

Main Roads Technical Standard

MRTS92

Traffic Signal and Road Lighting Footings

June 09

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June 09

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Traffic Signal and Road Lighting Footings

1 INTRODUCTION

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

This Technical Standard forms part of the Main Roads Specifications and Technical Standards Manual.

2 DEFINITION OF TERMS

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

Table 2 – Definition of Terms

Term	Definition
Act	<i>Electrical Safety Act 2002</i> and associated Regulations and Codes of Practice
Administrator	Principal's Representative or Superintendent as defined in Clause 14 of MRTS01
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
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.
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.
QSTC	Queensland Transmission and Supply Corporation.
Rate 2 Lighting	Public lighting owned and maintained by the Electricity Entity.
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 Standard.

Table 3.1 – Referenced Documents

Reference	Title
AS/NZS 3000	Australian / New Zealand Wiring Rules
	QTSC Group – <i>Standard Conditions for the Provision of Public Lighting Services</i>

3.2 Standard Drawings

Table 3.2 lists the Standard Drawings referenced in this document.

Table 3.2 – Referenced Standard Drawings

Drawing Number	Title
1328	Road Lighting Pole – Anchor Cage Fabrication Details.
1380	Road Lighting Pole - Slip Base Pole Installation Details for no Crossfall.
1381	Road Lighting Pole - Slip Base Pole Installation Details for Crossfalls Not Exceeding 1:6.
1382	Road Lighting Pole - Slip Base Pole Installation Details for Crossfalls of Between 1:6 and 1:3.
1392	Road Lighting Pole - Fixed Base Pole Installation Details for Crossfalls Up to 1:2.
1393	Road Lighting Pole - Fixed Base Pole Installation Details for Crossfalls Over 1:2.
1395	Road Lighting Pole - Fixed Base in Concrete Median Barrier Installation Details.
1396	Road Lighting Pole - Joint Use Traffic Signal and Road Lighting Pole 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 Footing Installation Details.
1422	Traffic Signals - Ragbolt Sub-Assembly Fabrication Details.
1423	Traffic Signals - Controller Base Installation Details.
1429	Road Lighting Pole - Slip Base Pole Installation Details for Crossfalls of Between 1:6 and 1:3 Using Concrete Step Tread.
1437	Traffic Signals – Hinged Base Plate for Traffic Signal Post Fabrication Details.

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 Standards*.

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

Table 4 – Hold Points and Witness Points

Clause	Hold Point	Witness Point
7.1	1. Location of footing.	
7.3.3	2. Depth of footings.	
7.3.7	3. Placement of concrete.	
7.3.9		Construction of retaining wall on slopes.

5 COMPLIANCE WITH ELECTRICAL LEGISLATION

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

The Contractor shall engage an Electrical Supervisor and/or 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 MATERIALS

6.1 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.

6.2 Traffic Signals and Road Lighting Rate 3

6.2.1 Anchor Cage / Ragbolt Assembly

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

- a) Road lighting footing – 1328;
- b) Traffic signal mast arm footing – 1404; and
- c) Traffic signal post footing – 1422.

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

A template shall be supplied with rag-bolt assemblies.

6.2.2 Electrical Conduit

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

6.2.3 Concrete

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

7 CONSTRUCTION

7.1 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.

7.2 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.

7.3 Traffic Signals and Road Lighting Rate 3

7.3.1 General

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

- a) Road lighting footings – 1380, 1381, 1382, 1392, 1393, 1395, 1396 and 1429;
- b) Traffic signal mast arm footings – 1403;
- c) Traffic signal post footings – 1421; and
- d) Traffic signal controller base – 1423.

7.3.2 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 7.3.4 or where specifically shown on the 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*.

7.3.3 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 on the appropriate Standard Drawing for poor soil conditions.

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

7.3.4 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 number 1395 to allow access for the flexible ducting.

7.3.5 Anchor Cage / Ragbolt Assembly / Holding Down Bolts

7.3.5.1 General

Where the excavation for a footing has been extended to additional depth to accommodate poor soil conditions in accordance with Clause 7.3.3, the anchor cage shall be varied, in accordance with the appropriate Standard Drawing, 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.

7.3.5.2 Slip Base Poles

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

7.3.5.3 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 number 1437.

7.3.5.4 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 \pm 10 mm above projected finished surface height at the centre of the median barrier at the nominated chainage.

7.3.6 Conduit

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

7.3.7 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 MRTS 70 is given to allow the concrete to free fall into the hole from a height of up to three metres (3m), 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**

7.3.8 Curing Concrete

Concrete shall be allowed to cure for a period of at least 7 days before erection of traffic signal mast arms, traffic signal controllers, traffic signal posts or road lighting poles is undertaken.

7.3.9 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 number 1382 or 1393, as appropriate. **Witness Point**