SPECIFICATION 703

CLOSED CIRCUIT TELEVISION (CCTV) CAMERAS

REVISION REGISTER			
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SPECIFICATION 703

CLOSED CIRCUIT TELEVISION (CCTV) CAMERAS

GENERAL

703.01 SCOPE

1. This specification defines the requirements for the supply, installation, testing, commissioning and handover of Closed Circuit Television (CCTV) cameras for the monitoring of Main Roads' metropolitan road network by the Main Roads Western Australia Road Network Operations Centre (RNOC). This includes Operational Cameras for use by Main Roads staff to manage the road network and Web Cameras for the provision of static images to the Main Roads website.

   The scope of work covered by this specification includes:

   (a) The supply and installation of the camera, mounting pole and washer system;

   (b) The supply and installation of the Intelligent Transport Systems (ITS) cabinet and/or traffic signal cabinet extension;

   (c) The supply and installation of all communications and associated equipment;

   (d) The interfacing of all camera sites into the Main Roads CCTV Video Management System (VMS); and

   (e) Testing, Commissioning and Asset Handover including comprehensive Installation, Operation and Maintenance Manuals (IOM).

2. This specification must be read in conjunction with the specification datasheets and drawings. The specification datasheets are included in Annexure 703B. The specification drawings can be downloaded from the Main Roads website and are listed in Annexure 703A.

3. The Contractor must lodge all notices required by power supply and communications authorities or any other authority having jurisdiction over the installation. The Contractor must pay any fees required.

703.02 REFERENCES

1. Australian Standards, MAIN ROADS Western Australia Standards and MAIN ROADS Western Australia Test Methods are referred to in abbreviated form (e.g. AS 1234, MRS 67-08-43 or WA 123). For convenience, the full titles are given below:

Acts and Regulations

Electricity Act 1945 (WA)

Electricity Licensing Regulations 1991 (WA)

Western Australian Electrical Requirements

Australian Standards

AS 1100	Technical Drawing
AS 1101	Graphical Symbols for General Engineering
AS 1102	Graphical Symbols for Electro Technology
AS 2312	Guide to the Protection of Structural Steel against Atmospheric Corrosion by the Use of Protective Coatings
AS 2339	Traffic Signal Posts, Mast Arms and Attachments
AS 4006	Software Test Documentation
AS 4100	Steel Structures
AS 4262.1	Telecommunications over Voltages – Part 1 Protection of Persons
AS 4262.2	Telecommunications over Voltages – Part 2 Protection of Equipment
AS 4806.1	Closed Circuit Television (CCTV) – Management and Operation
AS 60529	Degrees of protection provided by enclosures for electrical equipment (IP Code)

Australian/New Zealand Standards

AS/NZS 1163	Structural Steel Hollow Sections
AS/NZS 1170.0	Structural Design Actions, SAA Loading Code
AS/NZS 1170.2	Structural Design Actions Part 2: Wind Actions
AS 1289.6.3.3	Soil Strength and Consolidation Tests
AS/NZS 1554.1	Structural Steel Welding – Welding of Steel Structures
AS/NZS 1554.2	Arc Stud Welding
AS/NZS 1768	Lightning Protection
AS/NZS 2053.1	Conduits and Fittings for Electrical Installation General Requirements
AS/NZS 3000	Electrical Installations – Buildings, Structures and Premises (SAA Wiring Rules)
AS/NZS 3085.1	Telecommunications Installations – Administration of Communications Cabling Systems – Basic Requirements
AS/NZS 3100	General Requirements for Electrical Equipment
AS/NZS 3678	Hot Rolled Structural Steel Plates
AS/NZS 3679	Hot Rolled Structural Steel Bars
AS/NZS 4251.1	Electromagnetic Compatibility – Generic Emission Standard – Part 1: Residential, Commercial and Light Industry

AS/NZS 4677	Steel Utility Service Poles
AS/NZS 4680	Hot-Dip Galvanized (Zinc) Coatings on Fabricated Ferrous Articles
AS/NZS 4792	Hot-Dip Galvanized (Zinc) Coatings on Ferrous Hollow Sections, Applied by a Continuous or a Specialised Process
AS/NZS ISO 9002	Quality Management and Quality Assurance Standards – Model for Quality Assurance in Production, Installation and Servicing
AS/NZS 60950.1	Information Technology Equipment – Safety

Other Standards

ACMA Technical Planning Guidelines – Appendix 3, Emission Standard for the Australian Analog Terrestrial Television Service – Video Characteristics

AS/ACIF S008	Requirements for Customer Cabling Products
AS/ACIF S009	Installation Requirements for Customer Cabling
IEC 61643	Low Voltage Surge Protection Devices
IEEE 802.15.4	PHY IEEE Physical Layer Protocol

MAIN ROADS Specifications and Documents

67-08-71	Intelligent Transport Systems (ITS) Guideline
Specification 100	GENERAL REQUIREMENTS
Specification 202	TRAFFIC MANAGEMENT
Specification 301	VEGETATION CLEARING AND DEMOLITION
Specification 302	EARTHWORKS
Specification 704	CABLE CONDUITS AND PITS FOR INTELLIGENT TRANSPORT SYSTEMS (ITS)
Specification 712	TRAFFIC SIGNALS
Specification 801	EXCAVATION AND BACKFILL FOR STRUCTURES
Specification 901	CONCRETE – GENERAL WORKS
Specification 908	ANTI-GRAFFITI
D11#38472	Main Roads Supplement to Austroads Guide to Road Design Part 6: Roadside Design, Safety and Barriers
D17#362799	ITS Testing and Commissioning Guidelines
D17#744632	Handover of Electrical and ITS Assets Policy
D17#748571	Handover of Electrical and ITS Assets Procedure
D17#786208	Electrical and ITS Asset Drawing and Data Requirements Policy

D17#877844	Electrical and ITS Asset Drawing and Data Requirements Procedure
D18#1119807	CCTV Asset Data Requirements List

Note: Internal Main Roads document numbers are referenced above for convenience; however, all of these documents are available from the Main Roads external website under Electrical and ITS Engineering. Specification Drawings are listed separately under Annexure 703A.

Definition of Terms

ADRL	Asset Data and Requirements List
AS	Australian Standard
AS/NZS	Australian and New Zealand Standard
CCTV	Closed Circuit Television Cameras
CDDL	Contract Drawing and Data List
DIN rail	Metal rail of standard type used for the mounting on circuit breakers and industrial control equipment
FLIR	Main Roads CCTV Video Management System
IOM	Installation, Operation and Maintenance Manuals
IP	Ingress Protection
ITP	Inspection and Test Plan
ITS	Intelligent Transport Systems
PTZ	Pan Tilt and Zoom
RNOC	Road Network Operations Centre
Superintendent	Main Roads contract manager as defined in AS 2124:1992
VMS	Video Management System

703.03 – 703.05 NOT USED

PRODUCTS AND MATERIALS

703.06 QUALITY OF MATERIALS

1. All materials used must be new and of the best quality and of the class most suitable for working under the conditions specified. ***New Materials***

2. Materials must withstand the variations of temperature and loading arising under working conditions without: ***Material Withstand***

   (a) Distortion;

   (b) Deteriorating at an unreasonable rate;

   (c) The setting up of undue stresses at any point; and

(d) Affecting its strength and suitability to the work to which they have to perform.

3. All materials provided by the Contractor must satisfy the requirements of this specification. Where it is unclear that an item will fully satisfy these requirements or the item does not satisfy the requirements, the Contractor must submit details of the item to the Superintendent for approval. Details must include the manufacturer datasheets, how the item specifically does not meet compliance and any other required information. ***Exception***

4. When the Contractor is using unspecific materials and equipment, they must demonstrate conformance to the requirements of this specification and associated project documentation. ***Conformance***

703.07 FIVE AND TEN YEAR SPARE PARTS

1. A spare parts list with pricing must be provided with equipment tender as per code V05 of the model Asset Data Requirements List (ADRL) in Annexure 703C. The list must at least contain spare parts recommended to ensure five years of operation. A further option of additional spare parts for ten years of operation must also be provided. ***Spare Parts***

2. A commissioning spare parts list must also be provided after award as per code V06 of the model ADRL in Annexure 703C. ***Commissioning Spares***

DESIGN

703.08 GENERAL

1. The Closed Circuit Television Cameras shall be designed in accordance with this specification. ***Specification***

2. This specification shall be read in conjunction with the standard drawings contained in Annexure 703A. ***Standard Drawings***

3. The standard drawings in Annexure 703A are not complete and must be finalised by the designer to match the specific installation. ***Modification***

4. In the event that the specific camera used requires changes to the standard drawings to be technically correct and accurate, these changes must be made. ***Design Accuracy***

5. The designer is fully responsible for all aspects of the design and must check all details to ensure accuracy and adequacy for the installation. This includes all protection and cable calculations. ***Design Responsibility***

703.09 OPERATIONAL CAMERA REQUIREMENTS

1. All hardware and software must be compatible with the RNOC systems. The current VMS version is specified in Annexure 703B. ***RNOC Systems***

2. Video and control signals for each camera must be transmitted digitally over the same telecommunications channel. ***Signals***

3. Digital Internet Protocol cameras must be used. Existing analogue cameras must be replaced with Digital Internet Protocol cameras. ***Digital***

4. The camera must be suitable for monitoring day time and night time traffic. Low light sensitivity must meet the requirements in Annexure 703B. ***Day and Night***

5. Image stabilisation functionality must be included and the overall mass limited as specified in Annexure 703B. ***Image Stabilisation***

6. The camera must be suitable for outdoor operation in a corrosive, high traffic volume atmosphere. The camera must be manufactured from rust proof materials resistant to a high level of solar exposure and relative humidity. Further details including Ingress Protection (IP) rating are specified in Annexure 703B. ***IP Rating***

7. The camera must have a thermostat controlled heater to prevent moisture build up. Refer Annexure 703B. ***Heater***

8. The camera must have a colour, semiconductor imager as per Annexure 703B providing day and night operating modes. The imager chip must be of minimum size as specified. ***Imager***

9. The camera must include automatic white balancing to compensate for colour temperature changes caused by light sources including street lighting. ***White Balancing***

10. The camera must include sensitivity enhancement techniques of frame averaging and dynamic range adjustment functionally. ***Sensitivity***

11. The video standard must be compatible as specified in Annexure 703B. ***Video***

12. The camera must have Pan, Tilt and Zoom (PTZ) functionality as specified in Annexure 703B. Position feedback for all three functions must be included such that the VMS has the position parameters available at all times. ***PTZ***

13. The camera must be fitted with a physical wiper for the lens glass and must be activated from the VMS. ***Wiper***

14. The camera must be fitted with a voltage free contact or equivalent for the activation of the washer function as per Annexure 703B. This contact must be capable of being activated from the VMS. ***Washer***

15. Camera control must have programmable positional pre-set functionally for the full PTZ range with a minimum number of pre-set positions as specified in Annexure 703B. Operators must be able to set and recall all pre-set positions from the VMS as specified. ***PTZ Programming***

16. The camera lens must have a motorised zoom as per Annexure 703B with auto iris and position feedback and must meet the following minimum requirements: ***Zoom***

    (a) Maximum aperture number must be as specified in Annexure 703B. The auto iris in combination with the camera Automatic Gain Control must provide a minimum light adaption range as specified;

    (b) Focus range must be as specified in Annexure 703B;

    (c) Focus tracking must be such that the lens will not require focus adjustment for an object at infinity over the entire zoom range at all light

levels. There must be no visible distortion or lens artefacts to the image over the entire zoom range; and

(d) Both zoom and focus must be fitted with position feedback as specified in Annexure 703B.

703.10 WEB CAMERA REQUIREMENTS

1. Items 1 through 11 in section 703.09 apply to Web Cameras.

2. The Web Camera view direction must be adjustable by maintenance personnel on site. Refer Annexure 703B. ***View Direction***

3. The Web Camera is to have a multi stream function to enable the streaming of more than one video of differing image quality at the same time. Refer Annexure 703B. ***Multi Stream***

4. All broadcasted images and streams are to comply with the Western Australian Government Privacy Policies. People and number plates must not be identifiable. In practice, this is achieved by appropriately adjusting the camera field of view and resolution settings. ***Privacy***

703.11 CAMERA POLES AND HARDWARE

703.11.01 GENERAL

1. Poles and hardware must be designed and fabricated in accordance with AS/NZS 4677, AS 1170.2 and AS/NZS 4680. ***Standard***

2. Poles and hardware must be sealed to ensure that moisture or vermin cannot enter the column. ***Sealing***

3. Poles and hardware must be hot dip galvanised with coating thickness as specified in Annexure 703B and in accordance with AS/NZS 4680 and/or AS/NZS 4792. ***HDG***

4. The following camera poles are approved for installation and mounting of cameras provided they meet the requirements of this specification: ***Poles***

   (a) Tilt Pole;

   (b) Baseplate Mounted Combined CCTV Traffic Signal Pole; and

   (c) Direct Buried Combined CCTV Traffic Signal Pole.

5. Combined CCTV Traffic Signal Camera Poles must meet the applicable requirements in respect of the design and installation of traffic signalling. Refer Main Roads SPECIFICATION 712 TRAFFIC SIGNALS. ***Combined Poles***

6. Pole and extension arms must be load rated for camera gross weight as per Annexure 703B. ***Load Rating***

703.11.02 TAPERED TILT POLE REQUIREMENTS

1. Tilt Poles must be fit for purpose providing a solid and stable camera platform. The main use of this poles being on freeways and highways. ***Tilt Poles***

2. Tilt Poles must be approved for the specific location by a registered structural engineer based upon the Standard Drawings in Annexure 703A and to the design parameters in Annexure 703B. ***Structural Approval***

3. Tilt Poles must be capable of carrying a camera unit weight as specified in Annexure 703B. The tilt mechanism must provide for rotational balance to facilitate ease of maintenance access and minimum wear. ***Tilt Mechanism***

4. Tilt Poles must be supplied with a matching foundation, rag bolt assembly and associated fixing template. The top of the pole width must minimise wind-induced vibration, as per Annexure 703B. ***Foundation***

5. A lockable weatherproof door for access to electrical terminations must be provided in the base of the pole, with the dimensions and parameters specified in Annexure 703B. ***Access Door***

6. The pole base plate must allow conduits to enter the pole as specified in Annexure 703B. ***Base Plate***

7. Foundation bolts complete with two nuts and two flat washers per bolt must be provided in a single assembly. Spacing between the bolts must allow the passage of underground conduits considering the cable-bending radius. ***Foundation***

8. Fixing templates must be provided for each of the different assemblies to allow the correct orientation and placing of the assembly in the concrete foundation. The template must accurately reflect the shape of the pole base to ± 1 mm. The template must be made of strong waterproof material to prevent movement of the assembly during construction. ***Fixing Templates***

9. Deflection from wind loading with the camera must be as per Annexure 703B and AS/NZS 1163. ***Deflection***

703.11.03 BASEPLATE MOUNTED COMBINED CCTV TRAFFIC SIGNAL POLE

1. The column shaft and base must comply with Australian Standards and be of a grade and thickness determined in the Standard Drawings as listed in Annexure 703A. ***Baseplate Pole***

2. The construction of the column must be steel, square in shape with four equal sides, as per the Standard Drawings in Annexure 703A. ***Construction***

3. The general finish of all columns must be of a high quality with all holes and surfaces free from burrs and sharp edges to allow the installation, without damage, of electrical cables into the pole. The surface must be free of kinks, ripples and galvanising defects. ***General Finish***

4. Extension arms are permitted. ***Extension Arms***

703.11.04 DIRECT BURIED COMBINED CCTV TRAFFIC SIGNAL POLE

1. The Traffic Signal Pole must meet the required standards as per SPECIFICATION 712 TRAFFIC SIGNALS and as per the Standard Drawings in Annexure 703A. ***Standard***

2. The mounted signalling equipment on the Traffic Signal Pole must not exceed one three-aspect traffic signal lantern and one walk/don't walk signal as per the Standard Drawings in Annexure 703A. Site-specific conditions and target board orientation must be considered. ***Mounted Equipment***

3. A terminal box and terminal block assembly must be provided and installed. The terminal box must be heavy duty, vandal resistant and constructed as per Annexure 703B. ***Terminal Box***

4. The use of extension arms on existing standard height Traffic Signal Poles requires Main Roads approval. ***Extension Arms***

703.12 WATER SUPPLY EQUIPMENT FOR WASH FUNCTION

1. All Operational Cameras must be provided with a screen wash facility with a dedicated pre-set position complete with a washer nozzle. The cameras pre-set wash function must orientate the screen towards the nozzle's water jet. ***Washer***

2. The water reservoir volume must match that specified in Annexure 703B. ***Reservoir***

703.13 CAMERA COMMUNICATIONS

1. The roadside transmission system as per Annexure 703B must be used to transmit video and control data between the camera and the RNOC. ***Data***

2. The data transmission must provide for video, camera selection and control. ***Data Content***

3. All communication cables must be outdoor rated. ***Cables***

4. Full motion colour (during daylight hours) video must be transmitted to the RNOC as per Annexure 703B. ***Video***

5. Data cable must terminate at the ITS cabinet with connector as per Annexure 703B. ***Termination***

703.14 ITS CABINET

1. An ITS cabinet or traffic signal controller cabinet top extension shall be supplied to house the camera electronics. The ITS cabinet shall be a ground-mounted field cabinet containing the requisite control and communications equipment. ***Cabinet***

2. The ITS cabinet must be provided with a raised concrete plinth as specified in Annexure 703B. ***Plinth***

3. The ITS cabinet is to be shared with other proximate ITS assets where practicable. ***Sharing***

4. Doors must be fitted with internal stiffeners. ***Stiffeners***

5. Moisture absorbing gel packs of an appropriate size must be provided. ***Gel Packs***

6. ITS cabinets must have a three point locking mechanism on all doors and be lockable with a Main Roads 247 key as specified in Annexure 703B. If a Western Power meter is housed in the cabinet, the key must be dual ***Locks***

keyed, capable of being opened by both a standard Western Power key and Main Roads 247 key.

703.15 POWER SURGE AND LIGHTNING PROTECTION

1. All protection equipment must comply with AS/NZS 4262.1, AS/NZS 4262.2 and AS/NZS 1768. ***Protection***

2. All protection devices must have a visual indictor to determine their operating state. ***Indicator***

3. All protection devices must be DIN rail mountable inside the ITS cabinet. ***DIN***

703.16 FIVE AND TEN YEAR SPARE PARTS

1. A spare parts list with pricing must be provided with equipment tender as per code V05 of the model Asset Data Requirements List in Annexure 703C. The list must at least contain spare parts recommended to ensure five years of operation. A further option of additional spare parts for ten years of operation must also be provided. ***Spare Parts***

2. A commissioning spare parts list must also be provided after award as per code V06 of the model Asset Data Requirements List in Annexure 703C. ***Commissioning Spares***

703.17 – 703.25 NOT USED

CONSTRUCTION – CIVIL REQUIREMENTS

703.26 CONFLICT WITH OTHER SERVICES

1. Prior to the commencement of any work, the Contractor must verify the exact location of services and structures likely to be utilised, modified or in any way affected by the proposed installation. ***Conflict***

2. Excavation nearby other services must be undertaken in a manner that minimises the risk of damage e.g. hand digging or vacuum excavation. ***Excavation***

3. Damage caused by the activities of the Contractor must be rectified by the Contractor. ***Damage***

4. Utilisation of any existing services or structures for any purpose requires approval from Main Roads. ***Existing Services***

703.27 TRENCHING AND BACKFILL

1. When an excavation is necessary for the installation of cable pits and conduits, the trench must be backfilled with full surface reparation. ***Backfill***

2. The backfill must be compacted to match the surrounding soil density and graded to match surrounding surface level. The top 100 mm layer above the conduits must be clean sand. ***Compacting***

3. The Contractor must progress the works such that the length of open trench is kept to a minimum. No open trenches must be left unattended or accessible by the public. ***Open Trenches***

703.28 REINSTATEMENT AND CLEAN-UP

1. Disturbed pavement surfaces for non-motorised traffic such as concrete or brick paved areas and pathways must be reinstated to original condition and to the satisfaction of the Superintendent. ***Reinstatement***

703.29 ROAD AND RAIL CROSSINGS

1. Conduits requiring underground traversing of a road must be installed using directional drilling methods, unless otherwise approved by the Superintendent. ***Conduit***

2. Conduits requiring underground traversing of a rail line must require approval from the Public Transport Authority. ***Rail Conduit***

703.30 – 703.31 NOT USED

CONSTRUCTION – INSTALLATION REQUIREMENTS

703.32 GENERAL

703.32.01 NOTICES

1. The Contractor must lodge all notices required by the power supply authority and any other authority having jurisdiction over the installation, including the payment of any required fees. ***Notices***

703.32.02 PUBLIC SAFETY

1. Where necessary, control of traffic including pedestrians and cyclists must be undertaken by the Contractor in accordance with SPECIFICATION 202 TRAFFIC MANAGEMENT. ***Traffic Control***

703.32.03 VEGETATION CLEARING

1. Vegetation clearing must be undertaken in accordance with SPECIFICATION 301 VEGETATION CLEARING AND DEMOLITION. ***Vegetation***

703.32.04 LOCATIONS

1. Camera installation locations must be selected in accordance with this specification. ***Camera Locations***

2. The Contractor must undertake testing at each camera site using temporary facilities to test the operation, suitability of image and range of the camera in the nominated position (including at the proposed height) to accurately determine the final camera type, position, mounting equipment and final pole installation height details. The Superintendent will verify these details prior to the ordering of equipment. ***Testing***

3. Camera locations must consider occlusion from vegetation and other objects such as signs and existing structures to minimise visual obstructions. ***Visual Obstruction***

4. All CCTV camera poles and associated roadside equipment must be easily and safely accessible for maintenance purposes. Cameras are not to be ***Maintenance Access***

installed in rail reserves without specific approval from the Superintendent, in which case an access and maintenance approval plan is required.

5. CCTV Tilt Poles must be positioned such that they are break-back parallel to the road. ***Tilt Poles***

703.33 CAMERA INSTALLATION

1. Cameras must be mounted at a height nominated in the specific design documentation for the project within ± 10 mm. ***Height***

2. The field of view of each camera must be in accordance with what is agreed to by the Superintendent. ***Field of View***

3. Cameras may be mounted on an extension arm connected to the Baseplate Mounted Combined CCTV Traffic Signal Pole if the camera footprint and weight is such that the pole is still compliant with AS 1163. ***Extension Arm***

4. The installation of cameras in cyclone prone areas must adhere to cyclone installation requirements. ***Cyclones***

703.34 CAMERA POLE INSTALLATION

703.34.01 GENERAL

1. Assembly and installation of the columns must be in accordance with the manufacturer's instructions, excluding foundation bolts and all fixings, which must be hot dip galvanised steel. ***Pole***

2. Prior to the installation of the pole footing, the excavated hole must be presented to the Superintendent for approval to proceed. ***Footing***

3. All concrete must be minimum Class N32 in accordance with Main Roads SPECIFICATION 901 CONCRETE – GENERAL WORKS, as agreed with the Superintendent. ***Concrete***

4. Should the water table be such that the concrete cannot be placed in a dry hole, guidance from Main Roads must be sought. Hole liners or pre-cast foundations must not be used. ***Water Table***

5. All pole footings must be designed by a qualified and registered structural engineer to Australian Standards considering site-specific wind, soil, clearance and other environmental conditions. Soil compaction and testing must be in accordance with Main Roads SPECIFICATION 801 EXCAVATION AND BACKFILL FOR STRUCTURES. ***Structural Design***

6. Poles must be bolted truly vertical on its footing in accordance with the manufacturer’s instructions. ***Bolting***

7. Control instrumentation for the washer facility is to be mounted inside the ITS Cabinet. ***Instrumentation Location***

8. The reservoir and pump must be contained in a dedicated pit proximate to the camera pole and hardwired to the camera as per the Standard Drawings in Annexure 703A. ***Reservoir and Pump***

9. The washer nozzle must be mounted on the pole or camera adaptor as specified in the Standard Drawings in Annexure 703A. ***Washer Nozzle***

10. The installation of a Direct Buried or Baseplate Mounted Combined Traffic Signal Camera Pole must adhere to all applicable requirements in respect of the design and installation of traffic signalling. Refer Main Roads SPECIFICATION 712 TRAFFIC SIGNALS. ***Specification 712***

11. All infrastructure installed in high wind prone areas must adhere to the specific wind region requirements. Refer AS 1170.2. ***AS 1170***

703.34.02 TAPERED TILT POLE

1. Tilt poles must be installed to articulate in a direction parallel to the traffic that will not cause disturbance or danger to traffic, pedestrians and workers. ***Parallel***

2. Tilt poles must be balanced such that the break-back weight does not exceed 350 N. ***350 N***

703.34.03 BASEPLATE MOUNTED COMBINED CCTV TRAFFIC SIGNAL POLE

1. Extension arms may be installed atop a Baseplate Mounted Combined CCTV Traffic Signal Pole. Refer Standard Drawings in Annexure 703A. ***Extension Arm***

703.34.04 DIRECT BURIED COMBINED CCTV TRAFFIC SIGNAL POLE

1. If a Direct Buried Combined CCTV Traffic Signal Pole is used, refer Standard Drawings in Annexure 703A. ***Drawings***

2. **Extension arms atop of standard height Traffic Signal Poles require approval from Main Roads.** ***HOLD POINT***

703.35 ITS CABINET INSTALLATION

703.35.01 GENERAL

1. All traffic signal controller cabinet top extensions must be installed in accordance with Standard Drawings in Annexure 703A. ***Location***

2. Where practicable, cabinet doors must open away from traffic, such that service personnel do not have their back to traffic. ***Doors***

3. The ITS cabinet must be located at a safe distance from all services and trafficable infrastructure as per Main Roads Supplement to Austroads Guide to Road Design. ***Services Distance***

4. Where conduits enter the cabinet, vermin proof inserts must be provided. ***Vermin Pool***

5. ITS cabinets must be installed as per the design requirements and Standard Drawings in Annexure 703A. ***Drawings***

6. ITS cabinets requiring a meter box must be installed in the location outlined in the project specific design documentation. ***Meter Box***

703.35.02 POWER SURGE AND LIGHTING PROTECTION

1. All protection devices must connect to an approved earthing system, in accordance with AS/NZS 3000 and the manufacturer's recommendations. ***Earthing***

2. ITS cabinets must have a surge protection system in accordance with IEC 61643 and AS/NZS 1768. As a minimum, a Type 2 surge diverter must be installed directly downstream from the incoming mains switch as specified in Annexure 703B. Refer Standard Drawings in Annexure 703A. ***Type 2***

3. Hard-wired field devices, such as cameras must be connected via surge protection devices to protect internal equipment from downstream transients as specified in Annexure 703B. Refer Standard Drawings in Annexure 703A. ***Field Protection***

703.36 ELECTRICAL SUPPLY INSTALLATION

1. **Wherever practicable, the ITS cabinet must be powered by an electrical mains supply directly from a Main Roads lighting switchboard. Prior to installation the contractor shall obtain approval from the Superintendent. Evaluation of supply practicability must include:** ***HOLD POINT***

   (a) Distance from source;

   (b) Switchboard spare capacity;

   (c) Switchboard condition; and

   (d) Cost of installation.

2. ITS cabinets must have an always-on power source and not be powered via a dusk-dawn circuit. ***Always On***

3. Where an existing power supply is unavailable, arrangements must be made with Western Power or Horizon Power to provide a new consumer mains power supply. In such cases, a new electrical meter box adhering to Western Power's requirements must be required. ***New Supplies***

4. All downstream power from ITS cabinets must be reticulated underground. ***Underground***

703.37 CONDUIT AND PIT INSTALLATION

1. All conduits and pits installed for any CCTV sites must be supplied and installed in accordance with SPECIFICATION 704 – CABLE CONDUITS FOR INTELLIGENT TRANSPORT SYSTEMS (ITS). ***Specification 704***

2. One 100 mm orange conduit and one 100 mm white conduit must be installed between the ITS cabinet and respective ITS pits, as a minimum. Refer Standard Drawings in Annexure 703A. ***Conduit***

3. One 50 mm orange conduit and one 50 mm white conduit must be installed between the respective ITS power and communications pits and the washer pit at the base of the CCTV pole. Refer Standard Drawings in Annexure 703A. ***Conduit***

4. Conduits must be installed between the washer pit and the base of the pole as specified in the Standard Drawings in Annexure 703A. The following conduits must be installed as a minimum: ***Conduit***

   (a) One orange 50 mm conduit for power;

   (b) One white 50 mm conduit for communications; and

   (c) One white 32 mm conduit for water.

5. Spare conduits for future use must be installed. Refer Standard Drawings in Annexure 703A. ***Spare Conduit***

6. All conduits must be heavy duty PVC. ***PVC Conduit***

7. Conduits must have a bend radius of at least 320 mm and in accordance with AS/NZS 2053.1. ***Bend Radius***

8. All conduits must be installed such that water does not pool. ***Water Pooling***

9. All joined or unjoined cables in the pit must be taken over the conduit wedged into and across the top of the pit and securely fixed with a nylon cable tie. ***Conduit Fixing***

10. All cables must be clearly identified with permanent water resistant cable markers showing each outgoing cable from all cabinets and pits. ***Cable Markers***

11. Data and power cabling must be wired in accordance with cabling standard (AS/ACIF S009). ***Standard***

703.38 – 703.58 NOT USED

INSPECTION AND TESTING

703.59 GENERAL

1. The technological complexity of electrical and ITS equipment installed on Main Roads continues to increase, requiring rigorous and definitive inspection and testing of new works. The installed value of the equipment is also increasing, such that it is essential for Main Roads maintenance staff to have access to relevant design and manufacturer information to undertake maintenance, repair and life extension. ***Rationale***

2. Accordingly, the Contractor must undertake Testing and Commissioning in accordance with the Main Roads ITS Testing and Commissioning Guidelines. IOMs must also be prepared and provided in accordance with the Electrical and ITS Asset Drawing and Data Requirements (ADRL) Process. The documentation in respect of these processes is available on the Main Roads external website as referenced above. ***ADRL Process***

703.60 ASSET DATA REQUIREMENTS LIST

1. Main Roads has developed a comprehensive Asset Data Requirements List (ADRL) of all documentation, which can be expected to be provided for a standard CCTV installation. This list is included with this specification as Annexure 703C. ***ADRL***

703.61 CONTRACT DRAWING AND DATA LIST

1. The Contractor must use the model ADRL as the basis for their own job specific Contract Drawing and Data List (CDDL). This CDDL is to be submitted under code V01. The CDDL must include all proposed specific drawing and document titles and drawing numbers. The CDDL is to be agreed first and prior to the submission of any other documents, to ensure that the drawing and data expectations of the Superintendent and the Contractor are aligned. ***CDDL***

2. A CDDL format is included within the Electrical and ITS ADRL Procedure. ***CDDL Format***

703.62 DATASHEETS

1. The Contractor must submit the completed technical datasheets in Annexure 703B. This is to be submitted under ADRL codes E08 and IO3, as per Annexure 703C. The purpose of the datasheet is to identify at an early stage of manufacture any deviations from the specification. ***Datasheets***

703.63 INSPECTION AND TEST PLAN

1. The Contractor is expected to prepare a sample Inspection and Test Plan (ITP) to meet the requirements of the ITS Testing and Commissioning Guidelines. This sample ITP is to be submitted under ADRL code V02 as per Annexure 703C. ***ITP***

703.64 WORKS SCHEDULE

1. The Contractor is expected to prepare an engineering / procurement / fabrication schedule for the works. This schedule is to be submitted under ADRL code V04 as per Annexure 703C. The purpose of the schedule is to inform quality assurance and inspection activities by Main Roads. ***Schedule***

703.65 SPARE PARTS AND PRICING

1. The Contractor must provide a list of spare parts under ADRL code V05 as per Annexure 703C. ***Spare Parts***

703.66 TESTING AND COMMISSIONING COSTS

1. The Contractor must supply all labour, materials and equipment required to fully test and commission the installation. Testing must be carried out in the presence of the Superintendent.

2. Installation and/or equipment will be accepted only after satisfactory completion of commissioning tests. If a test is unsuccessful, the equipment must be repaired and re-erected as appropriate and subject to retest until successful. ***Costs***

3. The cost of any retesting if necessary must be borne by the Contractor. ***Failed Tests***

703.67 – 703.80 NOT USED

AS-BUILT AND HANDOVER REQUIREMENTS

703.81 DOCUMENTATION REQUIREMENTS

703.81.01 GENERAL

1. The Contractor must prepare an IOM under ADRL code V09 as per Annexure 703C. This manual is made up of all the other documentation codes of the ADRL. A Manufacturer's Data Report is also to be prepared under ADRL code V08 as per Annexure 703C. ***IOM***

2. The Contractor must supply Electrical and ITS Drawings conforming to the Main Roads Electrical and ITS Drawing Guidelines. These guidelines are available on the Main Roads external website under Buildings Roads, Standards and Technical, Electrical and ITS Engineering. ***Drawings***

703.81.02 STAGED REVIEW

1. The documentation included in the IOM is to have been individually reviewed at a time specified in the 'Wks from start' column of the ADRL. This staged process has the intention of identifying and resolving issues as early as possible in the design and fabrication process. The submittal of documentation should be staggered to avoid a "rush" of information at any one point in the process. ***Staged Review***

703.81.03 PROCESS DOCUMENTATION

1. The Contractor is to submit design drawings and documentation, for the purpose of staged reviews in accordance with: ***Documentation***

   (a) Electrical and ITS Asset Drawing and Data Requirements Policy; and

   (b) Electrical and ITS Asset Drawing and Data Requirements Procedure.

703.82 HANDOVER REQUIREMENTS

703.82.01 GENERAL

1. The Contractor is required to cooperate and participate in respect of Main Roads quality and compliance inspection processes. These processes are detailed in the: ***Handover***

   (a) Handover of Electrical and ITS Assets Policy; and

   (b) Handover of Electrical and ITS Assets Procedure.

2. The above process is available on the Main Roads external website as referenced above in section 703.2.

703.82.02 AGREEMENT OF INSPECTION CRITERIA AND FINDINGS

1. The Superintendent will undertake inspection according to prepared criteria, agreement of the Contractor that these criteria accurately represent obligations under the contract will be sought. The Contractor is required to make reasonable efforts to arrive at an agreed set of criteria. ***Agreement***

Main Roads reserves the right to proceed with inspection without agreement by the Contractor.

2. Main Roads will prepare findings of non-conformance against the criteria and seek agreement from the Contractor. The Contractor is required to make reasonable efforts to arrive at agreed findings. Main Roads reserves the right to issue findings without agreement by the Contractor. ***Findings***

703.82.03 DEVELOPMENT OF ACTION PLAN

1. The Contractor is required to develop an action plan to address non-conformances. The Contractor is expected to make reasonable efforts to arrive at agreement in respect of the plan with Main Roads. The Contractor is required to implement their action plan to address non-conformances. ***Action Plan***

703.83 – 703.90 NOT USED

CONTRACT SPECIFIC REQUIREMENTS

703.91 – 703.99 NOT USED

ANNEXURE 703A

MAIN ROADS STANDARD DRAWINGS

Drawing No.	Description
201948-3300	CCTV Schematic Diagram
201948-3301	CCTV Termination and Interconnection Diagram
201948-3302	CCTV Cabinet General Layout
201948-3303	CCTV Site Layout
201948-3304	12m CCTV Pole Installation Typical Details – Sheet 1
201948-3305	12m CCTV Pole Installation Typical Details – Sheet 2
201348-1599	Combined CCTV and Traffic Signal Pole Direct Buried
201231-0035-1	Combined CCTV and Traffic Pole Elevation and Sections - SHS Pole
201231-0054-1	Combined CCTV and Traffic Pole Details - SHS Pole
201948-3405	ITS Cabinet Typical Layout
201948-3406	ITS Cabinet General Arrangement
0648-3015	CCTV / VDS Cabinet – Standalone Site
9430-0506	Wind Speed Region and Terrain Category Chart

ANNEXURE 703B

EQUIPMENT DATASHEET

OPERATIONAL CAMERAS – SUBMIT UNDER ADRL CODE IO3

ITEM	DESCRIPTION	UNITS	DATA BY PURCHASER	DATA BY SUPPLIER
1.0	**Manufacturer's Details**			
1.1	Manufacturer's Name		Supplier	
1.2	Place of Manufacture		Supplier	
1.3	Camera Model		Supplier	
1.4	Camera Type		Digital Internet Protocol PTZ	
1.5	Image Stabilisation		Yes	
1.6	Maximum Camera Mass (Excluding when mounted on Direct Buried Combined Traffic Signal Pole)	kg	14	
2.0	**Camera Ratings**			
2.1	VMS Compatibility		FLIR 7.0	
2.2	Low Light Sensitivity		Minimum 0.02 Lux at 1/15 sec shutter speed	
2.3	Power Rating		Supplier	
2.4	Nominal Operating Frequency		Supplier	
2.5	Temperature Rating Minimum Range	ºC	-10 to 60	
2.6	Humidity Rating Minimum Range	%	10 to 90	
3.0	**Pan/Tilt**			
3.1	Minimum Upright Downcast Angle		80	
3.2	Minimum Upright Angle	º	20	
3.3	Pan Range	º	360	
3.4	Pan Setting Accuracy range	º	±1	
3.5	Position feedback to control system – Pan and Tilt Accuracy Range	º	±1	
3.6	Position feedback to control system – Zoom Accuracy Range	%	±3	
3.7	Minimum Pre-set Positions		8	
4.0	**Housing**			
4.1	Materials		Supplier – Aluminium or high grade plastic preferred	
4.2	Paint Finish		Supplier – Powder coat or baked enamel preferred	

ITEM	DESCRIPTION	UNITS	DATA BY PURCHASER	DATA BY SUPPLIER
4.3	IP Rating		IP 68	
4.4	Wiper		Yes	
4.5	Thermostat controlled heater		Yes	
5.0	**Imaging**			
5.1	Encoding Standard		ONVIF compatible	
5.2	Imager Chip Size	Inches	¼	
5.3	Imager Chip Type		CMOS	
5.4	Lens Zoom		24:1 optical	
5.5	Minimum Zoom Settings Available		8	
5.6	Maximum Aperture number		F1.2	
5.7	Minimum Focus Range	m	2 to Infinity	
5.8	Min Light Adaptation Range		10000:1	
5.9	Masking Feature		Supplier	
5.10	Frame Rate Range		Supplier	
5.11	Multi Stream		Supplier	
6.0	**Communication**			
6.1	Communication Type		IP/Ethernet at EIA/TIA568A standard	
6.2	Video Transmission		UDP Protocol	
6.3	Data Connector		RJ45	
6.4	Wash Activation		Voltage free contact or equivalent	

WEB CAMERAS – SUBMIT UNDER ADRL CODE IO3

ITEM	DESCRIPTION	UNITS	DATA BY PURCHASER	DATA BY SUPPLIER
1.0	**Manufacturer's Details**			
1.1	Manufacturer's Name		Supplier	
1.2	Place of Manufacture		Supplier	
1.3	Camera Model		Supplier	
1.4	Camera Type		Digital Internet Protocol	
1.5	Image Stabilisation		Yes	
1.6	Maximum Camera Mass	kg	14	
2.0	**Camera Ratings**			
2.1	VMS Compatibility		FLIR 7.0	
2.2	Low Light Sensitivity		Minimum 0.02 Lux at 1/15 sec shutter speed	
2.3	Power Rating		Supplier	
2.4	Nominal Operating Frequency		Supplier	
2.5	Temperature Rating Minimum Range	ºC	-10 to 60	

ITEM	DESCRIPTION	UNITS	DATA BY PURCHASER	DATA BY SUPPLIER
2.6	Humidity Rating Minimum Range	%	10 to 90	
3.0	**Pan/Tilt**			
3.1	Minimum Downcast Angle		Manually adjustable	
3.2	Minimum Upcast Angle		Manually adjustable	
3.3	Pan Range		Manually adjustable	
3.4	Position Feedback (PTZ)		Manually adjustable	
4.0	**Housing**			
4.1	Materials		Supplier – Aluminium or high grade plastic preferred	
4.2	Paint Finish		Supplier – Powder coat or baked enamel preferred	
4.3	IP Rating		IP68	
4.4	Wiper		NA	
4.5	Thermostat Controlled Heater		NA	
5.0	**Imaging**			
5.1	Encoding Standard		ONVIF compatible	
5.2	Imager Chip Size		¼ inch	
5.3	Imager Chip Type		CMOS	
5.4	Lens Zoom		NA	
5.5	Maximum Aperture Number		F1.2	
5.6	Minimum Focus Range	m	2 to Infinity	
5.7	Minimum Light Adaptation Range		10000:1	
5.8	Multi Stream		Low and High Resolution Format	
5.9	Masking Feature			
5.10	Frame Rate Range		Supplier	
6.0	**Communication**			
6.1	Communication Type		IP/Ethernet at EIA/TIA568A standard	
6.2	Video Transmission		UDP	
6.3	Data Connector		RJ45	
6.4	Auto White Balancing		Yes	

TAPERED TILT POLES – SUBMIT UNDER ADRL CODE M

ITEM	DESCRIPTION	UNITS	DATA BY PURCHASER	DATA BY SUPPLIER
1.0	**Manufacturer's Details**			
1.1	Manufacturer's Name		Supplier	
1.2	Place of Manufacture		Supplier	
1.3	Pole Model		Supplier	
2.0	**Materials**			

ITEM	DESCRIPTION	UNITS	DATA BY PURCHASER	DATA BY SUPPLIER
2.1	Fastenings		Hot dip galvanised steel	
2.2	Pole Materials		Hot dip galvanised steel	
2.3	Pole Cross section		Tapered Octagonal	
2.4	Minimum Pole Top Width	mm	150	
2.5	Door Hatch Dimensions	mm	125 x 500	
2.6	Door Hatch Position Above Pole Base	mm	500	
2.7	Door Hatch IP Rating		IP43	
2.8	Padlock Key		Main Roads CCTV secure key	
2.9	Galvanised Minimum Coating Thickness	µm	100	
3.0	**Lock Box**			
3.1	Dimensions	mm	130 wide x 100 height x 75 depth	
3.2	Position	mm	Opening to be 100 above base of lock	
3.3	Thickness (Galvanised Steel Preferred)	mm	4	
4.0	**Base Openings**			
4.1	Plastic Conduit Opening	mm	2x50	
4.2	Minimum Bend Radius	mm	250	
5.0	**Design Parameters**			
5.1	Design Life	years	50	
5.2	AS 1170 Parts 1 and 2	Y/N	Yes	
5.3	Wind Loading Deflection		0.1 degrees for 28m/s wind speed to AS1163	

BASEPLATE MOUNTED COMBINED CCTV TRAFFIC SIGNAL CAMERA POLE – SUBMIT UNDER ADRL CODE M

ITEM	DESCRIPTION	UNITS	DATA BY PURCHASER	DATA BY SUPPLIER
1.0	**Manufacturer's Details**			
1.1	Manufacturer's Name		Supplier	
1.2	Place of Manufacture		Supplier	
1.3	Pole Model		Supplier	
2.0	**Materials**			
2.1	Fastenings		As per Drawing 201231-0035-1	
2.2	Pole Materials		As per Drawing 201231-0035-1	
2.3	Pole Cross Section		As per Drawing 201231-0035-1	
2.4	Pole Cross Dimensions		As per Drawing 201231-0035-1	
2.6	Galvanised Coating Thickness		100 micron	

ITEM	DESCRIPTION	UNITS	DATA BY PURCHASER	DATA BY SUPPLIER
2.7	Corrosion Protection		Bottom 400mm (Nap-gard advised)	
3.0	**Terminal Box**			
3.1	Thickness		As per Drawing 201231-0035-1	
4.0	**Base Openings**			
4.1	Plastic Conduit Opening	mm	As per Drawing 201231-0035-1	
4.2	Minimum Bend Radius	mm	250	
5.0	**Design Parameters**			
5.1	Design Life	years	50	
5.2	AS 1170 Parts 1 and 2	Y/N	Yes	

DIRECT BURIED COMBINED CCTV TRAFFIC SIGNAL POLE – SUBMIT UNDER ADRL CODE M

ITEM	DESCRIPTION	UNITS	DATA BY PURCHASER	DATA BY SUPPLIER
1.0	**Manufacturer's Details**			
1.1	Manufacturer's Name		Supplier	
1.2	Place of Manufacture		Supplier	
1.3	Pole Model		Supplier	
2.0	**Materials**			
2.1	Fastenings		As per Drawing 201348-1599	
2.2	Pole Materials		As per Drawing 201348-1599	
2.3	Pole Cross Section		As per Drawing 201348-1599	
2.4	Maximum Camera Mass	kg	10	
2.5	Galvanised Coating Thickness	µm	100	
3.0	**Terminal Box**			
3.1	Thickness (Marine Grade Aluminium Preferred)	mm	2	
4.0	**Design Parameters**			
4.1	Design Life	years	50	
4.2	AS 1170 Parts 1 and 2	Y/N	Yes	

WASHER UNIT REQUIREMENTS – SUBMIT UNDER ADRL CODE IO3

ITEM	DESCRIPTION	UNITS	DATA BY PURCHASER	DATA BY SUPPLIER
1.0	**Manufacturer's Details**			
1.1	Manufacturer's Name		Supplier	
1.2	Place of Manufacture		Supplier	
1.3	Pump Model		Supplier	
2.0	**Materials**			
2.1	Storage Capacity Minimum	L	5	

ITS CABINET – SUBMIT UNDER ADRL CODE E08

ITEM	DESCRIPTION	UNITS	DATA BY PURCHASER	DATA BY SUPPLIER
1.0	**ITS Cabinet**			
1.1	Meter Box	Y/N	When required	
1.2	Keys		Main Roads 247 key or Dual keyed when required	
1.3	Downstream Power Reticulation		Underground	
1.4	Protection Device Mounting		DIN rail	
1.5	Concrete Plinth	mm	>100mm	
2.0	**Type Surge Diverter**			
2.1	Manufacturer		Supplier	
2.2	Visual Indicator		Yes	
2.3	Volt Free Contact		Yes	
2.4	Surge Diverter Max Discharge Current Rating at 8/20µs	kA	Supplier	
2.5	High Rupturing Capacity Backup Fuse Rating	A	Supplier	

ANNEXURE 703C

MODEL ASSET DATA REQUIREMENTS LIST

D18#1119807

ASSET DATA REQUIREMENTS LIST - ADRL
Electrical and Intelligent Transport Systems

EQUIPMENT DESCRIPTION :	CLOSED CIRCUIT TELEVISION	Rev:	0
ADRL No :		Date:	21/08/2019

ADRL Code	DESCRIPTION	TENDER	MRWA REVIEW		MRWA EAM REVIEW	FINAL	INCLUDE IN:	AS CONSTRUCTED required
		No. of copies	No. of copies	Wks from start	required	No. of copies		
V	**Management / Execution Documents**							
V01	Contract Drawing & Data List (CDDL)	1	1			1E,1P	IOM	
V02	Inspection And Test Plans (ITPs) - Sample only for Tender	1	1			1E,1P	MDR	
V03	Non Conformance Reports		1			1E,1P	MDR	
V04	Engineering / Procurement / Fabrication Schedule	1				1E,1P	MDR	
V05	Spare Parts with Pricing	1				1E,1P	IOM	
V06	Commissioning Spare Parts List		1			1E,1P	IOM	
V07	Manufacturer's Data Report (MDR) Index/IOM Index		1			1E,1P		
V08	Manufacturer's Data Report (MDR) (Note 1)					1E,1P		
V09	Installation, Operation and Maintenance Manual (IOM) (Note 2)					1E,1P		
V10	Completed Annexure B Datasheet - Data by Supplier		1	1	1	1E,1P	MDR	
M	**Mechanical**							
M01	Equipment List		1			1E,1P	IOM	
M08	Weights and COG		1			1E,1P	IOM	
M9	Foundation Details & Loading Data		1			1E,1P	IOM	
E	**Electrical**							
E01	Electrical Equipment List	1				1E,1P	IOM	
E02	Power Consumption List		1			1E,1P	IOM	
E03	Electrical Wiring Diagram	1				1E,1P	IOM	
E04	Electrical Schematics		1			1E,1P	IOM	
E05	Electrical Layout Drawings		1			1E,1P	IOM	
E06	Cable Interconnection Diagrams		1			1E,1P	IOM	
E08	Electrical Data Sheets & Curves		1			1E,1P	IOM	
E09	Cable Schedules		1			1E,1P	IOM	
E10	Outline / General Arrangement Drawings	1				1E,1P	IOM	
E11	Electrical Calculations		1			1E,1P	MDR	
E12	Nameplate Details		1			1E,1P	MDR	
I	**Intelligent Transport Systems - Instrumentation and Controls**							
I01	Instrument Index		1			1E,1P	IOM	
I02	Calibration Sheets		1			1E,1P	IOM	
I03	Data Sheets		1			1E,1P	IOM	
I04	Logic Diagrams		1			1E,1P	IOM	
I05	I/O Schedule		1			1E,1P	IOM	
I06	Interconnection Diagrams		1			1E,1P	IOM	
I07	Cable Schedule		1			1E,1P	IOM	
I08	Outline / General Arrangement Drawings		1			1E,1P	IOM	
I09	Control Panel Termination Diagrams		1			1E,1P	IOM	
I10	Control Panel - Internal and External Layout		1			1E,1P	IOM	
I11	Control Panel Wiring Diagram		1			1E,1P	IOM	
I12	Cable block Diagrams		1			1E,1P	IOM	
I13	Calculations		1			1E,1P	MDR	
F	**Supplier Fabrication Procedures**							
F06	Paint & Surface Preparation Procedure		1			1E,1P	MDR	
P	**Supplier Inspection / Test / Procedures (Note 3)**							
P01	Inspection and Test Record (ITR) Procedures		1			1E,1P	IOM	
P02	Factory Acceptance Testing Procedures (FAT)		1			1E,1P	IOM	
P03	Pre-Installation Testing Procedures (PIT)		1			1E,1P	IOM	
P04	Installation Acceptance Testing Procedures (IAT)		1			1E,1P	IOM	
P05	Site Acceptance Testing Procedures (SAT)		1			1E,1P	IOM	
P06	Network Integration Testing Procedures (NIT)		1			1E,1P	IOM	
P07	System Integration Acceptance Testing Procedures (SIAT)		1			1E,1P	IOM	
P08	Final System Testing Procedures (FST)		1			1E,1P	IOM	
T	**Supplier Test / Inspection Reports / Records**							
T01	Mechanical Inspection and Test Records (ITRs)		1			1E,1P	MDR	
T02	Instrument Inspection and Test Records (ITRs)		1			1E,1P	MDR	
T03	Electrical Inspection and Test Records (ITRs)		1			1E,1P	MDR	
T04	Civil / Structural Inspection and Test Records (ITRs)		1			1E,1P	MDR	
T05	Factory Acceptance Testing Report (FAT)		1			1E,1P	MDR	
C	**Material / Supplier Certificates**							
C01	Certificates of Compliance		1			1E,1P	MDR	
	EQUIPMENT DESCRIPTION : CLOSED CIRCUIT TELEVISION							
	ADRL No : 0							

REVISION HISTORY

Rev	Description	Prepared by	Date	Approved by	Date
0	CCTV Specification 703	Andrew Martin	21/08/2019	Andrew Martin	21/08/2019

Notes:

1. MDR documents due 2 weeks after delivery
2. IOM documents due 4 weeks before delivery
3. PIT is to replicate the onsite installation and operation prior to the installation. IAT is to confirm that the equipment has been installed and to correct installation errors.
   SAT is to verify the operation of the ITS equipment and devices in their installed state. NIT is to verify the operation of ITS equipment connected to the TCS network.
   SIAT is to verify the end-to-end system integration and operations of the device. FST is to verify the end-to-end delivery from device to control system (STREAMS).
   Refer to the MRWA ITS Testing and Commissioning Guidelines D17#362799 for more detailed information.

GUIDANCE NOTES

FOR REFERENCE ONLY – DELETE GUIDANCE NOTES FROM FINAL DOCUMENT

1. All edits to this Specification are to be made using track changes, to clearly show added/ deleted text.

2. If **all** information relating to a clause is deleted, the clause number should be retained and the words **"NOT USED"** should be inserted.

3. The proposed document with tracked changes must be submitted to the Project Manager for review, prior to finalising the document.

4. Once the Project Manager's review is complete, accept all changes in the document, turn off track changes and refresh the Table of Contents.

5. The Custodian of this specification is the Principal Electrical Standards Engineer.

CONTRACT SPECIFIC REQUIREMENTS

The following clauses are to be placed under the CONTRACT SPECIFIC REQUIREMENTS, as required. After inserting the clause, change the clause number and heading to style “H2 SP” so it appears in the Table of Contents.

XXX.XX SUB HEADING (H2 SP)

1. Insert text (Main Table SP) ***Keyword SP***

2. Insert text (Main Table SP)

XXX.XX SUB HEADING (H2 SP)

1. Insert text (Main Table SP)

2. Insert text (Main Table SP)

AMENDMENT CHECKLIST

Specification No. **703** Title: **CLOSED CIRCUIT TELEVISION (CCTV) CAMERAS** Revision No: _____

Project Manager: _____ Signature: _____ Date: _____

Checked by: _____ Signature: _____ Date: _____

Contract No: _____ Contract Name: _____

ITEM	DESCRIPTION	SIGN OFF
Note: All changes/amendments must be shown in tracked changes until approved.		
1.	Project Manager has reviewed the Specification and identified additions and amendments.	
2.	Standard clauses amended? **MUST SEEK** approval from Manager Contracts and Commercial Management.	
3.	Any unlisted materials/products proposed and approved by the Project Manager? If "Yes" provide details at 16.	
4.	Deleted clauses shown as **"NOT USED"**.	
5.	Ensure appropriate **INSPECTION AND TESTING** parameters are included in Specification 201 (test methods, minimum testing frequencies verified).	
6.	**AS-BUILT AND HANDOVER** requirements addressed.	
7.	**CONTRACT SPECIFIC REQUIREMENTS** addressed? Contract specific materials, products, clauses added? (refer Specification Guidance Notes).	
8.	**ANNEXURES** completed (refer Specification Guidance Notes).	
9.	Estimates Manager has approved changes to **SMM**.	
10.	Project Manager certifies completed Specification reflects intent of the design.	
11.	Independent verification of completed Specification arranged by Project Manager.	
12.	Project Manager's review completed.	
13.	**SPECIFICATION GUIDANCE NOTES** deleted.	
14.	**TABLE OF CONTENTS** updated.	
15.	**FOOTER** updated with Document No., Contract No. and Contract Name.	
16.	Supporting information prepared and submitted to Project Manager.	
Additional information or further action:		

Signed: _____ *(Project Manager)* Date: _____