

TCN 010

Installation of electrical conduits for DoT projects

V1.0 January 2020

Purpose

The purpose of this Technical Note is to provide guidance to Contractors and DoT Project Managers engaged in works associated with the installation of electrical conduits as part of DoT projects.

Background

The requirements for the installation of electrical wiring systems, including electrical conduits, are specified in Australian/New Zealand Standard AS/NZS 3000, Electrical Installations “Wiring Rules”.

Electrical conduits installed as part of an electrical installation **MUST be installed by, or under the direct supervision of, a licensed electrician.**

The carrying out of electrical installation works by anyone other than a licensed electrician is prohibited under Energy Safe Victoria (ESV) Regulations and Electrical Safety Regulations.

Under DoT (Roads) pre-qualification scheme, only Registered Electrical Contractors that hold the following pre-qualification levels can install or directly supervise the installation of electrical conduits for any DoT projects.

- **STS** for traffic signal related installation works
- **STCE** for all other on-road electrical installation works

Referenced documents

This Technical Note should be read in conjunction with the following referenced documents:

- AS/NZS 3000 – Wiring Rules
- Electricity Safety (registration and Licensing) Regulations 2010
- Electricity Safety (installations) Regulations 1999 (reprinted 26 September 2007)
- Electricity Safety Act 1998 reprinted 3 November 2011)
- DoT Standard Contract Section 733 – Conduits and Pits
- DoT Standard Contract Section 734 – Electrical Network Installation

Installation

The installation of electrical conduits shall be carried out by, or under the direct supervision of, a Registered Electrical Contractor that holds current, relevant DoT pre-qualification.

The conduits shall be installed in:

- accordance with the requirements of AS/NZS 3000
- accordance with DoT Standard Section 733
- compliance with the minimum depth of cover as detailed in DoT Standard Section 733

- accordance with minimum spacing from other services as specified in Clause 3.11.5 of AS/NZS 3000 and the requirements of relevant service authorities

If electrical conduits are installed by a different Electrical Contractor to the Contractor installing the electrical cabling, the conduit installer shall provide DoT with a copy of a Certificate of Electrical Safety for the conduits.

Minimum depth of cover

Conduits shall be provided with the **minimum** depth of cover as detailed in Standard Section 733, Table 733.031. A summary of minimum required depth of cover for specific locations is provided in Table 1 below.

Location	DoT Requirement
Under freeway or arterial road pavement	1200mm
Under local road pavement	600mm
Under open drains	750mm
Under footpath or unpaved areas	600mm
Under tram tracks	1200mm
Under railway road crossing	2000mm

Table 1 – Summary of minimum depth of cover
(Table 733.031 from Standard Section 733)

If other services exist at the depths required to achieve the minimum depth of cover detailed in Table 1 above, the default option is to install the electrical conduit under the existing services, that is at a greater depth of cover.

Where DoT minimum depth of cover cannot be achieved

If DoT requirements for depth of cover cannot be met, and installing the conduit deeper is not possible, the Contractor shall notify the Superintendent or Superintendent's representative. The Contractor shall provide full details of the site conditions that prevent the minimum cover being achieved.

DoT may grant approval to install conduits under roads to a reduced depth. The accepted depth will be determined on a case by case basis.

DoT may grant approval to install conduits under footpaths or unpaved areas in accordance with AS/NZS 3000 to the reduced depth of:

- 500mm below finished surface level; or, if 500mm is not achievable
- 300mm below the underside of a minimum 75mm thick concrete as detailed in AS/NZS 3000, Figure 3.10.

Where 300mm cover below the underside of a minimum 75mm thick concrete is approved, surface cable markers as shown in Figures 1, 2 and 3 below shall be installed. As a minimum, markers shall be installed as follows:

- Within 300mm from either end of the conduit
- At every change in direction (above each entry point onto the pit).
- At intervals of not less than 5m along the entire length of the conduit run.

A request for a reduced level of cover for all other locations shall be considered on a case-by-case basis.

The Contractor shall not install any conduits with a reduced depth of cover prior to obtaining written approval from DoT.

Where the Wiring Rules minimum depth of cover cannot be achieved

Where site specific conditions prohibit the ability to achieve the 300mm cover below 75mm thick concrete as described above, the Electrical Contractor shall notify the Superintendent or Superintendent's representative. The Contractor shall provide full details of the site conditions that prevent this depth of cover being achieved.

In situations where all other options have been explored and determined not possible, DoT may consider making an application to ESV for a reduced depth of cover.

DoT (VicRoads) has an agreed process in place with ESV for applying for a reduced level of cover in specific circumstances. This process may be applied at sites where physical constraints and other services make it impossible to meet the normal requirement for minimum depth of cover.

The process for applying for a reduced depth of cover is detailed in correspondence from ESV titled:

- *Procedure for exemptions for VicRoads owned underground wiring systems – depth of cover required by Regulation 217 Electricity safety (Installations) Regulations 2009* (dated 13 December 2010); and the
- *Guideline for VicRoads owned underground wiring systems – depth of cover required by Regulation 217 of the Electricity safety (Installations) Regulations 2009.*

Where a Contractor has determined that the minimum depth of cover under AS/NZS 3000 cannot be met, the Contractor shall advise the Superintendent or Superintendent's representative in writing with details of the site constraints that prevent minimum cover being achieved and the proposed depth of cover arrangement. If agreed by DoT, the Contractor shall follow the ESV approved process for applying for reduced cover.

The Contractor shall not proceed with the installation of any conduits with reduced cover without prior written approval from DoT.

The ESV approved process for applying for reduced cover is summarised below:

1. After excavation of the site and before installation of any conduit, photographs shall be provided clearly and accurately showing the existing services and the depth of the same.

2. The application for exemption must include written support from a Licensed Electrical Inspector (LEI).
3. Conduit shall only be installed following written approval by DoT.
4. After installation of the new electrical conduit, photographs shall be provided clearly showing the depth of the new conduit is not less than 300mm below finished surface level.
5. Before back filling, the installed conduit must be inspected by a LEI.
6. The conduit shall be installed with additional mechanical protection as required by ESV under the conditions of exemption. See Figure 1 for details.
7. Photographs shall be provided showing the installation of each layer of mechanical protection for the entire length of the installation.
8. Surface cable markers (warning labels manufactured from aluminium or other approved material) shall be located on the ground surface warning of shallow LV cables. An example of a suitable plate legend is provided in Figures 2 and 3 below.

When installing any conduits, the Contractor must maintain minimum spacing distances from other underground services as required under AS/NZS 3000 and the requirements of relevant service authorities.

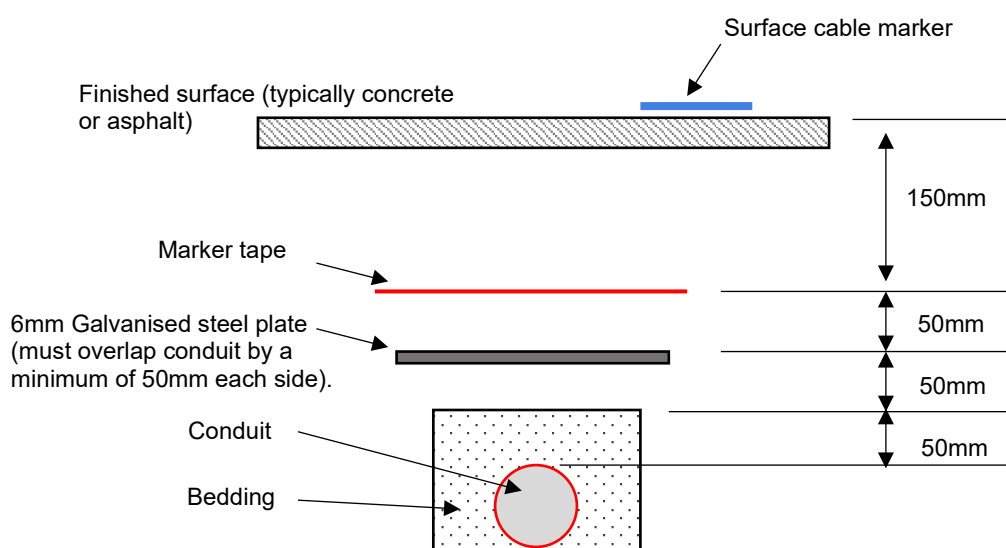


Figure 1 – ESV Approved installation with additional mechanical protection

Examples of typical surface cable markers

The figures below are examples of typical surface cable markers that are required to be placed on the surface over the shallow conduits. The arrow shall point in the direction the conduit runs. The marker design shall be approved by the Superintendent or Superintendent's representative before installation. The lettering height shall be a minimum of 20mm.

Figure 1 shows a typical surface cable marker for LV traffic signal installations. Figure 2 shows a typical surface cable marker for other LV installations.

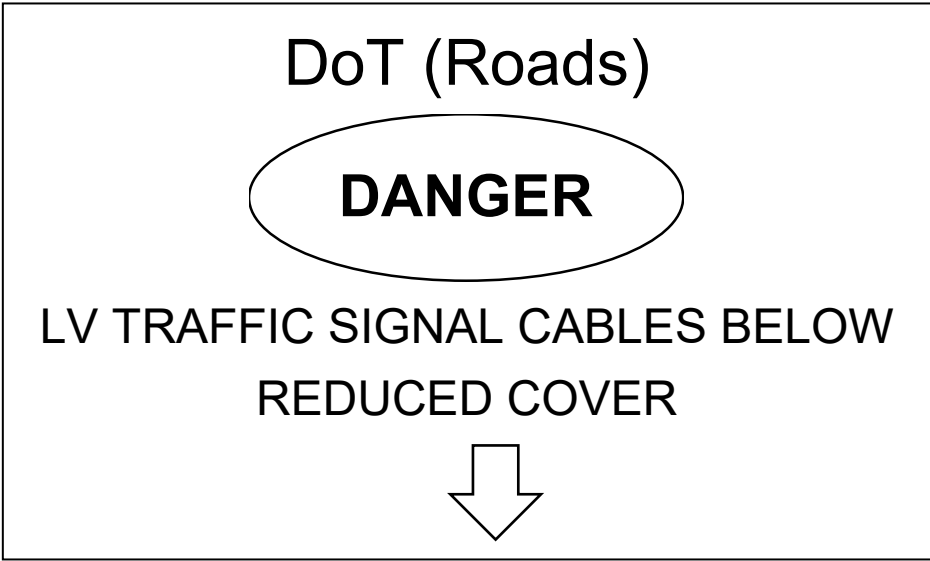


Figure 2 – Example of surface cable marker for LV traffic signal cables

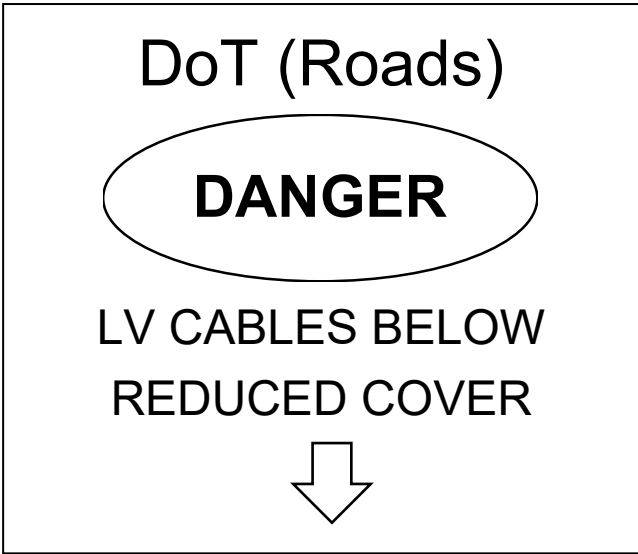


Figure 3 – Example of surface cable marker for other LV cables

Where ELV traffic signal cables are installed with reduce cover, a surface cable marker shall be located on the ground surface warning of shallow ELV cables. An example of a suitable marker legend is provided in Figure 4.

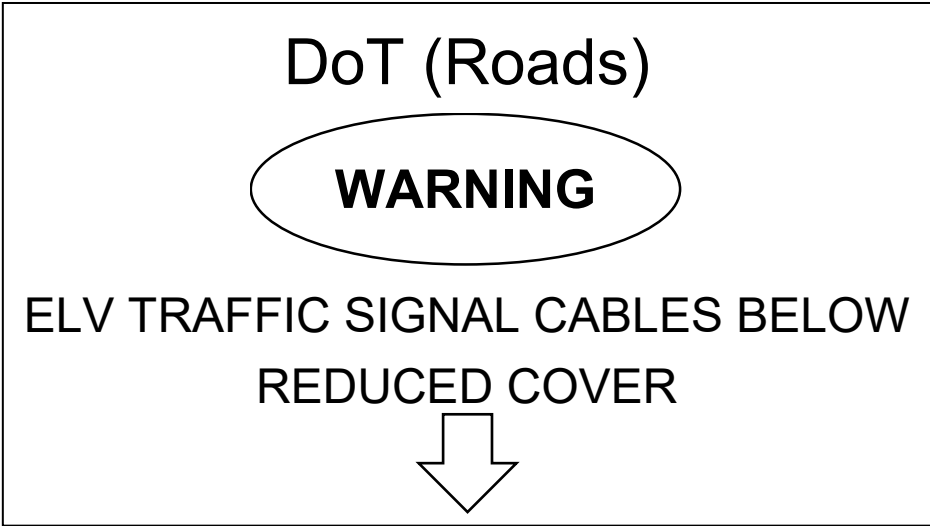


Figure 4 – Example of surface cable marker for ELV traffic signal cables