold Points, Witness Points and Milestones are specified in Clause 5.2 of MRTS01 *Introduction to Technical Specifications*.

The Hold Points and Witness Points applicable to this Technical Specification are summarised in Table 4. There are no Milestones defined.

Table 4 – Hold Points and Witness Points

Clause	Hold Point	Witness Point	Milestone
8.1	1. Location of footing.		
8.3.3	2. Depth of footings.		
8.3.7	3. Placement of concrete		
8.3.9		1. Construction of retaining wall on slopes.	

5 Compliance with electrical legislation

The work covered by this Technical Specification shall comply with the requirements of the Act and subordinate legislation and AS/NZS 3000.

The Contractor shall engage a Licensed Electrical Contractor to perform the duties and functions of "electrical works" as defined in the Act. This includes installation of pits and conduits for power and communications cables.

6 Design life of footings

Design life of footings for poles, post, mast arms shall be 40 years.

7 Materials

7.1 Road lighting Rate 2

For Rate 2 road lighting, materials shall comply with the requirements of QTSC's *QTSC Group – Standard Conditions for the Provision of Public Lighting Services* as well as any relevant local Electricity Entity policies or Standards.

7.2 Traffic signals and road lighting Rate 3

7.2.1 Anchor cage / ragbolt assembly

Anchor cages and rag-bolt assemblies shall be constructed in accordance with the following Standard Drawings:

a) Road Lighting footing – SD1328

b) Traffic signal mast arm footing – SD1404, and

c) Ragbolt sub-assembly fabrication – SD1422.

Anchor cages and rag-bolt assemblies shall be supplied complete with nuts and washers.

A template shall be supplied with rag-bolt assemblies.

7.2.2 Electrical conduit

Electrical conduit shall comply with the requirements of MRTS91 *Conduits and Pits*.

7.2.3 Concrete

Concrete shall be Class 25 MPa/20 complying with the requirements specified in MRTS70 *Concrete*.

8 Construction

8.1 Location of footings

The footing locations shall be set out in accordance with the details provided in the design documentation.

Prior to commencement of excavation of any footing, it shall be accurately located and an existing utility service investigation carried out. **Hold Point 1**

The utility service investigation shall confirm the exact location of existing underground and overhead utility services and other installations and/or roadside structures which may impact on the footing location.

The utility service investigation shall include but not be limited to the following activities:

a) Request for copies of drawings showing existing services adjacent to the footing locations from "Dial Before You Dig", service authorities and Local Government, and

b) Pot holing (excavations) over the existing utility services to verify their alignment and levels.

The actual locations for the footings may need to be varied slightly from the locations shown in the design documentation so that existing utility services are not compromised.

8.2 Road lighting Rate 2

Installations shall comply with the requirements of QTSC's *QTSC Group – Standard Conditions for the Provision of Public Lighting Services* as well as any relevant local Electricity Entity policies or Standards.

8.3 Traffic signals and road lighting Rate 3

8.3.1 General

Footings shall comply with the details shown on the following Standard Drawings, as appropriate:

a) Road lighting footings – SD1380, SD1381, SD1382, SD1392, SD1393, SD1395, SD1396 and SD1429

b) Traffic signal mast arm footings – SD1403

c) Traffic signal post footings – SD1421, and

d) Traffic signal controller base – SD1423.

8.3.2 Excavation

Footings for poles shall be excavated using earth augers of the appropriate size or other similar techniques which result in a neat hole of the minimum size shown on the Standard Drawings.

Other than that described in Clause 8.3.4 or where specifically shown on the Standard Drawings, footings for poles shall not be formed. Where footings are required in or adjacent to existing excavations or footing excavations become too large, the excavation shall be backfilled with suitable material and compacted in accordance with the requirements of Clause 19 of MRTS04 *General Earthworks*. The footing excavation shall then be carried out in accordance with this clause.

Surplus excavated material shall be disposed of in accordance with the requirements of Clause 11 of MRTS04 *General Earthworks*.

8.3.3 Depth of footing

Each footing for road lighting and traffic signal mast arm poles shall be constructed to at least the depth shown on the appropriate Standard Drawing for average to good soil conditions.

For poor soil conditions, the excavation for pole footings shall be continued to the additional depth shown in the Standard Drawing 1680.

The excavation shall be inspected by the Administrator prior to installation of the anchor cage. **Hold Point 2**

The centre and invert location of the excavation shall be surveyed and must comply with the requirements as prescribed in Clauses 6.2, 6.3 and 6.4 of the *TMR Surveying Standards,* Part 2, February 2016 and notice of such works provided to the Administrator. **Hold Point 2**

As constructed survey requirements for the installation of footings for poles, post and mast arm during construction of road infrastructure projects have been included.

8.3.4 Formwork

Formwork of appropriate dimensions and strength to achieve the shape shown in the design documentation shall be utilised for traffic signal controller bases.

In general, formwork is not required for the construction of footings for traffic signal mast arms, traffic signal posts or road lighting poles. However in collapsing soils a 600 mm round form 150 mm high shall be constructed.

For road lighting poles located in a concrete median barrier, the top section of the footing shall be formed to 450 mm diameter as shown on Standard Drawing 1395 to allow access for the flexible ducting.

8.3.5 Anchor cage / ragbolt assembly / holding down bolts

8.3.5.1 General

Where the excavation for a footing has been extended to additional depth to accommodate poor soil conditions in accordance with Clause 8.3.3, the anchor cage shall be varied, in accordance with the Standard Drawing 1680, to suit the actual depth prior to its placement.

Anchor cages, rag-bolt assemblies and holding down bolts shall be suspended in the correct position, at the correct orientation and at the heights shown on the appropriate Standard Drawing.

The method of suspension shall be such that the anchor cage, rag-bolt assembly or holding down bolts remain in the correct location and bolts remain vertical during placement and vibration of concrete.

8.3.5.2 Slip Base Poles

For slip base poles, the installation shall be checked to ensure the correct level of the slip plane.

8.3.5.3 Footings for Hinged Base Poles

Care shall be taken to ensure that ragbolts and the tops of footings for traffic signal posts which require a hinged baseplate, are set at an appropriate lower level to accommodate the hinged baseplate as shown on Standard Drawing 1437.

8.3.5.4 Median Barrier Installation Tolerances

The anchor cage for median barrier installations shall be positioned in accordance with the following tolerances:

a) centre of cage

   ± 3 mm centre of median barrier, transversely, and
   ± 50 mm at the nominated chainage, longitudinally.

b) top of bars

   220 mm ± 10 mm above projected finished surface height at the centre of the median barrier at the nominated chainage.

8.3.6 Conduit

Conduit shall be supplied and installed, or under the supervision of a Licensed Electrical Contractor at the locations shown on the appropriate Standard Drawing and in accordance with the requirements of MRTS91 *Conduits and Pits.*

8.3.7 Placing concrete

Concrete shall be placed and compacted in accordance with the requirements specified in MRTS70 *Concrete*. In the specific case (only) of footings for Traffic Signals and Light poles a relaxation from MRTS70 *Concrete* is given to allow the concrete to free fall into the hole from a height of up to 3 m, provided the hole is stable and the tie wires, reinforcing and form work cannot be moved by the falling concrete. All care should be taken to reduce this drop height to a minimum.

Concrete shall not be placed until the excavation, formwork and anchor cage, rag bolt assembly or holding down bolts have been inspected by the Administrator. **Hold Point 3**

8.3.8 Curing concrete

Concrete shall be allowed to cure for a period of at least seven days before erection of traffic signal mast arms, traffic signal controllers, traffic signal posts or road lighting poles is undertaken.

8.3.9 Retaining walls

Where road lighting is installed on slopes greater than:

a) 1:6 for slip base poles, or

b) 1:2 for fixed base poles.

A retaining wall shall be constructed in accordance with the details shown on Standard Drawing 1382 or 1393, as appropriate. **Witness Point 1**

9 Conformance and as constructed survey

All the surveying requirements associated with the installation of new or relocated traffic signal and road light footings are to be fulfilled as prescribed in Clauses 6.1, 6.2, 6.3, 6.4 and 6.7, of the *TMR Surveying Standards,* Part 2, February 2016.

As constructed survey requirements for the installation of footings for poles, post and mast arms during construction of road infrastructure projects have been included.