

TCS 059 – A – 2014

The Supply
of
Closed Circuit TeleVision Camera (CCTV)
and
Video Encoder Equipment

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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 the 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	May 2014	E Lee	W Harvey

PREFACE

A. APPROVED PRODUCTS

- A.1 All equipment supplied under this specification shall conform to a sample previously supplied to, and formally accepted, or separately exempted, by the Department. Such acceptance shall be subject to the issue of a Certificate of Type Approval or Notification of Acceptance by the Department.
- A.2 References to “approved” within this specification shall mean individual components or methods that have been previously accepted by the Department.
- A.3 All equipment supplied under this specification shall be manufactured and supplied by an approved manufacturer under a VicRoads approved Quality Assurance System and shall be subject to all requirements of audit therein.

B TELECOMMUNICATIONS EQUIPMENT

- B.1 All telecommunications equipment shall comply with relevant requirements of the Australian Communications and Media Authority (ACMA). Such equipment shall be labelled with Compliant RCM mark.

C CHANGES TO THIS SPECIFICATION

- C.1 The main changes to this specification are listed below:

- Additional of ADSL requirements

The following table details version to this specification:

Revision	Date	Revision Owner	Purpose of Revision
Original	August 2011	VicRoads ITS	New specification

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Contents

SECTION 1	SCOPE AND GENERAL	7
1.1	SCOPE.....	7
1.2	GENERAL.....	7
SECTION 2	RELATED SPECIFICATIONS AND DRAWINGS	8
SECTION 3	ACRONYMS.....	9
3.1	ACRONYMS	9
SECTION 4	CAMERA PERFORMANCE REQUIREMENTS	10
4.1	GENERAL.....	10
4.2	VIDEO.....	10
4.3	PTZ REQUIREMENT.....	10
4.4	LENS	11
4.5	OTHER REQUIREMENTS.....	11
SECTION 5	VIDEO ENCODER REQUIREMENTS.....	13
5.1	GENERAL.....	13
5.2	VIDEO.....	13
5.3	DATA	14
5.4	TRANSMISSION INTERFACE.....	14
5.5	MANAGEMENT.....	15
5.6	OTHER REQUIREMENTS.....	15
SECTION 6	MECHANICAL & PHYSICAL REQUIREMENTS	17
6.1	CONNECTIONS.....	17
6.2	CAMERA HOUSING	17
6.3	CAMERA HOUSING MOUNTING ARM.....	17
6.4	CABLING.....	18
6.5	VIDEO ENCODER.....	18
6.6	CAMERA CONTROLLER CABINET.....	19
SECTION 7	ELECTRICAL REQUIREMENTS	20
7.1	GENERAL.....	20
7.2	OPERATING VOLTAGES	20
7.2.1	Mains	20
7.2.2	Camera / PTZ Voltage	20
7.2.3	Encoder	20
7.3	ELECTRICAL SUPPLY	21
7.4	INTERNAL PROTECTION.....	21
SECTION 8	ENVIRONMENTAL REQUIREMENTS.....	22

8.1	TEMPERATURE AND HUMIDITY	22
8.2	ENCLOSURE PROTECTION.....	22
8.3	WIND LOADING	22
8.4	ELECTROMAGNETIC COMPATIBILITY (EMC).....	22
8.4.1	General.....	22
8.4.2	Immunity.....	23
8.4.3	Electromagnetic Emission.....	23
APPENDIX A		24
	EQUIPMENT CURRENTLY BEING USED BY VICROADS	24
APPENDIX B		25
	REQUIREMENTS FOR TYPE APPROVAL.....	25
APPENDIX C		27
	INSTALLATION REQUIREMENTS.....	27

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

- 1.1.1 This document covers the requirements for the supply of 'dome' style CCTV cameras, digital transmission equipment and all associated equipment, for use by VicRoads throughout the State of Victoria.
- 1.1.2 The typical CCTV installation is connected to VicRoads fibre-optic cable network.

1.2 GENERAL

- 1.2.1 VicRoads has a network of CCTV cameras throughout the metropolitan freeway and arterial road network.
- 1.2.2 These cameras are used to provide real time images of traffic conditions and assist in the management and verification of on-road incidents.
- 1.2.3 VicRoads uses the 'dome' type camera configuration for all camera installations.
- 1.2.4 The standard camera is an analogue type.
- 1.2.5 VicRoads uses the video management system "Omnicast" by Genetec Inc. version 4.6 or later. video management system.
- 1.2.6 Any camera and video encoder solution must be fully supported within the video management software package "Omnicast" by Genetec Inc.
- 1.2.7 All CCTV equipment shall comply with the relevant requirements of this specification.
- 1.2.8 All CCTV equipment shall be fully compatible with VicRoads existing devices and systems. A list of current equipment being used for VicRoads CCTV network can be referred to Appendix A.
- 1.2.9 The typical CCTV installation consists of the following:
- Camera;
 - Weather proof housing;
 - Pole on which to mount the above items; and
 - Control cabinet including encoder, control equipment, fibre-optic cable termination and electrical switchboard.

SECTION 2 RELATED SPECIFICATIONS AND DRAWINGS

- 2.1 The supply and installation of the CCTV and video encoder equipment shall conform with all relevant Australian Standards.
- 2.2 All installation works shall conform to the relevant VicRoads specifications and related specifications and standards as indicated throughout this document.
- 2.3 The following related Australian Standards are defined:
- | | |
|---------------|---|
| AS/NZS 3000 | Wiring rules |
| AS 4806.2 | Closed Circuit Television (CCTV) Application Guidelines |
| AS 14496 - 10 | H.246, MPEG-4 and MJPEG digital video compression standard |
| AS 60529 | Degrees of protection provided by enclosures for electrical equipment (IP code) |
- 2.4 The following related documents are defined:
- | | |
|------------|--|
| IEEE 802.3 | IEEE Standard for Information Technology – Specific Requirements: Part 3 |
|------------|--|

SECTION 3 ACRONYMS

3.1 ACRONYMS

3.1.1 The acronyms used in this document shall be interpreted as follows:

ACMA	Australian Communications and Media Authority
AS	Australian Standards
ARP	Address Resolution Protocol
B/W	Black and White
CCTV	Closed Circuit TeleVision
CIF	Common Intermediate Format
EMC	Electromagnetic Compatibility
HTTP	Hypertext Transfer Protocol
ICMP	Internet Control Message Protocol
IEEE	Institute of Electrical and Electronics Engineers
IP	Ingress Protection
ITS	Intelligent Transport Systems
MPEG-4	Moving Pictures Expert Group encoding scheme
NZS	New Zealand Standard
PAL	Phase Alternating Line
PTZ	Pan Tilt Zoom
SNMPv2	Simple Network Management Protocol version 2
TCP	Transmission Control Protocol
UDP	User Datagram Protocol

SECTION 4 CAMERA PERFORMANCE REQUIREMENTS

4.1 GENERAL

4.1.1 All cameras shall be analogue video output with dome type housing and shall meet the following minimum requirements.

4.2 VIDEO

4.2.1 The camera shall comply with the video requirements as detailed in Table 4.1.

Video	
Video Output	1.0 Vp-p/75 ohm composite PAL
Signal to Noise Ratio	Greater than, or equal to 50 dB
Horizontal Resolution	Not less than 460 TV Lines

Table 4.1- Video Requirements

4.3 PTZ REQUIREMENT

4.3.1 The PTZ control shall provide the following degree of freedom:

- Continuous 360 degree panning.
- Continuous tilting through at least 190 degrees, and shall employ automatic image flip at the bottom of tilt travel to prevent the output of an inverted image.
- Minimum vertical tilt of 18 degrees above horizontal.

4.3.2 The speed motion shall comply with the following:

- A minimum range of 0.2 degrees per second to 80 degrees per second for manual panning operation.
- A minimum range of 0.2 degrees per second to 40 degrees per second for manual tilting operation.
- A minimum of 200 degrees per second for both pan and tilt directions during preset-recall operation.

4.3.3 Preset positions

- Preset-positions shall store the pan, tilt and zoom position. The camera shall provide a minimum of 16 presets, all with the option for on screen labels.

4.3.4 Compass and position feedback:

- The camera shall provide a display of compass position indicating the current direction the camera is looking.
- This reference shall be superimposed on the output image.
- The camera shall also support digital position feedback through the PTZ serial port.
- A built in digital and absolute magnetic compass device a highly desirable option and is preferred.
- Inferred and pulse encoder based compass devices shall only be used where the aforementioned is unavailable.

4.4 LENS

4.4.1 The lens shall meet the following zoom requirements:

- Minimum 35x optical zoom
- Minimum 12x digital zoom

4.4.2 The lens shall meet the following iris and focus requirements:

- The lens shall have auto iris and auto focus.
- Focus and iris control shall be set to automatic by default.
- The camera shall support manual override of focus and iris functions.

4.5 OTHER REQUIREMENTS

4.5.1 Programmable privacy zones:

- The camera shall provide a minimum of eight (8) programmable privacy zones.
- The privacy zones shall consist of an opaque polygon superimposed over the image to occlude parts of the field of view.
- The privacy zones shall move across the output image as appropriate to keep the desired zone covered as the camera moves.

4.5.2 Day/Night Operation:

- The camera shall provide a wide dynamic range colour image for daytime operation with the ability to automatically switch to a higher sensitivity mode when operating in low light.

4.5.3 The camera shall be able to operate in the following minimum illumination levels:

- Day (Colour) Mode: 0.5 lux
- Night (Colour or B/W) Mode: 0.04 lux
- The camera shall have the ability to show a colour image both during the day and the night.

4.5.4 White Balance

- The camera shall provide Automatic White Balance

4.5.5 Camera Serial Communication Protocol

- The camera shall fully support Pelco D protocol.
- Support of American Dynamics or Sensormatic protocol can be used as option.
- Pre-configuration and testing of the serial communication parameters of the dome camera and digital video encoder shall be undertaken prior to installation.
- The camera and encoder's serial communication parameters shall be configured as follows:
 - Baud rate: 4800kbps
 - PTZ address: 1 (for Pelco D protocol) and American Dynamics RS422
 - Duplex: Irrespective of the devices' ability to support full-duplex; the serial ports must be wired in a 4-wire configuration.

4.5.6 Operational Life

- The dome camera shall have a minimum operational life of at least 70,000 hours.

4.5.7 All the camera and PTZ pre-sets such as labels, privacy zones and presets, shall be retained after power failure.

SECTION 5 VIDEO ENCODER REQUIREMENTS

5.1 GENERAL

- 5.1.1 VicRoads uses a video encoder to convert analogue video signals to digital video signals.
- 5.1.2 A video decoder is also used to convert digital video signals to analogue video signals.
- 5.1.3 Video encoders shall comply with this specification and must be fully compatible with VicRoads existing encoders currently in use.

5.2 VIDEO

- 5.2.1 The video encoder shall comply with the video requirements as detailed in Table 5.1.

Item	Requirement
Video Channels	1xPAL/NTSC (Auto/PAL/NTSC)
Input level	1 Vpp (± 3 dB)
Compression algorithm	H.264 BP (ISO/IEC 14496-10), MJPEG, MPEG-4 (ISO/IEC 14496-2, ISMA comp.)
Type of streaming	UDP/IP (multicast and unicast)
Number of output streams	Up to 20
Input impedance	75 Ω /Hi-Z selectable
Encoding latency	<130ms typ.
Resolution	D1, 1/2D1, 2CIF, CIF, QCIF, VGA
Frame rate	1 to 30 fps
Dual Streaming	D1 @30 fps H264 + D1 @ 30fps MPEG-4+ MJPEG
Output data rate	56 kb/s to 20 Mb/s (CBR or VBR selectable/ user profiles)
Video Settings	User profiles, contrast, brightness, color saturation, hue, sharpness
Video Overlay	3x Text lines (configurable: position color, border/outline color, font size), 1x image in BMP, GIF, or JPEG format (configurable: position, scaling)
Live View encoder	HTTP, FTP pull
Connector type	BNC 75 Ω (gold-plated center pin)

Table 5.1 – Video Requirements

5.3 DATA

5.3.1 The video encoder shall comply with the data requirements as detailed in Table 5.2.

Item	Requirement
Number of channels	2x (full-duplex)
Number of streams	2x 3 (multicast or unicast)
Interfaces	1x RS-232 1x RS-422/485 (2 or 4-wire)
Stream	TCP/UDP configurable
Data rate	300 b/s to 230.4 kb/s
Connector type	RJ-45

Table 5.2 - Data

5.4 TRANSMISSION INTERFACE

5.4.1 The video encoder shall comply with the transmission interface requirements as detailed in Table 5.3.

Item	Requirement
Number of interfaces	1
Interface	10/100Base-TX Fast Ethernet Autonegotiation, half-duplex/full-duplex, 10/100 Mb
SFP option	Empty SFP slot for 100 Mbps SFP device
Protocols	H.264 BP, MPEG-4 ES, (M)JPEG, RTP, RTCP, RTSP, TCP, UDP, IP, DHCP, IGMPv2, (S)NTP, HTTP, SNMP v2, FTP, TelNet, DiffServ, SAP, UPnP
Connector type	RJ-45

Table 5.3 – Transmission Interface

5.5 MANAGEMENT

5.5.1 The video encoder shall comply with the management requirements as detailed in Table 5.4.

Item	Requirement
Led status indicators	Power-on indicator No Video on input
SYNC status indicators	All links are operational failure in RX stream(s) failure in TX stream(s)
Ethernet port indicators	LED: on=100 Mb, off=10 Mb; LED: on=link okay, flashes with Activity
Network management and Control	SNMP v2, HTTP API, HTML (password protected)

Table 5.4 - Management

5.6 OTHER REQUIREMENTS

5.6.1 Data and Time

- The encoder shall provide an option to display the date and time on screen.

5.6.2 Network Interface Communication Protocols

- The encoder shall support static IP address setting.
- The IP address must be retained after the device has lost power.
- The codec shall support unicast and multicast transmission of digital video over IP.

5.6.3 Camera Communication Port

- The encoder shall provide a camera communication port through which it will transmit data to and from the connected dome camera.
- The physical interface of the port shall be RS422 full duplex (4 wire).
- The video encoder's camera communication port shall support the functions of the connected camera in order to satisfy the camera operational requirements and camera communication protocol requirements of this specification.

5.6.4 Web Interface

- The encoder shall have the ability to be configured through a web page provided from a web server internal to the codec.
- The web page shall use HTTP on port 80.
- The codec shall allow configuration of the following through the web page interface as a minimum:

- Network interface settings.
 - Unicast and Multicast settings.
 - Camera communication interface settings.
 - Image resolution settings.
 - Encoding quality settings.
 - Data rate settings.
- The web page interface shall also provide the ability to:
 - View the video output.
 - Pan, tilt and zoom the connected camera.
 - Recall and store preset PTZ positions.

5.6.5 Operational Life

- The video encoder shall have a minimum operational life of at least 70,000 hours.

5.6.6 Decoder

- The decoder shall be fully compatible to the encoder.

SECTION 6 MECHANICAL & PHYSICAL REQUIREMENTS

6.1 CONNECTIONS

- 6.1.1 A standard coaxial cable terminated with BNC connectors shall be used to connect the camera's video output to the encoder.
- 6.1.2 The camera shall provide a quick disconnect BNC connector for analogue video output.
- 6.1.3 This connector shall be protected from the outside environment.
- 6.1.4 Connections for power and serial communication shall provide the ability to be quickly connected and disconnected through the use of one or more miniature terminal strip connectors or similar.

6.2 CAMERA HOUSING

- 6.2.1 An environmental housing shall be supplied with the dome camera to provide a controlled atmosphere for the camera. The housing shall:
- be tamper-proof.
 - have an operational life of at least 70,000 hours in outdoor environmental conditions.
 - use a clear optical grade thermoformed acrylic or equivalent grade bubble to house the optical components. This bubble shall securely attach to the housing, with sufficient fasteners to ensure that any sealing gaskets are well compressed.
 - incorporate a "drip ring" to keep rainwater from the bubble.
 - have a maximum weight (including environmental dome housing assembly but excluding the mounting bracket) of 5kg.

6.3 CAMERA HOUSING MOUNTING ARM

- 6.3.1 The camera housing mounting arm shall be a VicRoads approved mounting arm.
- 6.3.2 The housing mounting arm or outreach shall be suitable for mounting on VicRoads mid-hinge poles, joint use poles, gantries and other standard CCTV mounting structures.
- 6.3.3 Any mounting arm or outreach used to attach the dome camera to a pole shall not extend more than 2.5 metres laterally from the pole.
- 6.3.4 The design of the outreach arm shall minimise the potential of the camera's field of view to be partially occluded by the arm itself.

6.4 CABLING

- 6.4.1 All serial cables, co-axial cables and power cables used in the camera installation shall have UV stabilised outer sheaths and be suitable for outdoor use.
- 6.4.2 Co-axial cable shall be a low loss type.
- 6.4.3 The length of co-axial cable between the camera and the video encoder shall not exceed 50m.
- 6.4.4 Flexible conduit shall be used to provide protection to the above mentioned cables where they are exposed to the environment.
- 6.4.5 This conduit shall be UV stabilised and suitable to outdoor use.
- 6.4.6 Where necessary, the Contractor shall provide suitable adaptors to ensure that the impedance of the dome camera output, video encoder input and cable are matched.

6.5 VIDEO ENCODER

- 6.5.1 The video encoder shall have a maximum weight of 3kg
- 6.5.2 The external dimensions of the encoder shall not exceed 200mm x 200mm x 200mm (Height, Width, Depth).
- 6.5.3 All connectors (including communications and power connections) shall provide a locking mechanism preventing accidental removal.
- 6.5.4 This locking system shall be secured by hand without the need for additional tooling.
- 6.5.5 All connectors used to connect cables to the video encoder shall have a maximum length of 50mm.
- 6.5.6 Labels shall be affixed to the exterior of the video encoder's surface to indicate the meaning of diagnostic indicators and any power connector, video connector, serial connector, or configuration switches.
- 6.5.7 The video encoder shall be suited for mounting on a shelf or DIN rail.
- 6.5.8 A shelf mounted encoder shall provided holes and/or lugs suitable for securing using screws or similar.
- 6.5.9 The devices shall be effectively sealed, and/or have all sensitive components coated in a protective layer to resist the corrosive effects of an outdoor environment.
- 6.5.10 The video encoder shall be able to operate continuously at an ambient temperature of -10°C to 65 °C, non-condensing.

6.6 CAMERA CONTROLLER CABINET

6.6.1 A camera controller cabinet is required to house the following equipment:

- Electrical switch board;
- Socket outlets
- Video Encoder;
- Fibre-optic router/converter (fibre-optic connections);
- Fibre-optic splicing tray (fibre-optic connections);
- ADSL Modem-Router (ADSL connections);

6.6.2 Either the Universal Roadside Cabinet or ITS Field Cabinet may be used for the camera controller cabinet.

6.6.3 If the camera is installed at a traffic signal site, it is preferable to use the existing traffic signal controller cabinet.

6.6.4 A housing top extension ('top-hat') should be installed to provide the extra space for the CCTV camera equipment if existing cabinet is full with equipment.

6.6.5 If the traffic signal controller has an existing PSTN line for connection to SCATS, this line should be used for the CCTV camera's ADSL connection.

6.6.6 An ADSL filter/splitter shall be installed to allow both communication services to use the same PSTN line. Refer to the traffic signal controller specification, TCS 016 - The Supply and Installation of Traffic Signal Controllers for details of this configuration.

SECTION 7 ELECTRICAL REQUIREMENTS

7.1 GENERAL

- 7.1.1 All electrical works shall comply with AS/NZS3000.
- 7.1.2 All cables and wires shall be insulated with a material with a degree of protection not less than that provided by V-90 grade PVC and shall be suitably labelled.
- 7.1.3 The combined electrical load of all of the dome camera, encoding equipment, and environmental housing shall not exceed 120 VA.
- 7.1.4 Any socket outlets installed as part of a CCTV installation shall include an integral RCD.
- 7.1.5 The electrical system shall incorporate the following facilities:
 - i. A circuit-breaker board comprising appropriately rated mains isolation switch and circuit breaker;
 - ii. The ability to be isolated from mains supply at ground level using a suitable switch/breaker system.

7.2 OPERATING VOLTAGES

7.2.1 Mains

- 7.2.1.1 The mains supply voltage shall be deemed to be 230 VAC +10%, -6% in accordance with AS 60038.

7.2.2 Camera / PTZ Voltage

- 7.2.2.1 The voltage for the camera and PTZ shall be nominal 24Vac.

7.2.3 Encoder

- 7.2.3.1 The voltage for the video encoder shall be a nominal 12Vdc. This should be provided via a plug in type power supply.

7.3 ELECTRICAL SUPPLY

- 7.3.1 The dome camera installation shall include, within the camera control cabinet, a circuit-breaker board comprising appropriately rated mains isolation switch and an appropriately rated circuit breaker for each individual circuit.

7.4 INTERNAL PROTECTION

- 7.4.1 All equipment including data lines shall be internally protected against damage resulting from:

- Lighting striking at or near the camera;
- Electrical transients on power cabling;
- Electrical transients on communications wiring;
- Radio frequency interference; and
- Static electrical discharge.

SECTION 8 ENVIRONMENTAL REQUIREMENTS

8.1 TEMPERATURE AND HUMIDITY

- 8.1.1 The camera and associated equipment shall be designed to operate under the following conditions:
- Ambient air temperatures within the range -15°C to $+60^{\circ}\text{C}$; and
 - Insolation of up to $1000\text{W}/\text{m}^2$, incident at an angle of 30° from the vertical, applied to the maximum exposed surface of the equipment.

Note: Where it is not practical to provide the required insolation during testing, it is acceptable to increase the upper ambient temperature limit by 10°C as substitute.

- 8.1.2 Consideration shall be given to protection against the effects of high humidity, including condensation following a drop in ambient temperature.
- 8.1.3 The camera shall be able to operate continuously at an ambient temperature of -10°C to $+60^{\circ}\text{C}$ with a relative humidity of 10% to 95%, non-condensing.

8.2 ENCLOSURE PROTECTION


- 8.2.1 The Dome camera housing shall meet the requirements of AS 60529 for IP66.

8.3 WIND LOADING

- 8.3.1 The facilities provided for supporting and stabilizing the camera shall ensure that, when installed as in normal operation, the camera will maintain its intended orientation and position when subjected to the wind-loading conditions applicable to the region in which the camera is intended to be used, in accordance with AS/NZS 1170.2.
- 8.3.2 Notwithstanding, the minimum wind-loading conditions applicable shall be those for Region A, Terrain Category 2 in accordance with AS/NZS 1170.2.

8.4 ELECTROMAGNETIC COMPATIBILITY (EMC)

8.4.1 General

- 8.4.1 All equipment covered by this specification shall comply with all relevant requirements of the Australian Communications Media Authority (ACMA) for EMC and shall be labelled with a conforming 'C-Tick'. 

8.4.2 Immunity

8.4.2.1 The camera shall comply with the relevant requirement of AS/NZS 61000.6.1.

8.4.3 Electromagnetic Emission

8.4.3.1 The camera shall comply with the relevant requirement of AS/NZS 61000.6.3.

APPENDIX A

EQUIPMENT CURRENTLY BEING USED BY VICROADS

(Informative)

- A1 Any CCTV equipment supplied to VicRoads must be fully compatible with VicRoads existing systems and devices.
- A2 It is the responsibility of the supplier to demonstrate such compliance.
- A3 To assist with this, Table A1 details all devices and systems currently being used by VicRoads.

Item	Brand	Model Number
Dome Camera	Pelco pendant type	SD435-PG-0
Video Encoder	NKF (by Optotelecom)	S-60E
Video Decoder	NKF (by Optotelecom)	S-60D
Video Management System	Omnicast (by Genetec)	Version 4.8

Table A1 – Current VicRoads Devices and Systems

APPENDIX B

REQUIREMENTS FOR TYPE APPROVAL

(Normative)

B1 GENERAL

To enable assessment for the purpose of granting Type Approval, the supplier is to submit a formal request for Type Approval, for each device submitted, accompanied by the following:

- a. A complete working sample of the device.
- b. An outline drawing showing the general presentation and overall dimensions of the complete device.
- c. Documentation to demonstrate that the device has been manufactured and supplied under an approved quality assurance system.
- d. Documentation to demonstrate that the device conforms to the requirements of VicRoads Specification. This may be by means of submitting test results from approved and appropriately qualified independent testing organisations, or providing the manufacturer's assurance that the product complies with each paragraph of the specification.

B2 REQUIRED NATA ACCREDITED TESTING

Notwithstanding B1 above, the supplier shall submit test results from a NATA accredited testing organisation to demonstrate compliance with the following:

Clause	Requirements	Evidence
8.1	Temperature and humidity (all devices)	Test Report
8.2	Enclosure protection (Dome enclosure)	Test Report
8.4	EMC Compliance	Test Report
	Field Test	To be arranged with VicRoads

B3 OTHER REQUIRED TESTING

- a. VicRoads may require additional information or testing to be carried out as part of its evaluation of the product.

- b. If the product is approved, a Certificate of Type Approval will be provided to the supplier. Until such time as this Certificate is issued, the product is not to be used in the State of Victoria.

B4 ASSESSMENT PROCEDURE

B4.1 The assessment procedure will include, but not be limited to, the following:

- a. Assessment of construction, workmanship and critical dimensions.
- b. Evaluation of the submitted data against the requirements of the specification

Where some of these procedures have been completed prior to formal submission, the results will be considered in the evaluation, provided there is no relevant change in the design. The supplier is to state whether tests carried out prior to formal submission were carried out on an identical sample.

B4.2 FIELD TEST

B4.2.1 Once VicRoads is satisfied the device meets all relevant requirements, a field test to prove compatibility will be carried out.

APPENDIX C

INSTALLATION REQUIREMENTS

(Informative)

C.1 GENERAL

- C1.1 The dome camera, digital video encoder, and all associated communications and power wiring shall be installed according to the manufacturer's instructions.
- C1.2 All video, communication and power cables shall be labelled at both ends. All cables should be neatly trained and organised.
- C1.3 The camera controller cabinet shall be installed adjacent to the camera.
- C1.4 VicRoads ITS Group shall allocate a camera site number when requested.

C.2 INSTALLATION RECORDS

- C.2.1 After installation of the dome camera and digital video encoder, the following information should be provided to VicRoads:
- The GPS location of the installed dome camera;
 - The GPS location of the installed digital video encoder.
- C2.2 All GPS coordinates shall be given in electronic format in GDA94 coordinate projection.
- C2.3 All GPS records shall also contain the camera site number provided by VicRoads.

C.3 CONFIGURATION

- C.3.1 The Contractor shall configure all network parameters including the IP address into each applicable device.
- C3.2 All parameters including IP addresses shall be obtained from VicRoads.
- C3.3 The Contractor shall provide a summary of the proposed settings for the dome camera and digital video encoder for review by VicRoads prior final configuration of these devices.
- C3.4 The Contractor shall configure the agreed parameters into the dome camera and video encoder during installation.