
TII492 Intelligent Transport Systems (ITS) - Equipment Supply and Installation Framework - Generation 2 - Lot 2

Volume A: Works Requirements

**Part 3: Technical Specifications
Section 11: CCTV**

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1. Introduction

1.1 General

This specification defines the requirements for the supply, installation, testing and commissioning of new CCTV cameras for monitoring and management of the motorway network.

The Contractor shall design, supply and install CCTV cameras in accordance with this specification at the locations detailed in Volume A – Part 2: Works Specification.

The document outlines the following for the CCTV camera display equipment:

- Scope of Works;
- CCTV Requirements;
- Design Requirements;
- Supply Requirements;
- Install Requirements.

1.2 Scope of Works

The scope of works includes but is not limited to the following:

- The Contractor shall design all CCTV camera equipment in accordance with the requirements of this specification.
- The Contractor shall supply and install all CCTV camera equipment including all necessary mounting bracketry, power connections and communications interfaces in accordance with the requirements of this specification.
- The Contractor shall support the integration of the CCTV camera equipment with the Associated Services, in accordance with the requirements of this specification.
- The Contractor shall undertake all testing and commissioning of all CCTV camera equipment in accordance with the requirements of this specification as well as Volume A - Part 4: Testing and Commissioning Specification.

2. CCTV Requirements

2.1 General Requirements

The Contractor shall supply, install, test and commission all CCTV camera equipment, mounting arrangements and power supply equipment.

All CCTV cameras and associated equipment supplied as part of the Works shall be Internet Protocol (IP) Camera types that receive control data and send image data via an IP network.

The Contractor shall supply and install CCTV cameras and equipment in compliance the requirements of this specification.

The Contractor shall supply and install all interfaces and elements installed as part of the Works in compliance with current Industry Standards for IP CCTV.

All equipment shall comply with the requirements of relevant European Directives and Irish legislation, in particular those related to Product Liability, Safety, Electromagnetic Compatibility, Waste Management and Restrictions on the use of Hazardous Substances, current at the Contract Date.

All equipment shall be designed, manufactured, installed, tested and commissioned in accordance with the latest versions and amendments of all relevant Irish and/or European Standards, Regulations, Rules, Codes of Practice, Guides Legislation and Directives.

National and international codes and standards shall be those published by the NSAI, BSI, CENELEC, IEC and ISO. Where there is a conflict between standards, standards shall take precedence in the following order: Irish and/or European. Where there is a conflict between ETCl and IET rules and regulations, ETCl regulations shall take precedence.

The Contractor shall carry out all Works in accordance with a recognised Quality Assurance procedure of relevance to this type of work, ISO 9001:2015/Amd1:2024 or equivalent.

The Contractor shall carry out all Works in accordance with the Safety Health and Welfare at Work Act 2021 and any other Acts, Orders, Regulations and Codes of Practice relating to Health and Safety.

The Contractor shall carry out all Works in compliance with the recommendations and requirements set out in the current edition of the following:

- DN-STR-03018 Design of Support Structures for Roadside Furniture plus relevant TII publications (standards);
- CC-GSW-01300 - Notes for Guidance on the Specification for Road Lighting Columns and CCTV Masts;
- CC-SPW-01300 - Specification for Road Lighting Columns and CCTV Masts;
- Environmental Tests for Motorway Communications Equipment and Portable and Permanent Road Traffic Control Equipment TR2130;
- Safety, Health and Welfare at Work (Construction) Regulations, 2021;
- Safety, Health and Welfare at Work (General Application) Regulations, 20237
- All appropriate European Union (EU) Health and Safety legislation;
- EU Waste Electrical and Electronic Equipment Regulations, 2014; and
- All publications as detailed within these requirements.

All parts of the CCTV camera equipment shall be designed and manufactured in a modular fashion to facilitate simple maintenance and enhancement activities.

All equipment supplied shall have a design life of not less than 15 years within the motorway environment. The supplier shall provide warranties ensuring that spares will be available for a period of 10 years from the date of purchase. The supplier shall provide any technical support required.

All equipment supplied shall have a Mean Time Between Failure (MTBF) in excess of 50,000 hours (where a failure is defined to be any equipment failure, which leads to the loss of any control, viewing, recording and all other elements).

The supplier shall provide warranties ensuring that spares will be available for a period of 10 years from the date of purchase.

The Contractor shall provide a warranty of 1 year following substantial completion of the works. As part of this warranty, the Contractor shall agree to repair or replace all equipment that are found to be faulting in the warranty period. The Contractor shall provide technical support to the ITS Maintenance Contractor during the warranty period.

2.2 Design

The Contractor shall ensure compliance with all the requirements of this chapter.

2.2.1 CCTV Camera

2.2.1.1 Functional Requirements

The camera lens shall feature a range from 1/1.9" to 1/4" or better, progressive scan Complementary Metal-Oxide Semiconductor (CMOS) image sensor.

The camera shall be capable of:

- Automatically controlling the iris level of the fitted lens;
- Automatic gain control;
- Back-light compensation; and
- Providing video motion detection.
- Blanking certain parts of the image

The camera and/or the outstation shall include (and allow for the installation of 3rd party) video analytics capability as well as setting rules and filters. The rules and filters shall include but not be limited to:

- Stopped vehicle;
- Direction of traffic;
- Speed of vehicles;
- Detection of unauthorised vehicles; and
- Traffic count.

The rules and filters shall be linked to the dedicated pre-set zones (when the camera is at pre-set positions) within the camera outstation.

The camera shall have the ability for rules and templates to be set locally (on-site) as well as via remote access (back office).

System configuration and programming shall be accessed remotely and locally at each camera outstation.

The camera outstation shall generate Open Network Video Interface Forum (ONVIF) alarms that details the issues from a pre-set filter as detailed in in this Part.

The ONVIF alarms shall be sent to the AFMS to allow prioritisation of workflow for Video Management System.

Manual control of the camera across pre-set areas shall not activate any rules or filters while under manual control.

The camera shall have an Electronic Image Stabilisation (EIS) feature.

The EIS shall allow the operator to easily direct the camera to where the operator wants to view without causing any noticeable distortion to the video being streamed.

The Contractor shall ensure that camera lens is compatible with the camera and suitably sized.

The Contractor shall ensure that the camera lens is capable of the correct focal operation in all light conditions.

The camera lens coating shall not cause any optical problems which create either glare on high or low-pressure sodium lighting or coloured surrounds to high-pressure sodium lighting.

The camera lens shall feature motorised zoom capable of control by the camera.

The camera lens shall feature laser focus or auto-iris operation capable of control by the camera.

The camera lens shall feature a maximum aperture ratio (F-Stop) F1.4 or better.

The camera shall transmit images in digital form. The camera shall have the capability of video compression H.264 (MPEG-4 Part 10/AVC) Baseline, Main and High Profiles Motion JPEG.

The camera shall alert the operator with the location and reference of the camera in case of any tampering with the camera.

2.2.1.2 Performance Requirements

The minimum camera resolution quality shall be HDTV 1080p.

The camera shall allow the resolution quality to be set lower than HDTV 1080p if required, to minimise bandwidth requirements.

The camera shall be capable of capturing images at configurable frame rate with a minimum of 25 frames per second (fps) in all lighting conditions.

The camera shall be capable of operating in low light conditions with Minimum Scene Illumination of:

- Colour: 0.15/0.2 lux at 30/50 IRE, F1.6 or 0.15/0.2 lux at 30/50 IRE, F1.4 or better
- Black and White: 0.01/0.02 lux at 30/50 IRE, F1.6 or 0.03/0.04 lux at 30/50 IRE, F1.4 or better

The camera shall be capable of zoom functionality 30x optical, 12x digital, total 360x zoom or better.

The camera shall be capable of capturing an image of an HGV from a distance 500 metres, and displaying it as a minimum 10% of the full screen size.

The camera lens fitted to the camera shall produce an image of sufficient quality to allow the operator to be able to identify individual vehicle colour and type in the daylight at a distance of 500 metres from the installed camera location.

The camera shall meet all performance requirements of this specification, particularly in high contrast situations such as in artificial lighting at night and low light conditions associated with the outdoor, specifically the motorway environment, where there is light pollution from road lights and / or headlamps.

2.2.2 Pan Tilt Unit

2.2.2.1 Functional Requirements

The control unit shall store a minimum 50 programmable Pan Tilt Unit "Pre-set" positions.

The control unit shall be capable of automatic setting of the Pan Tilt Unit to "Pre-set" positions.

2.2.2.2 Performance Requirements

The Pan Tilt unit shall be maintenance free with a reasonable acceleration providing up to 0.1° – 30° per second pan speed.

The Pan Tilt unit shall feature minimum backlash with continuous rotation of the camera housing.

The Pan Tilt unit shall feature a panning range of +/-360° and Tilting Range of +90° to -90° or more.

The Pan Tilt motor shall be classed as heavy duty.

The Pan Tilt unit shall repeatedly achieve a precise position, to within 0.5° (degrees) of accuracy when automatically setting the "Pre-set" positions.

The Pan Tilt unit variable speed control and the braking mechanism shall not produce any discernible judder when the speed is reduced from maximum to a smooth and graduated stop, under either manual or automatic control.

2.2.3 Enclosure & Ventilation

2.2.3.1 Functional Requirements

Camera wash units shall not be required.

All cameras, enclosures and mounting hardware and other equipment visible from ground level shall be finished in Grey 18B21 BS4800 (non-reflective) to achieve the required design life and/or reduce solar gain.

All external equipment enclosures shall be compliant with Category IP 65 of BS EN 60529 as a minimum to protect the internal components from rain, ice, dust and corrosion.

The enclosure shall not be visible within the any part of the camera viewing area.

The enclosure glass window shall not cause any optical distortion when exposed to any external light source. The camera and enclosure shall be thermostatically controlled with an appropriate heater and humidifier. The Contractor shall provide a sun hood/visor to reduce the effects of sun glare.

2.2.4 Brackets

2.2.4.1 Functional Requirements

In accordance with Clause 1537.1AR of Volume A - Part 2: Works Specification, the Contractor shall carry out a dimensional survey of the existing gantries and mounting infrastructure. The Contractor shall utilise dimensional information in the development of the mounting arrangement solution to mount onto the existing infrastructure.

The Contractor shall design, supply and fix all suitable brackets and fixings, taking into account maximum supported load, wind factor and the height at which the equipment is required to operate.

The Contractor shall submit their proposed design 20 working days in advance of installation to the Employers Representative for review.

The brackets shall be designed to minimise deflection of the camera during high winds of 120km/h ensuring the video image from the camera to be without vibration or jitter.

The brackets shall be protected against environmental degradation by being galvanised and painted.

All mountings, bolts, screws and any other fixing hardware shall be galvanised to EN ISO 1461:2022.

All parts shall be manufactured from suitable non-corrodible material.

2.2.5 Power

2.2.5.1 Functional Requirements

The cameras shall be powered through a Power over Ethernet (PoE) port or a PoE+ port.

Where a camera is powered by a bespoke camera power and communication unit it shall be connected via a composite cable.

The Contractor shall also refer to the Volume A – Part 3 – Section 14: Power Supplies Specification for the power requirements for details on electrical cabling.

2.2.6 Communications

2.2.6.1 Functional Requirements

The cameras shall be ONVIF Profile S compliant.

The cameras shall use the ONVIF protocol for communications with the MOCC Video Management System.

The cameras shall include an RJ45 communications port to connect to the fibre communication or point to multi-point wireless network (via a Media Convertor and copper cable).

Where a composite cable is required to connect the camera to the power and communication unit within the ITS cabinet the cable shall be pre-made with an IP68 12 way connector at the camera end and the other (power and communication unit) end shall have all the cables stripped and tinned ready to be connected to the connectors.

The Contractor shall also refer to Volume A - Part 3 - Section 15: Telecommunication Specification.

3. Supply

The Contractor shall supply all equipment new and manufactured from new components.

The Contractor shall supply and install shock and vibration interface camera mounts to ensure that they are not affected by the vibration and wind caused by the motorway environment.

The Contractor shall supply all the materials, software and services necessary to install all CCTV camera equipment that comply with the functional requirements of this specification.

The Contractor shall supply all brackets and fixtures required to mount the CCTV camera equipment onto camera mounting structures.

The Contractor shall supply all CCTV cameras from one manufacturer to allow interchange if a camera fails.

4. Install

4.1 Location

The Contactor shall install the CCTV cameras on CCTV poles and/or gantries as listed in Volume A: Part 2 Works Specifications.

The Contractor is responsible for ensuring that all CCTV can be mounted to the existing CCTV poles prior to the placement of any orders.

The Contractor shall install the CCTV cameras on the central reservation side of the cantilever gantries unless otherwise advised by the Employer's Representative.

The Contractor shall align all CCTV to meet all the functional and performance requirements specified in this specification.

The Contractor shall submit all drawings detailing the positions and configuration of each CCTV site 20 working days in advance of installation to the Employer's Representative for review.

For full span (portal) gantries the Contractor shall install the camera over the central reserve part of the Gantry.

All in-station equipment shall be located in the MOCC.

4.2 Mounting Requirements

All mounting brackets and arrangements shall be designed in accordance with DN-STR-03018 (NRA BD 94) - Design of Support Structures for Roadside Furniture.

The CCTV camera brackets shall be installed in accordance with the manufacturer instructions.

The CCTV camera brackets (if there is any) shall be installed in a manner that access and maintenance (including the replacement of cameras) is not restricted.

The CCTV camera shall be installed on CCTV poles and structures provided by others; the CCTV shall be mounted via standard PTZ camera fixing with 4 hole equip-spaced on 101.6PCD bracket.

All equipment shall be securely fixed in place eliminating the opportunity for tools or equipment to fall to the roadside below.

All bolts, with the exception of high strength friction-grip bolts, shall have locking nuts to prevent loosening by vibration.

Brackets and mounting structures used shall be designed to take into account the maximum supported load, wind factor and the height at which equipment is required to operate.

There shall be no drilling or welding on any part of the gantry structure or CCTV pole.

The mounting arrangements for the CCTV camera equipment shall provide protection against bi-metallic corrosion at the contact points with the gantry structure or CCTV pole.

4.3 Co-ordination

The Contractor shall participate in collaboration meetings with the MOCC operator to agree all matters to support the programming of works, joint responsibilities and the successful testing and commissioning of all CCTV camera equipment.

As the Contractor shall install CCTV camera equipment on existing gantries and cantilever structures and poles. The Contractor shall liaise with the structures' designer to confirm the mounting arrangements for each CCTV camera equipment.

4.4 Integration

The Contractor shall integrate all CCTV camera equipment with NIMS, AFMS and any other Associated Services as directed by the Employer's Representative.

The CCTV camera equipment shall integrate into the existing CCTV matrix housed in the MOCC.

All IP elements of the CCTV camera equipment shall have the facility to be monitored by an existing SNMP Monitoring Application.

The Contractor shall ensure that CCTV camera fault reporting is reported to the AFMS via Employer's existing SolarWind application.

The camera outstation shall have an internal clock and shall use Network Time Protocol (NTP) protocol to synchronise the time and date with the NIMS.

The camera shall be able to report the following faults, but not limited to:

- Power Failure
- Fan Operations
- Temperature Limits
- Opening of Unit
- Mechanical PTZ Failure
- Data Storage
- Lens Fault

4.5 Communications & Power

The Contractor shall install, test and commission the CCTV cameras, communications and power-supply equipment.

The Contractor shall refer Volume A – Part 3 – Section 14: Telecommunication Specification for communication requirements, and Volume A – Part 3 – Section 13 - Power Supplies.

4.6 Testing & Commissioning

The Contractor shall test and commission all CCTV camera equipment in accordance with the requirements of Volume A - Part 4: Testing and Commissioning Specification.