**PART R67**

**IMAGING EQUIPMENT**

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**1. GENERAL**

This Part specifies the requirements for the supply of imaging Equipment for ITS Applications associated with the Traffic Management Systems. It also specifies installation requirements for Contracts that include installation of the Equipment. This Part must be read in conjunction with Part R60 “General Requirements for the Supply of ITS Equipment” and if installation forms part of this Contract, Part R61 “Installation of ITS Equipment”.

Documents referenced in this Part are listed below:

|  |  |
| --- | --- |
| AS 3000 | Electrical Installations (also referred to as the “Wiring Rules”) |
| AS 3085.1 | Telecommunications installations - Administration of communications cabling systems - Basic requirement  |
| AS 9001 | Quality Management Systems – Requirements |

Equipment supplied under this Contract must comply with applicable Australian Standards, or where no appropriate Australian Standard exists, the Equipment must comply with the appropriate British Standard.

The telecommunications Equipment must comply with relevant Australian Communications Authority technical standards and requirements. Equipment requiring connection to telephone lines must be Austel approved and be labelled with the appropriate approval number. All radio communications must comply with the requirements of the Australian Department of Communications.

**“Imaging Equipment**” means the lens, camera, housing, Pan-Tilt unit, mounts, pole, field cabinet, transmitters, receivers, associated cabling and any other Equipment and works necessary to operate as intended;

**“Electrical Legislation”** means the Electricity Act 1994 and associated Amendments and Regulations and Electrical Safety Act 2002 and associated Amendments, Regulations and Codes of Practice;

**“Image Quality”** means parameters of image information, such as resolution, colour, contrast and image refresh rate.

**“TMC”** means the Principal’s Traffic Management Centre at Norwood, South Australia.

Note: a reference in this Part to a clause in Part R60 “Supply of ITS Equipment” is indicated by “R60.” preceding the clause number.

**2. QUALITY REQUIREMENTS**

The Contractor must prepare and implement a Quality Plan that includes or annexes the following documentation:

1. Acceptance Test Plans (refer Clause R60.13 “Testing and Acceptance”), which provides full details of all tests necessary;
2. Routine maintenance recommendations;
3. Training Plan (refer Clause R60.15 “Training”);
4. Spare part requirements;
5. manufacturer’s specifications (catalogue extracts) of all major components detailing ratings and performance characteristics; and
6. all layout, fabrication, interconnection and assembly drawings and diagrams necessary for this contract.

Where STREAMS compatibility has been specified, the Contractor must provide evidence of this compatibility in accordance with Clause R60.6 “STREAMS”.

The Contractor must provide samples for acceptance in accordance with Clause R60.3 “Equipment Requirements”.

If not submitted beforehand, the samples and documentation required by this Clause must be submitted at least 28 days prior to the commencement of site work or placing an order for Equipment.

Provision of the documentation and samples listed in this Clause shall constitute a **HOLD POINT**.

The Equipment must be manufactured under a quality system certified to AS 9001.

**3.** **EQUIPMENT REQUIREMENTS**

**3.1** **Colour Camera**

Cameras must be colour and must conform to the CCIR standard of 625 lines interlaced, 50 frames per second with a composite PAL video signal output of 1 Volt peak to peak, negative sync. The semiconductor imagery must be of the CCD type with the imagery chip having a minimum active area of 6.1 mm (1/3 inch) diagonal.

The lens mount must be a standard C mount and include a CS lens adaptor. Sensitivity must be better than 2 lux scene illumination at F1.2 for a useable picture that is un-enhanced by averaging techniques and 6 lux for a picture signal of -6db. The camera must operate with a supply voltage of 24 Volts AC ± 10%.

**3.2** **Lens**

Lenses must be a motorised zoom type with a minimum zoom ratio of 10:1 with auto iris and position feedback. Focus tracking must be such that the lens will not require focus adjustment for an object at infinity (>10m) over the entire 10:1 zoom range. The lens mount must be suitable for attachment to the video cameras described above.

Maximum aperture must be at least F1.2 with a focus range of 1.2 metres to infinity. The motorised zoom and auto-iris must operate from 12 Volts DC ± 10%.

**3.3** **Camera Housing**

Each camera must be enclosed in a weatherproof housing to provide protection from driving rain, moisture and dust. The housing, including a sunscreen, must be corrosion resistant in construction, with baked enamel or equivalent finish. Coatings and fittings must tolerate exposure to salt atmosphere and motor vehicle fumes.

**3.4** **Pan-Tilt Unit**

The camera housing must be mounted on a pan tilt unit. This unit must be capable of continuously panning the camera assembly a minimum of 350 degrees in the horizontal plane. It must also be capable of continuously tilting in the vertical plane between +20 degrees and -90 degrees to horizontal.

**3.5 Camera Pole**

The camera pole must be a hinged type standard column of appropriate height and stability to provide clear and stable pictures from the sites. The pole must be of galvanised welded steel construction, tapered with a round or polygonal section of smooth appearance. The pole must be base plate mounted and be suitable for mounting on a rag bolt assembly in a concrete footing or equivalent. If the pole is of a height that a standard column is not available, the pole must be designed in accordance with Clause R61.7 “Design of Support Structures”.

**3.6 Field Cabinets**

Weatherproof field cabinets must be supplied for each camera site to house the camera control, video transmission Equipment and power supply. The field cabinets must comply with Part R60 “Field Cabinets”.

**3.7 Camera Controls**

Closed Circuit Television (CCTV) cameras must have control facilities for pan, tilt, zoom and focus that are compatible with the CCTV control network in the TMC current at the time of the provision of the CCTV cameras.

**3.8 Lightning Protection**

Each camera, lens and housing assembly must be suitably protected from damage from transients induced by lightning strikes.

**4. OPERATIONAL REQUIREMENTS**

**4.1 Functional Requirements**

The imaging Equipment must be used as part of an overall Traffic Management System (TMS). In accordance with the project specific requirements, the imaging Equipment must allow TMC staff to:

1. detect, verify and manage incidents and other congestion;
2. monitor and control the imaging Equipment from the TMC, and/or other nominated location(s);
3. monitor pedestrian and/or cycleway activities;
4. monitor operation of Heavy Vehicle Management System, including security at the associated interception sites.

**4.2 Performance Requirements**

**General**

Images must be captured, transmitted and displayed at the highest quality and refresh rate permitted by capacity of the Principal’s telecommunications network and the imaging Equipment. The video and control signals associated with a particular camera must be transmitted digitally over the same telecommunications channel. Non-vendor specific video compression may be used. Images must be transmitted to the TMC, and other sites as specified in the Contract.

Digital imaging technology may be used throughout the entire image data chain, including the camera and displays. However, the imaging Equipment, and images provided by this Equipment must be interoperable with the imaging display and control systems being utilised by the Principal, current at the time of the provision of the Equipment. In addition, imaging Equipment must utilise proven, industry-standards that are current at the time of the provision of the Equipment.

The video images from the field cameras must be either real time or slow scan as determined by the communication system used to each camera site. End-to-end image compression / decompression must retain the maximum image quality to ensure that the functional requirements are met. The image quality and resolution displayed at the TMC must satisfy the identification requirements as specified below:

**Image Data Rate**

Where the image will be transmitted entirely by fibre, the transmitted image must be refreshed with at least 25 frames per second at maximum camera resolution over the full dynamic ranges of the camera. Where the image will be transmitted other than entirely by fibre, the transmitted image must be refreshed with at least four (4) frames per second at minimum CIF resolution over the full dynamic ranges of the camera.

Where reduced bandwidth conditions occur due to failure and/or degradation of the normal (primary) image transmission channel, the image quality must automatically throttle back to retain maximum image quality as allowed by the reduced channel bandwidth. The absolute minimum image quality parameters acceptable over a reduced bandwidth (secondary) transmission channel must be least four (4) frames per second at minimum CIF resolution using the full dynamic ranges of the camera. Upon resumption of normal (primary) transmission channel bandwidth, the image quality must automatically return to normal image quality.

**Type “P” (Pedestrian) Applications**

At all points in the area(s) nominated in the Contract, the entire body of a person approximately 1.8m tall must occupy at least 240 vertical pixels of the uncompressed image captured by the camera. Human characteristics such as hair, skin and clothing colour (during daylight hours), and bodily appearance, sufficient to make positive identification at locations nominated in the Contract in all lighting conditions. The decompressed image at the TMC must display the same person with at least 240 vertical pixels when shown at 100% of image size.

**Type “V” (Vehicle) Applications**

At all points between CCTV camera installation sites, an entire small passenger sedan vehicle must occupy at least 25 vertical pixels (approximately 60mm per vertical pixel) of the uncompressed image captured by the camera. Vehicle characteristics such as colour (during daylight hours) and shape must be easily discernable at all points between CCTV camera installation sites in all lighting conditions. The decompressed image at the TMC must display the same vehicle with at least 25 vertical pixels when shown at 100% of image size.

**CCTV Control System**

The effect of commands issued by the operator in the TMC must be observed by the operator within 200msec.

**4.3 Power Supply**

Mains Power must be supplied in accordance with Part R62 “Mains Power”. The Contractor must provide hardwired step-down power supplies for the imaging Equipment. Where multiple cameras are connected to a single field cabinet, separate hardwired step-down power supplies must be provided for the imaging Equipment associated with each camera.

**5. TELECOMMUNICATIONS REQUIREMENTS**

Where necessary, the Contractor must act as the Principal’s agent in arranging for connection of a public telecommunications service to the site in the name of the Principal. Within 14 days of a written request, the Principal will provide relevant details to enable the Contractor to complete the forms required by the public telecommunications service provider.

Temporary connections to a public telecommunications service must be in the name of the Contractor.

Provision for telecommunications lines must be provided in accordance with the requirements of ACIF and AS3085.1. Telecommunication cables must comply with Part R70 “Telecommunications Cabling”.

**6. HOLD POINTS**

The following is a summary of Hold Points referenced in this Part:

|  |  |  |
| --- | --- | --- |
| **CLAUSE REF.** | **HOLD POINT** | **RESPONSE TIME** |
| 2 | Quality Plan | 7 days |
| 2 | Evidence of STREAMS compatibility | 7 days |
| 2 | Samples for acceptance | 7 days |

**7. VERIFICATION REQUIREMENTS AND RECORDS**

The Contractor must supply the following records:

| **CLAUSE REF.** | **SUBJECT** | **RECORD TO BE PROVIDED** |
| --- | --- | --- |
| R60.11 | Manuals | Operation and maintenance manual(s) |
| R60.12 | Warranty | Manufacturer’s Warranty |
| R60.13 | Testing and commissioning | Factory Acceptance Test (FAT) Records |
| R60.14 | System documentation | “As Built” documentation |
| R61.6 | Testing and commissioning (where the Contract includes installation) | Site Acceptance Test (SAT) and System Integration Acceptance Test (SIAT) Records - refer Part R61 “Installation of ITS Equipment”. |

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