VICROADS SPECIFICATION

TCS 054 – 2– 2012

The Installation

Of

Inductive Detector Loops

Version:	2
Revision:	B
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Foreword

This specification has been developed by VicRoads. It is one of a number of technical specifications, and associated standard drawings, which set out the requirements for roadside ITS devices, traffic signal equipment and other electrical equipment and associated devices and control systems.

This specification is intended for use in all relevant works undertaken by or on behalf of VicRoads.

VicRoads Standard Drawings, Specifications and Guidelines are available for downloading from VicRoads website at the following address under 'Tenders & Suppliers', http://www.vicroads.vic.gov.au/itsspecs

Specification updates. VicRoads specifications and associated standard drawings are subject to periodic review. To keep the specifications up to date, amendments or new editions are issued as necessary. It is therefore important for users of VicRoads specifications to ensure that they have the latest version and associated amendments.

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Revision History

Revision	Date	Prepared by	Approved by
A (original)	May 2010	S Purtill	S. Bean
B	Mar 2012	E Lee	S Bean

PREFACE

A TELECOMMUNICATIONS EQUIPMENT

A.1 All telecommunications equipment shall comply with relevant requirements of the Australian Communications and Media Authority (ACMA). Such equipment shall be labelled with an ACMA issued ‘A-Tick’ .

B. CHANGES TO THIS SPECIFICATION

B.1 The main change made to Revision B is listed below.

- Addition of Slot Sealing in Clause 6.2.1.

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1. SCOPE

1.1 This document covers the requirements for the supply and installation of inductive detector loops for use within the State of Victoria.

2. DEFINITIONS

The following definitions are used within this specification.

Detector pit – is the pit located beside the road way in which the feeder cable and the loop cables are joined.

Feeder cable – is the cable used to connect a loop to the traffic signal controller or Freeway Data Station.

Jointing – is the connection of the 'lead-in' wires from the loop, to the feeder cable wires.

Lead-ins – the two ends of the loop wire which run between the detector pit and to loop itself.

Loop – (or inductive loop) one or more turns of loop wire installed below the pavement surface within the saw cuts or slots.

Loop cable – is the wire placed in the slot which is used to create the inductive loop.

Sealing compound – (or slot sealant) the substance used to fill and seal the slot once the loop cable has been installed.

Slot – A slot of appropriate depth saw cut into the pavement surface in which the loop wires are placed.

Sub-pavement loop – a loop that is pre-wound and encapsulated in a protective, adhesive bandage so that it may be laid within a road pavement as a single unit. Sub-pavement loops do not require saw cutting into the road pavement and therefore do not effect the structural integrity of the pavement.

3. GENERAL

3.1 The supply and installation of inductive detector loops shall be undertaken in accordance with the requirements of this specification and individual tender documents.

3.2 Inductive detector loops are generally 'saw cut' into the pavement surface. Alternatively a sub-pavement loop may be installed. The later type requires pre-planning and co-ordination with the pavement contractor in order to install the 'stick down' loops prior to the final asphalt course being laid.

3.3 For the purpose of this specification, an inductive detector loop shall typically include the following:

a) Symmetripole loops (typically associated with stop line loops and advanced loops at traffic signals);

b) Vehicle and tram loops associated with shared lanes;

c) Tram loops associated with exclusive tram lanes;

d) Wheel chair loops; and

e) Freeway Data Station loops

3.4 All works associated with the installation of inductive detector loops shall be carried out in accordance with the requirements of individual tender documents, this specification and relevant clauses of VicRoads specification TCS-013 for the Installation and Remodel of Traffic Signals.

3.5 Where there are two lanes, each loop may be cut back to the same side of the road or one to each side.

3.6 Where there are three or more lanes, the loops shall be divided and cut back both sides of the road. The following table shows some examples of typical installations.

Number of Lanes	Loops Cut to Left Curb	Loops Cut to Right Curb
3	2	1
4	2	2
5	3	2
6	3	3

3.7 Wherever possible, cutting loops into steel re-enforced concrete bridge decks should be avoided.

4. PREQUALIFIED CONTRACTORS

4.1 All loop installation works shall be undertaken by contractors that hold appropriate pre-qualification under VicRoads contractor pre-qualification scheme.

5. RELATED SPECIFICATIONS AND DRAWINGS

5.1 The fabrication and supply of all components for inductive detector loops shall conform with all relevant Australian Standards or, in the absence of same, with appropriate international standards.

5.2 All installation works shall conform to the relevant VicRoads specifications and related specifications and standards as indicated throughout this document.

5.3 The following specifications, standards, documents and standard drawings are referred to or relevant to this specification:

- AS/NZS 2276.3:2002 – Cables for traffic signal installations, Part 3: Loop cable for vehicle detectors.
- TCS-013 – VicRoads specification for the Installation and Remodel of Traffic Signals.
- VicRoads Standard Drawings as detailed in Appendix C.

6. LOOP INSTALLATION

6.1 Saw Cutting

6.1.1 All slots shall be saw cut with a single blade of suitable thickness and diameter to achieve a smooth straight cut of 6mm width that conforms to the tolerances indicated on the relevant VicRoads Standard Drawing.

6.1.2 The minimum depth of the slot shall be in accordance with the relevant Standard Drawing and be sufficient to ensure that all parts of the loop cables are covered with an average depth of sealant of 20mm (minimum depth of 13mm). Saw cuts shall be overrun at corners to ensure full slot depth.

6.1.3 Corners should be chamfered (on the inside of the corner) to ease the cable bending radius.

6.1.4 Saw cutting of pit lids or other fittings in the road pavement is not permitted.

6.2 Slot Sealing

6.2.1 All slots shall be filled with either:

- Megapoxy LSS/5;
- Megapoxy PF Liquid;
- Megapoxy Wintergrade;
- Gun Grade LSS/36; or
- Piezo Sealant SP50.
- Scotec LSS/F6

6.2.2 Other sealants may be used with VicRoads approval. All sealing compound, when cured, shall be level with the road surface within ±2mm.

6.2.3 The slot sealant is required to flow around and ultimately support and protect the loop cable and shall be free from air bubbles and voids which may interfere with this function.

6.3 Loop Cable

6.3.1 The loop cable shall comply with the requirements of AS 2276.3:2002, Cables for traffic signal installations, Part 3: Loop cable for vehicle detectors.

6.4 Loop Formation

6.4.1 Each loop shall be formed by the installation of continuous turns of loop cable laid in sequence as specified in the relevant VicRoads Standard Drawing.

6.5 Lead-ins

6.5.1 Lead-in wires shall be installed into the associated detector pit in accordance with VicRoads Standard Drawing TC-1320. The lead-in wires shall be long enough to provide a minimum of 500mm of cable above ground level.

6.5.2 Pairs of lead-in wires for each loop shall be twisted together within the lead-in conduit and detector pit and held together with a cable tie.

6.5.3 The lead-in wires for each loop shall be left coiled together in the detector pit for jointing to the loop feeder cable.

6.5.4 A maximum of three loops should be cut back to a single detector pit

6.6 Labelling

6.6.1 The ends of the loop cable (lead-ins) shall be labelled to indicate the start termination point (*SN*) and the finish termination point (*FN*), where '*N*' is the loop identification number as indicated on the site layout plan. Such labels shall be closed type marker sleeves with durably printed characters.

6.7 Jointing

6.7.1 The loop lead-in cables shall typically be terminated to the detector feeder cables by others (e.g. the traffic signal installation contractor).

> ***Note:*** *(for information only) Prior to terminating the lead-in cables with the feeder cables, the lead-in cables for each loop (e.g. four cables for a stop line symmetripole loop and two cables for a freeway data station loop) shall be 'knotted' together.*
>
> *The lead-in cables shall be terminated with the feeder cables in the detector pit by soldering the wires together. Unused lead-in cable ends shall be left open circuit. All terminations, joined or unjoined, shall be separately insulated and sealed against the ingress of moisture by an approved method such as heat shrink containing resin.*

6.8 Electrical Requirements

6.8.1 A completed detector loop, including lead-in cable, shall

- be electrically continuous with a maximum dc resistance of 1 Ohm; and
- have a minimum resistance to earth of 100 Mega Ohms (when measured with an Insulation Resistance meter.

7. LOOP TYPES

7.1 General

7.1.1 The following details the typical loop types used by VicRoads and the associated standard drawing that details the installation requirements.

7.2 Symmetripole Loops

7.2.1 Symmetripole loops are a SCATS compatible loop configuration typically used for 'stop line' loops at traffic signal sites.

7.2.1 Symmetripole loops shall be installed in accordance with VicRoads Standard Drawing TC-1300.

7.3 Tram Loops for Shared and Exclusive Tram Lanes

7.3.1 Tram loops in shared lanes are typically connected to a specialised 'tram detector' which reads a transponder fitted to the tram. This type of loop does not detect vehicles that are not fitted with a transponder.

7.3.2 Where a tram loop is installed in an exclusive tram lane, the use of a standard, inductive vehicle loop should be avoided in order to reduce the risk of detector problems associated with tram operation.

7.3.2 Tram loops in shared or exclusive tram lanes shall be installed in accordance with VicRoads Standard Drawing TC-1301.

7.4 Vehicle Loops for Shared Tram Lanes

7.4.1 Vehicle loops in shared tram lanes shall be installed in accordance with VicRoads Standard Drawing TC-1301.

7.5 Advance Tram Loops

7.5.1 Advance tram loops in shared or exclusive tram lanes shall be installed in accordance with VicRoads Standard Drawing TC-1301.

7.6 Wheel Chair Loops

7.6.1 Wheel Chair loops shall be installed in accordance with VicRoads Standard Drawing TC-1302.

7.7 Freeway Data Station Loops

7.7.1 Freeway Data Station loops shall be installed in accordance with VicRoads Standard Drawings TC-2031, TC-2032 and TC-2033.

7.8 Sub-Pavement Loops

7.8.1 The dimensions and formation of sub-pavement loops shall comply with the requirements of the relevant standard drawing.

7.8.2 The loop is adhered to a sub-layer of asphalt over which subsequent layers of asphalt are laid. They are typically laid at a depth of between 50mm and 150mm below the wearing course.

7.8.3 Sub-pavement loops shall be installed in accordance with manufacturer’s recommendations.

APPENDIX A

GUIDELINES FOR PURCHASING AND INSTALLATION

INFORMATIVE

A1. DETAILS TO BE CONSIDERED AND/OR INCLUDED WHEN TENDERING

When tendering, the following details should be considered and included in the tender document as required:

- Site plan detailing the total number of loops, lanes and loop configurations;
- Detail the required layout of lead-ins. Loops should be cut back to the kerb in accordance with Clauses 3.5 and 3.6 of this specification.
- Wherever possible, specify the use of sub-pavement loops.

APPENDIX B

REQUIREMENTS FOR TYPE APPROVAL

Detector loop cable and the slot sealant shall be subject to Type Approval or Acceptance by VicRoads.

Requests for approval of loop cable and slot sealant shall be submitted to VicRoads accompanied with relevant documentation demonstrating compliance with all relevant Australian Standards and relevant sections of this specification.

APPENDIX C

ASSOCIATED STANDARD DRAWINGS

Drg Number	Title
TC-1300	Loop Pattern and Installation Details – symmetripole
TC-1301	Vehicle and Tram Detector Loops Along Shared and Exclusive Tram Lines
TC-1302	Wheelchair Detector Loops
TC-1320	Detector Pit Installation Details
TC-1361	Red Light Camera Detector Loops
TC-1380	Concrete Slab For Tram Detectors
TC-2031	Freeway Data Station Site – Typical Layout
TC-2032	Loop Installation Details – Freeway Data Stations
TC-2033	Loop Pattern – Freeway Data Station