



*Project Managers
Chartered Civil, Structural
& Building Services Engineers*

CAHIR DIGITAL HUB



A.5.1.2 ELECTRICAL SITE SPECIFIC SPECIFICATION

TENDER ISSUE

21ME006

March 2026

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1 GENERAL

1.1 Introduction

The particular specification provides site specific details of particularly important areas of the design. It is to be read in conjunction with the data sheets at the end of this specification, the general specification, the drawings and all other contract documentation. Any apparent contradictions between tender documentation should be queried with the Employer's representative during the tender process. In the case where a contradiction is not highlighted it will be at the discretion of the Employer's Representative to decide which document takes precedence. In the case of all standards outlined in this and other contract documentation it is to be taken that the latest version or superseding standard is the relevant standard. (The precedence of information as defined within the Contract will still stand on all other matters.)

Labelling of all electrical plant will be as per the General Technical Specification.

Where any services pass through a fire wall or fire compartment a fire barrier is to be provided. All installations must ensure that the integrity of any fire-rated constructions remain intact. Fire barriers are to be provided where any services pass through a walls or enclosure.

1.2 Scope Of Works

The scope of the work is the refurbishment of an existing protected building in Cahir, Co Tipperary and comprise:

I. Main Electrical:

There will be a new ESB supply to the building.

II. Distribution:

Cables and wiring will be distributed in cable trays, cable trucking, and wire mesh trays.

III. General Services:

General power services will be outlets in DADO trunking, flush mounted and surface mounted outlets. Outlets will be a combination of switched, unswitched, single and double outlets installed on either wall, ceilings or ceiling voids.

IV. Lighting:

All light fittings will be LED type.

Light fittings will be a combination of down lighters, suspended linear fittings, in-ground site lighting and emergency fittings.

V. Access Control and CCTV:

An access control system comprising of card readers, keypads, magnetic locks, exit buttons and break glass units will be installed with the associated control gear and PC. The CCTV system will comprise of internal and external cameras with the associated recording and control equipment.

VI. Fire Alarm System:

The fire alarm system will comprise of smoke detectors, heat detectors, manual call points, AOV call points, door hold open units, disabled refuge call points, Aspirating Smoke Detector and fire panel.

VII. Hearing Services:

Induction loop system will be installed at reception.

1.3 Mock – Up's

The contractor shall work out the routes and positions of all cable runs and equipment for the approval of the building services engineer and these shall be agreed before any work has commenced. Only in cases where exact dimensions are shown on the drawings shall the contractor position the equipment shown without consultation with the building services engineer. In all other cases exact locations for equipment shall be agreed with the building services engineer prior to installation. Where this exercise is not implemented no variation will be granted for changing the location of equipment's or supplies to same. The contractor shall layout his/her equipment in a manner which allows easy replacement or duplication. He/she shall provide all builder's work details of the equipment which he is supplying including requirements for open's, floor ducts, roof supports and information on plinths as required. The contractor shall provide full builders work drawings in 1:100 scale for general layouts, and 1:20 scale for smaller area layouts, elevations and sections, of his section of the services installation. The contractor shall allow for routing services around building members namely columns, beams etc. which form part of the structure. Prior to the installation of any internal services, the contractor will provide a mock-up section of the main distribution route to a minimum length of 3 metres to include all of the following elements in co-ordination with mechanical services:

- Electrical services trunking and tray
- Any electrical items to be fitted to services trunking and tray (e.g. sensors, detectors, etc.).

The contractor shall also provide a full set of Working Drawings detailing out his exact positioning of services prior to commencement of his work on site. The working drawings shall contain but not limited to the following information;

- Reflected ceiling plans coordinated with the mechanical contractor
- Dimensions of all plant items
- Setting out of all plant items
- Dimensions of all switch boards
- Setting out and levels of all cable trays and containment routes
- Sections through the building at complicated/congested interfaces of services

Working drawings are to be submitted to the Engineer for approval.

1.4 Specialist Contractor Design

Any items that are not explicitly designed by the design team are the remit of the contractor. These items include but are not limited to:

- Temporary Pipework, Temporary Wiring, temporary supports.
- Temporary Builders Work.

These works are the specialist contractor's responsibility to design and will be covered under the contractors P.I. insurance but must be presented in good time for design team approval before works are carried out.

1.5 Phasing and temporary Works

The Contractor shall refer to the architects phasing / hoarding plan drawings for the proposed phasing of the works. These works will take place over a number of phased construction stages. Tie-ins to existing infrastructure must be sensitive to the operational requirements of the existing building and any shut-downs to existing services to facilitate tie-ins should be allowed for out of hours and in a rapid manner. Method statements will be required for approval by the design team in good time before the works are carried out for any tie-in works or shut-downs. Phasing details and programme are contained within the main contract documents, and should be read in conjunction with the M&E documents. No variations will be accepted for lack of contractor co-ordination. Phasing details and programme are contained within the main contract documents, and should be read in conjunction with the M&E documents. No variations will be accepted for lack of contractor co-ordination. The contractor shall provide for all associated builders work for tie-ins to the existing building including the removal and reinstallation of existing ceilings tiles / ceilings.

Contractors should refer to the Architect's details regarding programme of phasing of the works.

1.6 Co-Ordination Drawings and Method Statements

The electrical contractor shall comply with all current health and safety legislation. The contractor shall provide method statements for all tie-ins or works which interact with the live building and submit to the client's design team and engineering representatives for approval prior to commencement of any works on site. As part of the works the Electrical Contractor, in conjunction with all other Building Services' Contractors, shall issue co-ordinated working drawings for the building services to be installed prior to any work taking place. A co-ordinated opes drawing is to be provided through co-ordination of the main contractor and sub-contractors.

The drawings shall be co-ordinated with all aspects of the building, i.e. fabric, external and internal features and furniture and fittings etc. In particular, the position of service entry positions and box-outs shall be fully detailed and co-ordinated.

1.7 Printing of Documents

The M&E Consultant will print the contract documents for signing in A4 specification and A3 drawing format. The M&E consultant will issue all construction documentation including drawings in soft copy format only (PDF and DWF) and all required hard copies will be printed by the contractor. A single set of up to date A4 M&E specifications and A1 M&E drawings will be maintained on site by the contractor for the design team's use. A separate set of up to date A4 M&E specifications and A1 M&E drawings will be maintained on site by the contractor for the Clerk of Work's use.

1.8 Submittals and Samples

The electrical sub-contractor will provide submittals sheets for all elements of the electrical installation. The initial submittal package will include all items in a single submittal for ease of assessment. Submittals shall have the relevant technical information presented in a proper datasheet with the specific product highlighted. Evidence of CE Marking, warranties and triple E register compliance will be provided where applicable. Following approval of submittals by the M&E consultant all visible elements of the installation will be provided on a samples board on site for the M&E consultant and Architect to review. Following this review of samples final design team approval is issued.

1.9 BC(A)R 2014 Building Control (Amendment) Regulations:

The electrical specialist is to allow in full for the compliance with all statutory obligations under the Building Control (Amendment) Regulations BC(A)R, S.1.9 of 2014, including all revisions thereafter.

1.10 Materials

Materials shall be selected and all building elements designed to ensure that the building and all components are durable and low maintenance and do not present a hazard to the health and safety of the users. In accordance with Part D of the Building Regulations all works shall be carried out with proper materials and in a workmanlike manner. "Proper materials" means materials which are fit for the use for which they are intended and for the conditions in which they are to be used, and includes materials which:

- Bear a CE Marking in accordance with the provisions of the Construction Products Regulation;
- Comply with an appropriate harmonised standard or European Technical Assessment in accordance with the provisions of the Construction Products Regulation;

Or

- Comply with an appropriate Irish Standard or Irish Agreement Certificate or with an alternative national technical specification of any State which is a contracting party to the Agreement on the European Economic Area, which provides in use an equivalent level of safety and suitability.
- Products manufactured in the UK which do not have an Agreement cert or Certificate of Compliance from an EU notified body are not acceptable.

The Irish notified bodies are:

Body type	Name ▲	Country ▲
› NB 0050	National Standards Authority of Ireland (NSAI)	Ireland
› NB 0709	Legal Metrology Service, National Standards Authority of Ireland	Ireland
› NB 1595	Compliance Engineering Ireland Ltd	Ireland
› NB 2777	satra Technology Europe Ltd	Ireland
› NB 2805	Safenet Certification Services Ltd	Ireland
› NB 2809	FM Approvals Europe Limited	Ireland
› TAB	FM Approvals Europe Limited	Ireland
› NB 2810	HPI Verification Services (Ireland) Ltd	Ireland
› NB 2819	OMNI Assured Certification International Ltd.	Ireland
› RTPO	Vertigo Inspection (ROI) Ltd t/a Irish Engineering Services	Ireland
› NB 2820	Vertigo Inspection (ROI) Ltd t/a Irish Engineering Services	Ireland
› NB 2831	BRE Global Assurance (Ireland) Ltd	Ireland
› NB 2833	Hartford Steam Boiler Ireland Ltd	Ireland
› NB 2834	CCQS Certification Services Limited	Ireland
› NB 2839	Cranage Veritas Limited	Ireland
› NB 2845	CTI-CEM International Ltd	Ireland
› NB 2851	BASEC Conformity Limited	Ireland
› NB 2874	CATG Certification Limited	Ireland
› TAB	BRE Global Assurance (Ireland) Ltd.	Ireland
› RTPO	Metlab Limited	Ireland
› TAB	National Standards Authority of Ireland	Ireland
› RTPO	WQ-iC Ltd	Ireland

2 GENERAL SCOPE OF WORKS

- **Site Services** as indicated on the site services layout.
- **Sub Distribution Boards** comprising purpose-built equipment as specified elsewhere.
- **Sub Mains Cables** shall comprise cabling and proper support systems as specified elsewhere.
- **General Services Power Installation** shall comprise wiring to twin and single 13A outlets, cooker outlets and switched spur outlets as indicated on the power and general services layouts.
- **Removal**, making safe and disposal of existing electrical services and equipment as necessary.
- **Alteration**, expansion and connections to existing services.
- **Temporary** supplies as required.
- **All works** associated with the continued operation of the existing building including permanent & temporary power, Fire alarm and security services links as construction programme dictates.
- **Power Wiring of Miscellaneous Items** shall comprise the power wiring to items as noted.
- **Conduit**, Trunking and Cable Tray Installations shall be installed indicated on the drawings and as described below.
- **Wiring of Mechanical Services** shall comprise the wiring of burners, pumps, fans, speed controllers thermostats etc. as shown on the drawings and supplied by the mechanical contractor.
- **Internal Lighting** comprising wiring and fittings as shown and in compliance with general notes with regard to the lighting installation.
- **External Lighting** comprising wiring and fittings as indicated on the drawings and as described elsewhere.
- **Emergency Lighting** comprising wiring and fittings as indicated on the drawings and as described elsewhere.
- **Full Information and Communication Technology** installation comprising full supply and installation as indicated on the drawings.
- **Telephone System** shall comprise of installation of all wiring for phone systems
- **Fire Alarms** comprising supply & installation of smoke and heat detectors, break glass units, sounders, interfaces, fire alarm repeater panels and door hold open devices.
- **Disabled Persons Assistance** Required Alarm as indicated on the drawings and described below.
- **Maintenance Manuals** & record drawings as outlined.
- **Programme of Work** shall be according to the main contractor's programme.
- **Storage of Goods and Plant** facilities shall be provided by the contractor.
- **Brackets to support** all services shall be as described elsewhere.
- **Commissioning** of all plant shall be provided as specified.
- **All Systems**, fire alarm, security, access control etc. to be OPEN PROTOCOL

3 SITE SERVICES

3.1 Power

A new supply and metering will be installed.

3.2 Site Lighting

There are a number of in-ground fittings to be installed as per site drawings.

4 POWER

4.1 Main Distribution

A new main distribution board is to be provided in the building. This board will feed sub-boards.

4.2 Local Sub-distribution and Final Circuit Distribution

Sub-distribution boards shall have load break isolators with MCCB sub section breakers for lighting and power services to allow separate metering. Separate metering connected to the BMS is to be provided on the lighting and power sections of each sub-board. Construction will be 'Form 2B' metal clad type MCB cubicles fitted with standard metal 8mm triangular locks. The zones where final circuits will be fed by individual Main and sub-distribution boards are outlined in the electrical zoning drawing.

Both general services and lighting circuits will be provided with MCB and RCD protection. MCB's will be provided with suitable type:

Type	Instantaneous Trip Current	Application
B	5 x IN	Resistive Loads
C	10 x IN	Discharge Lighting, Small Motors etc,
D	20 x IN	Large Inductive Loads, Large Motors, Welding Plant etc,

All RCBO's are to be Type B.

4.3 General Services

Standards & Regulations:

IS10101 National Rules for Electrical Installations

General:

The requirements for each area are shown in the drawings.

20 Amp Radial circuits will be used for socket circuits with a maximum of 4No. Double-sockets per circuit. These 20 Amp radial circuits will be fed from sub-distribution boards in 4mm² XL/LSZH cable (increase to 6mm² where distance necessitates). A CPC shall be installed as per the requirement in IS10101 and connected to the main earth bar in the distribution board. Circuits will be enclosed in galvanised steel conduit and/or trunking. All circuits will be individually protected by MCBs with 30mA RCD protection. All cabling must have a minimum classification of C_{CA}, s1b, d1, a1, according to EN 13501–6.

4.4 Mechanical Plant and Controls Wiring

Wiring, in terms of power and control, will be provided for all mechanical services and mechanically operated items being installed or re-wired under this contract. Co-ordination to ensure all such items are wired and will function correctly is the responsibility of the contractor.

The contractor shall include for all the electrical work associated with the wiring of the mechanical services installation. Location of plant and equipment requiring electrical supplies are as shown on the drawings. However, the electrical contractor shall also refer to the mechanical drawings for reference to identify any points not listed on the electrical drawings. Equipment to be wired by the electrical contractor and supplied by the mechanical contractor include: heat pumps, pressure & circulation pumps, fans, heat recovery units, air conditioner units, fire smoke dampers, speed controllers and other equipment shown on the drawings. The contractor shall wire all the above equipment to diagrams provided by the mechanical contractor.

The contractor shall include for testing and commissioning the mechanical services installation. The contractor shall also include for client tuition on operation and maintenance aspects of electrical control circuits associated with the mechanical services equipment.

Schedule of Motors & Controls are:

Plantroom Schedule of Motors & Controls are but not limited to:

- Main Motor Control Centre: Door interlocked mains isolator and fuses.
- Circulation Pumps: Fuses, contactor, overloads, time setting from hand/off/auto switch, remote outside frost detector (common to all pumps) overriding time setting and heat dissipation thermostat and remote room stat.
 - Frost stats.
 - Weather Compensation.

- BMS Controller Unit.
- Any other controls deemed necessary by the manufacturer.
- All fans, AC units and HRV has a link to the BMS for fault monitoring and indication and enabling during fire conditions.

All equipment shall be wired to a numbered terminal block. A drawing of the unit shall be provided clearly indicating the function of each terminal. All wiring to equipment within the boiler house shall be carried out with high temperature cables in conduits with flexibles where necessary. All functions, lights, switches etc. shall have engraved labels as described in the General Specification. A large label shall be provided on the front of the control panel with the following wording "DO NOT ISOLATE SUPPLIES TO MECHANICAL SERVICES". Frost protection systems will always be maintained regardless of the settings on any other of the panels.

Automatic heating controls shall be supplied and installed by the mechanical contractor and wired by the electrical contractor on the following circuits:

- Weather compensation sets, serving the boiler house complete with external air temperature sensors and internal flow temperature sensors controlling three-port mixing valves on separate heating circuits served via individual room thermostats.
- First stage frost protection via external thermostats controlling circulation pumps and overriding time clock settings.
- Heat dissipation thermostat controlling circulation pumps.
- Second stage frost protection - low return water immersion thermostats controlling burners and overriding time clock settings.

All automatic controls shall be supplied and installed by the mechanical contractor and wired by the electrical contractor.

4.5 Power Wiring of Miscellaneous Items

The contractor shall provide and install a power supply to the fire alarm panel and security system panel, access-controlled doors, Fire Smoke Damper system as indicated on the M&E drawings.

4.6 Earthing and Bonding

Earthing is to be provided to the parameters of the NSAI National Rules for Electrical Installations in order to mitigate the danger caused by:

- All types of electrical faults
- Atmospheric discharges.
- Accumulation of static charges.

Earthing connections shall be provided in a manner that is neat, visible and aesthetically acceptable.

All connections shall be labelled as per IS10101 requirements with metallic tags. Where bonding conductors are not visible due to other fixtures eg where they are behind IPS panels, they shall be inspected before the panel is closed and an adhesive label confirming that they have been inspected is to be affixed in an unobtrusive location in close proximity eg under the sink.

The earthing and bonding installation shall be installed such that there is no probability of galvanic corrosion occurring due to dissimilar metals being in contact.

5 LIGHTING SERVICES

5.1 General Lighting

The lighting installation is to be efficient, easily maintainable and aesthetically pleasing, while providing for a high-quality working environment.

The lighting design is based on EN12464 Lighting of Workplaces: Part 1 Indoor Workplaces and CIBSE Lighting Guides.

The lighting installation is shown on the lighting layout drawings. Luminaires and lamp requirements are outlined in the lighting datasheets.

In the corridors and common areas full DALI controls are required. Indicative sensor locations are shown on the drawings but final locations will be agreed with the appointed lighting controls specialist supplier.

Manual dimming controls are to be provided in certain rooms as indicated on the drawings.

In ancillary rooms switching will be either be manual or by ceiling mounted presence sensor, as indicated on the Drawings.

All luminaires to be LED and are to be listed on SEAI's Triple E Register or shall comply with the Register's criteria. For luminaires not listed the contractor will be expected to provide the supporting documentation as would be required for submission to the Register.

Separate LED emergency lighting shall be installed as per the drawings and in accordance with the current version of I.S. 3217.

All lighting circuits will be fed from the indicated sub-distribution boards with final connections made in heat-resistant cable to each light fitting.

5.2 Lighting Control Strategies

In the corridors, the DALI controls shall be set to maintain an average illuminance of 200 lux during the day. Times and dimming levels shall be agreed with the Client before commissioning. Switching between day and night modes shall be automatic. A Hand/Off/Auto switch is to be provided for the main reception.

Ancillary rooms shall have manual or automatic switching in the form of ceiling mounted PIR/Daylight sensors. Off-Delay times and illuminance levels shall be as directed by the Engineer.

The Contractor is to provide a Commissioning Certificate confirming for each space that the controls have been commissioned and indicating the settings for each parameter.

5.3 Emergency Lighting Installation

• General

The contractor shall supply, install and commission a Central Testing Unit (CTU) emergency lighting system in accordance with the following standards:

- IS 3217 – Emergency Lighting
- BS EN 50172 – Emergency Escape Lighting Systems
- IEC 62034 – Automatic Test Systems
- BS EN 60598-2-22 – Luminaires for Emergency Lighting

The emergency lighting system shall consist of self-contained LED emergency luminaires and exit signs connected to a Central Testing Unit which will automatically manage testing, monitoring and reporting of the system.

The CTU shall automatically carry out functional and duration testing of all connected emergency luminaires in accordance with the above standards without the need for manual intervention.

All test results and fault conditions shall be indicated on the Central Testing Unit display panel and stored in the system log.

• Central Testing Unit (CTU)

A Central Testing Unit shall be provided to automatically control the testing and monitoring of all emergency luminaires and exit signs connected to the system.

The CTU shall provide the following functions:

- Automatic monthly functional tests
- Automatic annual full duration tests
- Local manual test initiation
- Fault monitoring and indication
- Event logging of test results and faults
- Local display of system status

The CTU shall continuously monitor communication with all connected emergency luminaires and shall indicate any loss of communication as a fault condition.

The CTU shall be installed in a readily accessible location, typically within the main electrical services room or adjacent to the main distribution board.

The system shall be capable of identifying individual luminaires or groups of luminaires to assist with maintenance and fault finding.

- **Emergency Luminaires**

Emergency luminaires shall be self-contained LED type with integral battery packs suitable for 3-hour emergency operation.

The luminaires shall be compatible with the specified CTU system to allow automatic testing and monitoring.

Emergency luminaires shall include:

- Non-maintained fittings for general escape route lighting
- Maintained exit signs where required

Each luminaire shall:

- Automatically report status to the CTU
- Indicate local status via a bi-colour LED indicator where appropriate
- Be capable of participating in automatic functional and duration testing

All emergency luminaires shall achieve the illumination levels required by IS 3217.

- **Emergency Exit Signs**

Emergency exit signs shall:

- Be LED illuminated
- Be maintained type
- Provide a minimum 3-hour emergency duration
- Comply with BS EN 1838 and IS 3217

All exit signs shall be compatible with the CTU system for automatic testing and monitoring.

- **Cabling**

Emergency lighting wiring shall comply with IS 10101 and IS 3217.

Cabling shall be:

- LSZH
- CPR rated minimum CCA s1b d1 a1
- Installed in accordance with the manufacturer's requirements

Control wiring between the CTU and emergency luminaires shall be installed in accordance with the manufacturer's system requirements.

All emergency lighting circuits shall be clearly identified and segregated from standard lighting circuits.

- **System Testing**

The CTU shall automatically carry out the following tests:

Test Type	Frequency
Functional test	Monthly
Full duration test	Annually

Test schedules shall comply with the requirements of **IS 3217** and **BS EN 50172**.

The CTU shall store test results and fault conditions for review by maintenance personnel.

- **Commissioning**

The emergency lighting system shall be commissioned in accordance with IS 3217 and the manufacturer's recommendations.

Commissioning shall include:

- Verification of luminaire addressing or identification
- Confirmation of communication between luminaires and CTU
- Functional testing of all emergency luminaires
- Verification of emergency duration

A commissioning certificate shall be provided as part of the handover documentation.

- **Operation and Maintenance Documentation**

The contractor shall provide the following documentation at handover:

- Emergency lighting system drawings
- Luminaire schedule
- CTU operating instructions
- Test records and commissioning certificates
- Maintenance instructions

6 COMMUNICATION SERVICES

6.1 Information Communication Technology

Category 6a Foil-shielded Twisted Pair (FTP) (ISO 11801 – Class E) /Class EA, ISO 11801 (fast Ethernet) system will be supplied for all rooms as indicated on the Drawings in accordance with the document National HSE Structural Cabling Systems, latest version

All data cabinets must be 47U 800x1000mm floor standing units.

Power and ICT connections to the comms room cabinet will include the following. 2x10 way power blocks shall be provided, one connected to the mains supply and one to the UPS. A 3kVA 30 minute rack mounted UPS is to be provided for each cabinet.

Active computer network equipment (hubs, routers, switches, servers) is outside the scope of the building contract however every wired point will be supplied its own patch lead and device lead.

All data products shall be randomly tested through the year by 3rd party test houses, as opposed to product that is selected specifically for test. The following parameters shall also be met with regard to the data system installation:

- Guarantee from manufacturer to end-user for 25 years
- Lifetime of applications
- Warranty must cover both copper and fibre
- Warranty must cover IEC fire ratings
- Full cost of replacement (**labour** and parts)
- Transferable warranty
- Extended distances (see technical specification)
- Fully compliant with latest International and European standards
- Fully Technical support from manufacturer in event of an accident
- Manufacturer must audit site during installation
- Proof of training of installer (not older than 2 years) must be supplied.
- All products must cover 3rd party compliance documents. 3rd party compliance must be **random** tested, **not sample** testing.

Provide cabinets complete with all required patch panels and patch leads. Wi-Fi points in ceilings are all to be wired to the same dedicated patch panel.

Two site visits from the cable manufacturer will be allowed for by the contractor in order to inspect the site and all work in progress.

6.2 Provision for the Hearing Impaired.

Induction loops shall be provided as part of the contract. These shall comprise:

- Mini counter induction loop at the main reception

Loop wiring is to be installed in the ceiling.

Counter induction loops are to be provided with desktop microphones.

All loops will be installed tested and commissioned to EN60118-4 with measured responses +/- 3dB between 100Hz and 5 Hz

7 PROTECTIVE SERVICES

7.1 Access Control System

The Contractor shall include for the supply and installation of an access control system via highlighted external access doors into the building. All entrance doors to each corridor on each floor and into all stairwells shall be controlled. Access should also be installed to doors between separate different sections within the building. Refer to the relevant drawings for locations and quantities.

The Access Control System Solutions' primary function is to regulate access through specific portals (doors, gates or barriers) to secured controlled access points. The system shall also have provision of capturing cardholder's images and producing access cards that can be used to provide access throughout designated areas.

All Access Control Units (ACU) controllers are supplied with internal non-volatile memory. This memory will allow all programming, access permissions, time schedules and the current date and time data stored in the internal memory to be retained during periods of power failure.

Door locking mechanisms shall be integrated into the ironmongery.

The system shall be controlled by a management software to be installed by the Contractor's security contractor on a dedicated PC.

A volt free signal is required to be run to each door from the fire alarm panel in PH120 rated cable. On activation of the fire alarm panel all doors should fail open. In addition, beside each door a break glass unit, colour green, to distinguish it from the fire alarm break glasses shall be installed. The function of which is that when activated the individual door will fail open.

In the event of a power failure the door locks are to fail safe to open.

100 swipe cards are to be supplied and programmed.

The system shall operate as follows:

- Doors shall have either swipe card access from both sides, or swipe card access from one side and an egress button on the other, as indicated in the drawings.
- Emergency egress shall be facilitated by a link to the fire alarm to deactivate the maglock, and green break glasses.
- All access-controlled doors are to fail open in the event of power failure.

- It shall be possible to program cards with different levels of access authority for example not all staff will have access to the Comms Room.
- Doors are to be interfaced with the anti-wander system such that in the event of a door being unlocked when a tagged patient approaches it will be automatically locked.

General Access Control requirements

Access Control System basic functionality and administration

The Access control system will be capable of providing multiple site access control and security management in real time. The system will fully integrate and be part of the Existing Access Control.

Access Control System Reports

The system will support a query-based reporting capability.

The system will include as standard the following reports:

- Alarm Report
- Card Parking report – cards become parked when unused for a system defined period
- Concurrent Alarms
- Device Access
- Device Report
- Device Access Levels
- First & Last card swipe – daily record for each or group of cardholders.
- Guard Tour
- Occupancy Zones
- Personnel
- Reader Activity
- Card Transaction
- Visitor
- The system will provide a choice of thick client or WEB based reporting applications at no additional system licence cost to the user.

Card Security

The system will include a secure card technology

- To avoid card cloning, a secure card technology that protects the transmission of data between the card and the reader will be used.
- Card technologies providing a reduced level of security are not acceptable.

Card Technology specifications

- The system will support a secure card choice of either Triple DESFire (3DES), iClass OR Mifare – support Protocol.
- Card technology must conform to ISO/IEC 14443 Type A or ISO15693 standard.

High security card requirements

- The card type shall be MIFARE DESFire EV1 and EV2. Or iClass

Access control System hardware and equipment

The entire system must be a single manufacturer solution:

- Except for access tokens, PC computer hardware equipment and integrated systems the system components supplied will be by one system manufacturer.
- The system will not have recurring licence fees for licences already purchased.

Card Readers and Door Controllers

Power supply requirements

- Card Readers, Exit Switches & Emergency BGU's will be connected to the Door Controller each with a CAT 6 Cable the lock will be powered through the BGU.
- Door Controllers – Door Controllers will be located in the services/electrical rooms in each household as shown on the drawings and System PSU's.

Ethernet panel door controller with Card Readers

- The System Software and door panel will be by the same manufacturer.
- The panel will be configurable for either one or two door control.
- The panel will feature two separate card reader connections.
- Eight monitored inputs with tamper detect.

Capable for either Door Position, Lock Sense, REX and Interlock or general purpose.

- Two 12V open collector outputs limited to 1.5A, and two relays rated at 30V@5A.

Capable for either Lock control and Interlock signal or general purpose.

- I/Os not used required by access devices shall be available for general purpose use.

Particular Product Specification**System Software**

Software Licence

The software licence for Additional Doors will be added to the Existing Software System. Designed to operate on a windows 10 platform, and will control all doors on the system by updating the Licence Software. It will comply in full with the Description outlined in the Overall Specification Overview.

Main Features Include the Following

- Integrated Photo ID Badging
- Visitors Management
- Time & Attendance Reporting
- Unlimited 'User Definable' software fields
- Support for up to 5 Windows® based operator workstations
- Offers a 'Complete IP Solution'
- Supports portable hand-held readers
- Graphical Alarm Event Display
- Time Zones & Holidays
- Advanced Reporting
- Seamless integration with External CCTV & Intruder alarm Systems

Door Controllers

- IP Controller for up to 4 Doors.
- This will be an Intelligent 4 Reader IP Controller mounted in an 12V DC Power Supply Enclosure and connects over Ethernet to the system control software.
- It can control up to 4 doors. It has an on-board 10/100 Ethernet connection and communicates directly with the Software central system.
- Using a powerful 32bit processor, it gives full off-line validation and decision-making capability at the point of entry, when host communication is not available.
- It will comply in full with the Description outlined in the Overall Specification Overview
- The Door Controller will be an extension to the existing system and connect into and be part of the existing access control system.

Card & Fob Readers**Smart Card Reader**

The smart card reader will offer an open architecture design permitting compatibility with many of the most popular cards in the market, which comply with ISO 14443A, 14443B, and 15693 interoperability standards.

- It will be smart card reader technology.
- It will be user friendly with a reading range of 10 cm.
- It will be iClass SE, or Mifare DesFire EV2 to prevent card cloning.
- It will comply in full with the Description outlined in the Overall Specification Overview.
- It will be an extension to the existing system and connect into and be part of the existing access control system.

Key Features:

- Secure - All RF data transmission between the card and reader is encrypted using secure algorithms.

- Additionally, security can be extended from the smart card reader all the way to the Hi-O enabled access control panel using encrypted Hi-O communication (Hi-O hardware option).
- Interoperability - based on international ISO interoperability standards providing compatibility with many popular card technologies (ISO15693, ISO14443A and ISO14443B).

Exit Switch Devices

Stainless Steel Non-Touch Proximity Exit Switch.

The Exit Switches will be Approved Stainless Steel Non-Touch Proximity units, & will provide exiting through the doors. It will be a flush mounted infrared non touch exit button with adjustable proximity range. It comes complete with illuminated circular display which switches from Red to Green when activated.

Key Features will include

- Infrared no touch button.
- Illuminated red and green changing LED.
- Adjustable proximity range.
- Adjustable LED colour change.

Emergency Exit Devices

Emergency Resettable Break Glass Unit

The Emergency Exit Green Break Glass Resettable Unit will be Approved and be a combined Siren Strobe and BGU unit. It will mimic the feel of breaking glass whilst offering the user the benefits and environmental advantages of a re-settable operating element.

It will use a simple yet ingenious patented mechanism which consists of a rigid plastic operating element and an over centre spring mechanism. This arrangement provides real action on operation and simulates break glass activation.

An activation indicator drops into view at the top of the window after the unit has been operated.

It comes complete with an approved key system; the unit is simply reset with a key and is ready for re-use straight away.

Electric Locking

Single Doors (Single Action – Opening one Way only)

Single Doors with Single Action will have a Fail-Safe Fire Rated Transom Housing Mortice Bar magnet Lock for Access Control Locking, these locks will have a minimum load holding force of 270 KG's.

These doors will have an Emergency Break Glass and a Non-Touch Proximity to Exit Switch.

The transom housing will be made from an architectural aluminium box section and will facilitate a Mortice Type Bar Magnet Lock. The Transom Housing will be mounted across the full width of the Door providing secure grounding for the electric Locking system.

The locking will operate on magnetism and have a holding force of Minimum 270 Kg's per lock.

It will comply in full with the Description outlined in the Overall Specification Overview

Door + ½ Door (Single Action – Opening one Way only)

Door + ½ Door with single Action will have a Fail-safe Fire Rated Transom Housing Mortise Bar Magnet Locking System for Access Control these locks will have a minimum holding force of 270 Kg's each both doors will be locked.

These doors will have an Emergency Break Glass and a Non-Touch Proximity to Exit Switch.

The transom housing will be made from an architectural aluminium box section and will facilitate a Mortice Type Bar Magnet Lock. The Transom Housing will be mounted across the full width of the Door providing secure grounding for the electric Locking system.

The locking will operate on magnetism and have a holding force of Minimum 270 Kg's per lock.

It will comply in full with the Description outlined in the Overall Specification Overview.

Double Doors (Single Action – Opening one Way only)

Double Doors with single Action will have a Fail-safe Fire Rated Transom Housing Mortise Bar Magnet Locking System for Access Control these locks will have a minimum holding force of 270 Kg's Per Lock.

These doors will have an Emergency Break Glass and a Non-Touch Proximity to Exit Switch.

The transom housing will be made from an architectural aluminium box section and will facilitate a Mortice Type Bar Magnet Lock. The Transom Housing will be mounted across the full width of the Door providing secure grounding for the electric Locking system.

The locking will operate on magnetism and have a holding force of Minimum 270 Kg's Per Lock.

It will comply in full with the Description outlined in the Overall Specification Overview.

Double Doors (Double Action – Opening both Ways)

Double Doors with double action will have a Fail-safe - Approved Mortice Fire Rated Lock with Side Load Opening This is a fail-unlocked, double action electric lock. 12 or 24VDC, monitored. This double action electric lock will meet the demanding prEN 13637 European Building Hardware standard.

The Lock releases instantly and is ideal for use on Double Action swing doors and fire routes. The specification will satisfy both building control and fire safety officers as it will

operate under extreme side pressure in the event of an emergency but is also pressure resistant to intrusion.

The Lock will be an Abloy Eff U80 351 or similar and approved.

These doors will have an Emergency Break Glass and a Non-Touch Proximity to Exit Switch.

It will comply in full with the Description outlined in the Overall Specification Overview.

Commissioning:

The system shall be commissioned by the specialist supplier and the following procedures shall be performed as a minimum.

- All field wiring tested before connection
- All field wiring terminated to console
- All devices tested for operation
- Demonstration to contractor.
- Present contractor and Employer's Representative with certificate of demonstration.
- Separate demonstration to Employer's Representative.
- Present Employer's Representative with certificate of demonstration once system proved to be fully complaint.
- Write commissioning certificate.
- All documents & certificates to form part of the hand over documents.

Client Handover and demonstration:

After the final commissioning by the specialist supplier the system shall be demonstrated to the Client. After demonstration a certificate of demonstration shall be signed by the Client and this document will form part of the hand over documents.

The hand over documents must include the following:

- Certificate of demonstration to Contractor.
- Certificate of demonstration to Employer's Representative.
- Certificate of demonstration to Client.
- Operation manuals.
- Commission Certificate.

The hand over documents must include the following:

- Certificate of demonstration to Contractor.
- Certificate of demonstration to Employer's Representative.
- Certificate of demonstration to Client.
- Operation manuals.
- Commission Certificate.

7.2 CCTV System

CCTV Video Management System (VMS) and Recording Platform

General Overview:

The Project will use American Dynamics Victor Video Management System (VMS) and VideoEdge Recording Platform Solution for the CCTV Aspect *or a similar system that can provide the same functionality.*

This is a proven Enterprise VMS which allows for the live display, playback and exporting of multiple images simultaneously on a dedicated Video Wall and multi operator environment. The solution delivers a robust and cyber hardened system which also offers compliance with current GDPR legislation. Access to all live and recorded footage is strictly controlled via operator login and password and all operator activity is logged for GDPR compliance. The management of all operator accounts can be managed through LDAP integration. Video Clip creation and download is centralised through the deployment of video clip servers and again all access is strictly controlled by privilege and password.

The VideoEdge recording solution can allow for the utilisation of RAID5 recording technology supplemented in a failover configuration, if required. VideoEdge is designed to be open platform and will accept cameras from all major manufacturers, a hybrid variant of the VideoEdge is also available to integrate analogue and IP cameras on one recorder. For GDPR compliance victor VMS platform allows for the management and central control of all passwords for all connected devices.

All devices – cameras, recorders and operator workstations are continuously monitored and status is reported in real time with instant notification of any potential/ actual failure.

The utilisation of a full Video Analytics suite is administered through the VMS

Project Requirements

The project will require 2 X integrated 64 Channel NVRs to cater for the CCTV Management & Recording of Cameras these NVRs will be located in a Designated Security Room location to be Finalised.

The NVR will incorporate Hard Disk Drive Storage to Satisfy the following requirements.

The System will Record all CCTV Camera at 25 Images per second at a minimum resolution of 2 Mega Pixel (1080P) for a Duration of Minimum 35 Days after 35 days have lapsed the system will re-write new Data over the oldest information.

All Cameras in the project will be Cabled in CAT6 Cable to the Electrical Services Room where Dedicated IP CCTV Managed Switches will be located in a secure IT Cabinet. These IP switches will provide Power and Communication for the CCTV Cameras.

Cameras cannot be located more than 90 Metres from the nearest IP Switch.

Solution Features

VideoEdge

Built in intelligence allows users to receive multiple video streams for live, record, alarm and metadata collection, all tailored to viewing conditions. The end result is superior video with significantly reduced network bandwidth, CPU resources and memory usage.

- Open platform supports cameras from multiple manufacturers
- UL Certified Cyber Protection
- Scalable and Robust NVR
- RAID 5 as standard if required
- Encrypted end to end
- Smart Streaming
- Sophisticated Analytics that deliver Business Intelligence
- ANPR
- Centralised Licencing
- POS Text insertion
- FISMA and FIPS Certified
- Advanced Stream Management & NVR transcoding
- Auto Camera Discovery
- Failover Enhancements – seamless operator playback
- Dynamic Bandwidth Management
- ONVIF Camera Handler
- New NVR server-class OS open SUSE Linux
- Camera Alarms Support

Software

The Project will allow for a 2 User Licence for the system software CCTV platform. It will be a highly scalable, integrated client server architecture intended to harness the power of video surveillance ecosystems. Designed to integrate as a front end for systems such as access control, intruder and fire detection and bring all information and reporting under one simple interface. victor can scale from a single site video surveillance system to a global, distributed multi-site solution. With the Enterprise MAS/SAS architecture, victor easily can support thousands of recorders without lengthy setup. Device Auto Discovery automatically finds associated security devices, saving hours of time.

- LDAP Integration for easy operator management
- FISMA Ready Cyber Protection
- SQL backend database on Application Server
- Supports deployment in virtual environments
- Real time, centralised event management
- Smart Search for faster investigations
- Business Intelligence and Data visualizer

- Streamlined incident management
- Map Support
- Heat Mapping and Path Analysis
- Health Monitoring Dashboard
- Smart Stream Management
- Integration Platform

Software Solution Features

Features of the Software will include the following

Health Diagnostic Monitoring

- To avoid prolonged downtime, enterprise-wide health monitoring via an intuitive interactive dashboard easily identifies system issues and outages.
- Single simple color-coded dashboard to identify issues with equipment

Enhanced Search Features

Thumbnail Search Results Quickly identify subject clips within a few clicks.

Motion Detection Identify specific areas within recorded video to search clips and identify subjects.

Boolean Search Identify subjects based on rules to eliminate or include critical factors

General Data Protection Regulation (GDPR)

Victor has the tools necessary for all data collected by the VMS and integrated systems to comply with your companies GDPR policies, all in one centralised location.

- All user interaction is logged and recorded, down to simple actions such as the movement of a PTZ camera.
- All device actions are logged across the entire system including integrations.
- Security protocols allow for anonymity of personnel data.
- User privilege allows complete control down to a granular level of system access.
- Video redaction feature built in.

Mega-Pixel Cameras

3MP Dome Vari-Focal Internal Camera

This will be an Internal 3 Mega-Pixel Mini-Dome Vari-Focal 3.6 to 12mm high quality camera producing efficient bandwidth management and is a True Day/Night camera providing 3MP full HD resolution for high-quality images.

Main Features will Include:

- 3MP resolution for true HD quality images
- True Day/Night functionality for quality video recording in low light conditions

- True Wide Dynamic Range
- Motion detection for instant intruder alerts
- Operating temperature for outdoor model to -50°C using PoE
- IK10-rated
- ONVIF compliant

It will comply in full with the Description outlined in the Overall Specification Overview.

It will connect into and be part of the existing CCTV Management System.

3MP Dome Vari-Focal External Camera

This will be an External 3 Mega-Pixel Mini-Dome Vari-Focal 3.6 to 12mm high quality camera producing efficient bandwidth management and is a True Day/Night camera providing 3MP full HD resolution for high-quality images.

Main Features will Include:

- 3MP resolution for true HD quality images
- True Day/Night functionality for quality video recording in low light conditions
- True Wide Dynamic Range
- Motion detection for instant intruder alerts
- Operating temperature for outdoor model to -50°C using PoE
- IK10-rated
- ONVIF compliant

It will comply in full with the Description outlined in the Overall Specification Overview.

It will connect into and be part of the CCTV Management System.

System Software & Servers

Video Management Security System Software:

The CCTV Cameras will connect into the Video Management Security System & Operate on its Software.

Camera Licence

A Camera Licence for Each Camera will be provided for the Connection of the CCTV Cameras into the CCTV System.

Network Switches

24 Port POE + Switch - This will be a 1GB 24 Port PoE Switch designed to provide power and Comms for up to 24 X 3MP Cameras.

It will comply in full with the Description outlined in the Overall Specification Overview.

IP Cabinet

There are three rooms available for the CCTV cabinets/equipment. One on lower ground floor, one on ground floor and one on first floor. All three these locations must be interlinked with fibre cables. One of these rooms will be identified as the master station where the recording equipment will be located.

The contractor should allow for all the required IP cabinets house the CCTV Equipment.

Viewing Station

Viewing Station PC:

This tender will allow for 1 X Viewing Station to Cater for up to 4 Viewing Monitors. The PC will be Core i7 with 16GB of RAM, 1TB Hard drive with 2 X NVidia Graphics card.

Viewing Monitors:

This tender will allow for 2 X 40" LED High-Definition CCTV Grade Viewing Monitors & 2 X 32" LED High-Definition CCTV Grade Viewing Monitors.

Client Handover and demonstration:

After the final commissioning by the specialist supplier the system shall be demonstrated to the Client. After demonstration a certificate of demonstration shall be signed by the Client and this document will form part of the hand over documents.

The hand over documents must include the following:

- Certificate of demonstration to Contractor.
- Certificate of demonstration to Employer's Representative.
- Certificate of demonstration to Client.
- Operation manuals.
- Commission Certificate.

7.3 Fire Detection and Alarm Systems

The contractor will supply, install, test and commission an open protocol, analogue, addressable, L1 fire alarm system to the latest version of IS3218. For the purpose of this contract open protocol systems are those where the manufacturers of field devices and/or CIE make the communication and data transfer protocol of their equipment openly available to other equipment manufacturers. Device numbers and locations are shown in the contract drawings.

A five-loop addressable panel is to be provided in the new main entrance/reception.

Sensors, call points, sounders, door hold-opens and interface units are to be provided as indicated on the drawings.

The fire alarm panels will have a liquid crystal display screen which is to display the location and state of any device which is activated. There will be an alarm system diagram provided beside the fire alarm panel indicating the zoning to aid location of devices and maintenance work.

Originating from the fire alarm panel will be loop circuits, sensors and manual call points shall be installed on the same loop circuit with covers provided and installed by the contractor for all manual call points. As a minimum circuit cabling will be carried out in 2 core enhanced fire cable (PH120) and distributed in HGSW conduit and trunking.

Interface units are to be provided for all systems which require interaction with the fire alarm system eg free-swing doors, cross corridor doors, wander alarm controlled doors, BMS and access control system.

Signage will be provided and installed by the Contractor or all 'Call units'; 'Refuge areas', external 'Fire assembly points' in addition to any signage required under the current regulations.

The contractor is to allow for the programming of the system in accordance with a Cause and Effect matrix which will be issued timeously before commissioning.

This will be designed for phased evacuation and operations defined will include:

- Sounders
- Door hold-opens
- Lifts
- Staff-assist and general alarms
- HVAC Systems

Client Handover and demonstration:

After the final commissioning the system shall be demonstrated. This demonstration shall take place on a separate day from any other Fire Alarm commissioning. After demonstration a certificate of demonstration shall be signed by the Client and this document will form part of the hand over documents.

The hand over documents must include the following:

- Certificate of demonstration to Contractor.
- Certificate of demonstration to Employer's Representative.
- Certificate of demonstration to Client.
- Operation manuals.
- Commission Certificates.

7.4 Surge Protection

All incoming and outgoing cables (of all types) shall be provided with Lightning/Surge Protection devices to the latest version (or superseding standard) of IS EN 62305. Surge protection shall be provided for all panels that form part of the final installation.

The following zones require protection:

Surge Protection Zones	
Surge Protection Zone 1 - Main Distribution Board	Surge Protection Zone 2 - Sub Distribution Boards
SPD's for power supplies must be capable of diverting both Direct Lightning impulses 25kA 10/350µs per pole and Surge currents 40kA 8/20µs per pole eg. The arrester must be a 3-stage combined arrester eg Type 1, 2 and 3 to protection level 1 100kA 10/350µs per device or 25kA 10/350µs per pole. The arrester must be fully co-ordinated between Lightning and Surge currents. The let through voltage should not exceed 1kV even in the event of 100kA10/350µs Lightning impulse. The arrester will also limit follow currents. Only hermetically sealed gas filled spark gap arresters should be used. The arrester must comply with BSEN62305-4 and EN61643-11. Arresters to be equipped with a fault alarm contact to remotely signal if the device fails	SPD's to have a maximum discharge current 40kA 8/20µs waveform per pole 160kA 8/20µs TP+N systems type 2. The arresters must have visual indication of status LED's. The arrester must be constructed so as to have no earth leakage currents. The arrester must comply to BSEN62305-4 and EN61643-11 Arresters to be equipped with a built-in thermal fault alarm contact to remotely signal if the device fails.

Surge Protection Zone 3 – Final Circuits	Surge Protection Zone 4 – Data/ICT
All fire / burglar alarm panels and any sensitive electronic equipment installed shall be protected for a maximum discharge current of SPD's 5kA 8/20µs type 3. All Protection devices must provide status indication. The arresters must comply with the current version (or superseding standards) of BSEN62305-4 and EN61643-11.	Incoming data links and telecoms lines and lines between buildings must be protected against Direct Lightning and Surge impulses on each core and at both ends. Arresters used for protection of data signal lines must be capable of handling Lightning impulse currents and Surges of at least 20kA 8/20µs The protection circuit for signal transmission <600kHz must have an EMI filter function (resonance circuit by inductance and capacitance) to protect also against harmonics caused by high frequency influences Arresters must comply to IEC61643-21 Screens of cables to be earthed directly or indirectly via shield earthing

7.5 Lightning Protection

The contractor will supply, install, test and commission a lightning protection system (through a specialist) in compliance with the latest version (or superseding standard) of IS EN 62305 in a manner that eliminates parallel paths, meets separation distance requirements and whose impedance value is lower than the final impedance value of all internal protection circuits. The system shall consist of a roof top air terminal network (bonded to all external metal part on or above roof level) connecting through sheathed copper down conductors (minimum size of 3mm x 25mm) to earth pits (an individual earth pit (Type A) for each down conductor) with all above ground elements coated in PVC to RAL colour of the architect's choice. The down conductors will be routed in a secure manner (fixed every 500mm using manufacturer's propriety clips) through the wall cavity using channels so that the down conductor does not come into contact with the cavity insulation. Streaming devices and associated antennae will not be accepted as a replacement for the described system.

Each earthing pit is to have its own inspection pit where an earth rod is driven a minimum depth of 3.1m below the finished ground level. The size and depth of the rod will be dictated by the previously outlined standard and impedance requirements

The lightning protection is to be kept completely separate from all other electrical installations and protection systems. Isolated air termination systems should be used for all electrical services in close proximity to the lightning protection system e.g. roof mounted antennas and CCTV cameras.

As previously described all internal metal parts are bonded to the building's main earth terminal as will all incoming metal services. These services are to be kept separate to the lightning protection system.

The LPS system should be cross bonded near the main incoming electrical panel zone 1.

The Contractor shall on completion issue Test results and Certification from a Lightning Specialist.

7.6 Labelling

All links and cables are to be clearly labelled with a consistent numbering scheme. The following labelling scheme is suggested for the main distribution facility (where z = incremental number): Each main distribution facility multimode fibre cable to be marked as "MDF MFZ". (Main distribution facility multi-mode fibre number Z) Each main distribution facility single mode fibre cable to be marked as "MDF SFZ". (Main distribution facility single mode fibre number Z) Each main distribution facility balanced cable to be marked as "MDF BCZ". (Main distribution facility balanced cable number Z)

- (a) A laminated label incorporating simple instructions for operating the following elements if present in the room shall be located in a suitable location near the door in each space:
- (b) Blinds: Include the following "Raise blinds when not required in order to reduce lighting energy used".
- (c) Local Heating Controls: Clear instructions on what local heating controls are provided and the operation of these in the space.
- (d) Lighting Controls: Clear instructions on what lighting controls are provided and how they work.

