

**ST. CIARAN'S COMMUNITY SCHOOL
TOWNSPARK,
KELLS,
CO. MEATH.
A82N677.**

ROLL NUMBER: 91456J

**'VOLUME A2'
OF THE
WORKS SPECIFICATION**

PARTICULAR SPECIFICATION

TENDER ISSUE (T1)

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GENERAL

Introduction

The intention of this specification issued is to describe and provide for a complete installation. The Contractor is advised that the work to be executed as described in these documents shall be complete in every detail, notwithstanding that every item involved may not be specifically mentioned or described.

The Contractor shall be held to allow for all materials and labour necessary for an entire and complete installation and shall not avail of any unmentioned error or omission should such exist.

St. Ciaran's Community School is a primary school that is located in Kells, Co. Dublin. The school is a two storey building consisting of classrooms, GP hall and technology block extending to 5,000m². This project entails works in decommissioning and replacing the existing emergency lighting and fire alarm system installations throughout the building. Refer to the drawings for further information on the works to be carried out.

The scope of the works will be as follows:

- Remedial works to the existing electrical boards throughout the building to cater for the new emergency lighting installation.
- Decommissioning and replacing of the existing emergency lighting installation throughout the building and installation of a new emergency lighting installation that shall be compliant with I.S. 3217:2023 throughout the building.
- Decommissioning and replacing of the existing fire alarm installation throughout the building and installation of a new fire alarm installation that shall be compliant with I.S. 3218:2024 throughout the building.
- Supply and installation of a new cable carrier system throughout the school building to cater for the proposed new fire alarm and emergency lighting installation to be installed.
- The existing ICT system installation, intruder alarm system, PA system and CCTV system installation shall be retained throughout the building.
- All electrical works as highlighted on the drawings and the specifications.
- Thorough cleaning of the building via contract cleaners once all works are completed so that the building is clean and tidy for re-opening of the building for the new term.
- All associated preliminaries for the project.
- All associated decommissioning works.
- All builders' works associated with the above. See 'Builders Work Schedule' in 'Volume C1 – Pricing Schedule' for further details.

- Acting as Project Supervisor Construction Stage for the project.
- Carrying out all works in compliance with current health and safety regulations.
- Any other works as identified on the drawings and the specifications.

The Contractor shall be deemed to have carried out a site visit prior to the completion of his tender and ensure that all factors, site conditions and items are taken account of necessary to complete the installation and to leave same in a complete working condition to the satisfaction of the Employer's Representative.

No extras or variations shall be allowed for additional work that could have been ascertained by visiting the site.

Applicants interested in visiting the building will need to contact St. Ciaran's Community School at 046-9241551 or the Caretaker on 086-1706711 to arrange an appropriate appointment to visit the site during the tender period. Do not visit the School without prior arrangement with the School.

No extension or significant Architectural works shall form part of this contract.

The Contractor shall appoint a suitably qualified Building Contractor to carry out the builder's works and building finishes works as specified in these documents.

All works shall be in compliance with all relevant Building Regulations, Irish Standards, British Standards, CIBSE Guidelines and Good Engineering Practices.

The Contractor shall be required to ensure all necessary flexibilities & resources are available to the project to meet the deadlines and programmes. The Contractor shall liaise with all his relevant Contractors regarding the programme and order of works and any concerns he may have over the completion date should be raised prior to the awarding of the contract.

The Contractor shall take all reasonable care to ensure all site workers and visitors are not endangered by any element of their works.

The Contractor must ensure that the works are completed as soon as possible and/or within the agreed program time frame.

It is the Contractor's responsibility to raise any concerns over the proposed works with the Employers Representative prior to commencement of works.

Failure to inform the Employers Representative of any such concerns will be deemed that the Contractor has accepted the design and scope of works to be fault free.

This specification will set out in general terms the data to be used by the Contractor in order to submit a tender bid for the works as identified. This shall include the production of a complete set of services installation drawings.

The procurement, delivery, supply, handling, erection, installation and commissioning of the services as there under described as may be seen or inferred from the enclosed documents from the Consulting Engineer.

The Contractor shall satisfy himself that the installation is in accordance with all codes and standards. All works described shall comply with:

- i) The Safety, Health and Welfare Act 2005
- ii) Requirements of the Health and Safety Authority / SI 138.
- iii) Requirements of the Fire Officer.
- iv) All Irish Building Regulations including Building Control (Amendment) Regulations (BC(A)R), S.I. 9 of 2014.
- v) Factories Act / Statutory Instruments.
- vi) Client Safety Protocol.
- vii) Client Specifications.
- viii) Chartered Institute of Building Services Engineers.
- ix) The Tender Drawings.
- x) The Contract Preliminaries.
- xi) All relevant Irish, British and European Standards and Codes of Practice.
- xii) The ETCI National Rules for Electrical Installations.
- xiii) All relevant Irish, British and European Standards and Codes of Practice.
- xiv) I.S. 10101:2020 National Rules for Electrical Installations.
- xv) I.S. 3217:2023 Emergency lighting systems.
- xvi) I.S. 3218:2024 Fire detection and alarm systems.

The Contractor shall familiarise himself with the above and the obligations therein.

Site visit

Applicants interested in visiting the building will need to contact St. Finian's National School at 046-9241551 or the Caretaker on 086-1706711 to arrange an appropriate appointment to visit the site during the tender period.

If the Contractor cannot get in contact with the Client, please contact Galileo Energy Services so that they can arrange access to the building for the Contractor.

Tenderers shall arrange to visit the site to ascertain for themselves the full extent and nature of the works and to familiarise themselves with the general site conditions, to its accessibility, modifications to existing electrical installations equipment and specialist equipment and the supply of and conditions affecting labour and of executing the contract generally.

As child protection policies and Data Protection policies are deployed in the building, the tendering Contractor **MUST NOT** arrive to site without prior appointment.

Tenderers shall note that no claim in respect of lack of knowledge of prevailing site conditions, builders work or existing services can be considered.

The tender drawings are based on the best information available at the time of preparation and by visiting the site the Contractor shall satisfy himself of the exact extent and nature of works involved.

Builders work and attendances

All builders work associated with the execution of the works shall be carried out under this contract by the Contractor. The appointed Contractor shall be completely responsible for all builder's work. A suitably qualified Building Contractor shall be employed by the Contractor to carry out the building works and building finishes associated with this contract.

Due allowance for this item must be allowed for in the tender price. **See 'Builders Work Schedule' in 'Volume C1' of this document and this specification for details on all builder's work required and building finishing works required.**

The Contractor shall prepare any working drawings if necessary, agree all details with the Employer's Representative, mark out and be responsible for correctness, and the cost of any unnecessary work due to the Contractor failing to comply with this condition shall be the Contractors responsibility.

The Contractor shall ensure that cutting away and general attendance is reduced to a minimum and must not impede or delay the carrying out or completion of this work. The permission of the Employer's Representative shall be secured before cutting or chasing is commenced.

The Contractor shall be responsible for the preparation of the following:

- All builders work and building finishing works associated with the execution of the works.
- All required opes through walls, roofs, floors, etc. for services.

- All required internal trenching, external trenching, etc. for services.
- The supply and installation of the new plasterboard ceiling throughout the majority of the building.
- Painting.
- Builders work drawings, including all necessary ops for installation.
- Technical submittals, for all items of plant and equipment that vary from the specified equipment herein.
- Ensuring that all services/installation details are completely integrated with all aspects of the building elements, to the satisfaction of the Client.

Cleaning

General:

The Contractor shall be totally responsible for the cleaning and tidy-up of the internal and external areas where all works shall occur, once all works are completed.

The Contractor shall be responsible for the cleanliness of all areas where and surrounding access areas where works are being carried out during the construction period.

The Contractor shall allow for the cleaning of all areas and removal of all rubbish before the anticipated handover date for the project.

All areas where works are to be carried out shall be cleaned and tidied to the satisfaction of the Client and if the cleaning is not to the satisfaction of the Client, the Client shall employ cleaners to complete the cleaning at the Contractor's expense.

All external areas and internal areas shall be cleaned and tidied to the satisfaction of the Client and if the cleaning is not to the satisfaction of the Client, the Client shall employ professional cleaners to complete the cleaning at the Contractor's expense.

Professional contract cleaners:

The Contractor shall allow for employing a professional cleaning company to clean all the internal areas in the building where works are to be carried out. The Contractor shall employ professional contract cleaners to clean all the internal areas in the building where works are to be carried out.

The Contractor shall be responsible for the cleanliness of all areas where and surrounding access areas where works are being carried out during the construction period.

All internal areas where works are to be carried out shall be cleaned and tidied to the satisfaction of the Client and if the cleaning is not to the satisfaction of the Client, the Client shall employ their own professional cleaners to complete the cleaning at the Contractor's expense.

Internal Areas:

For all internal areas, the Contractor shall clean the rooms to ensure the rooms/areas where the Contractor was working is free from all dust and is fit for immediate use once works have been completed in the rooms.

The Contractor shall also be responsible for the removal of rubbish and decommissioned material/equipment from the building and site and providing adequate number of skips to do so.

The Contractor shall allow for the hoovering and cleaning of all floors where works are to be carried out in the building by the Contractor.

The Contractor shall allow for the following works in all internal areas where works are to be completed:

- Immediately after all builders works, decommissioning works or installations works are carried out, the Contractor shall allow for the cleaning up and making good of all floors, walls and windows to remove all dust, rubble and dirt.
- Removal of all rubbish and decommissioned material/equipment from area building and areas where works shall be completed.
- Hoovering and cleaning of all floors throughout the areas where works are to be completed.
- All debris, packing cases, excess materials, plant and materials are to be removed off the site entirely
- All marks, scratches and minor defects are to be made good
- Decoration to be finally inspected and touched up as required
- All fittings such as electrical items, mechanical items and sanitary ware to be cleaned down completely
- Where opes are bored through internal and external walls, the walls shall be washed down and cleaned
- All tiled surfaces are to be cleaned of all grit washed as directed and polished to manufacturer's recommendations
- All painted work is to be cleaned down and washed

External Areas:

For external areas, the Contractor shall allow for removing any debris, materials, rubbles, dust, etc. where works have been carried out to ensure the external areas where the Contractor was working is clean and is fit for immediate use once works have ended prior to opening of the building.

The Contractor is to ensure that all external areas where works have been carried out, are to be left free of all dirt and debris and builder's materials and parking of construction vehicles, etc. and the roadways are to be thoroughly cleaned as and when required.

The Contractor shall also be responsible for the removal of rubbish and decommissioned material/equipment from the rooms/areas identified and providing adequate number of skips to do so.

Co-ordination

The Contractor shall act as lead co-ordinator for the entire project i.e. all building works, electrical works, mechanical works, etc. required to complete the project.

The Contractor shall be responsible particularly for the detailed installation design and co-ordination with other services and structures for the entire installations.

The co-ordination of the builders works, electrical installations and mechanical installations shall be the sole responsibility of the Contractor.

The Contractor shall agree all methods, sequences timing and all relevant details of the works within his contract with the Employers Representative in advance and shall not deviate from this agreement unless otherwise agreed in writing with the Employers Representative.

No adjustments will be made to the contract sum where additional work is required due to poor co-ordination or where the Employer's Representative has not been informed in good time of a co-ordination difficulty that could have been resolved by a design decision had the issue and its full implications been advised to the Employer's Representative in good time. The Contractor shall liaise with all other trades when co-ordinating their works.

The Contractor is deemed to have included all costs associated with co-ordination of each service and the building fabric. These costs shall be deemed to include all necessary pipework offsets, containment offsets, re-routing, etc. No claims for additional costs shall be accepted after receipt of tenders.

Project Supervisor Construction Stage (PSCS)

The successful Tendering Contractor shall act as the Project Supervisor for Construction Stage (PSCS) and the cost to fulfill this role shall be included in the Contractors submitted tender price. The role of the PSCS is to manage and co-ordinate health and safety matters during the construction stage.

The PSCS shall be appointed by the Client/School Authority to carry out the role as PSCS for the project.

The successful Contractor is to appoint competent persons as Supervisor for the Construction Phase (PSCS) in accordance with the current Health & Safety Legislation, with particular regard to the Safety, Health and Welfare at Work (Construction) Regulations 2006 and the Health & Safety Act 2005.

The duties of the PSCS include the following:

- Advise the Client of the requirements of the Construction Regulations
- Identify hazards arising from the design or from the technical, organisational, planning or time related aspects of the project.
- Where possible, eliminate the hazards or reduce the risks, in advance & during, the construction stage (by implementing the General Principles of Prevention).
- Coordinate the implementation of the construction regulations by contractors, welfare facilities on site & safe working procedures.
- Organise the required co-operation between contractors.
- Ensure all workers have appropriate safety training, including Safe Pass & CSCS.
- Communicate necessary control measures, safety management systems and safety principles to contractors & workers.
- Cooperate with the PSDP & Design Team to ensure safety.
- Prepare a written Construction Stage Safety and Health Plan for the project, from the Preliminary/ Design Process Safety Plan.
- Coordinate the implementation of Temporary Work Certification.
- Collect & prepare information for the Safety file for the completed structure and give it to the PSDP.
- Notify the Health & Safety Authority and the client of non-compliance with any written directions issued.
- Coordinate the reporting of accidents to the HSA.

The Project Supervisor Construction Stage must notify the Health and Safety Authority of any site where:

- The construction work is planned to last longer than 30 working days; or

- The volume of construction work is scheduled to exceed 500 person-days.

A working day is any day where the construction work is carried out, even if the work is of short duration, or the day is a holiday, or over a weekend. A person day is one individual, whether they be supervisors or other employee(s), carrying out work for one normal shift.

The notice must be submitted before the commencement of work on site.

The particulars required to be notified are set out in the Approved Form AF2.

O&M manuals

General:

The Contractor shall allow for supplying and providing an Operation & Maintenance (O&M) manual for the works to be carried out in the building.

O&M Manuals:

As highlighted above, the Contractor shall provide a Class D Operating & Maintenance manual for the works carried out in the building.

The Contractor shall allow for the supply and installation of a hard and soft copy of the O&M manual to the building. For a soft copy, the Contractor shall install the O&M manual on a USB stick that shall be included in the hard copy to be handed over to the Client.

All operation and maintenance manuals along with their associated record drawings shall be prepared in accordance with the requirements of BSRIA document 1/871 Operating and Maintenance Manuals for Building Services Installations.

The manuals must therefore contain all necessary technical information on each item of equipment and the associated components which have been used to assemble and construct the system(s).

Three no. hard copies and three no. soft copies of the final approved O&M documentation will be required.

In addition, manuals for each system must contain information on the design intent of the system, commissioning and testing results and reports of how the components of the system are adjusted to achieve the design intent, line diagrams to show how the system is arranged in the building giving the location of all equipment and components, its control system, how the system must be set in the normal operating mode and in the event of any emergency, routine check that must be made and a list of spares which should be kept and a list of any special tools which may be required.

The manuals must be prepared in such a way that an Engineer without any previous knowledge of the Project may use them to operate and maintain the system.

Contents of Manual of each manual:

Each Operating and Maintenance Manual shall be specific in respect of the complete Contract Works and shall include the following sections:

- | | |
|-------------|--------------------------------------|
| ➤ Section 1 | Description |
| ➤ Section 2 | Plant and Engineering Systems |
| ➤ Section 3 | Operating and Maintenance Procedures |
| ➤ Section 4 | Commissioning and Testing |
| ➤ Section 5 | As-Built drawings |

Section 1 – Description

This section shall comprise:

- A detailed description of each building services system
- General description of all plant and equipment
- Design data for the system and for each item of plant which affects the performance of the system.

Section 2 - Plant and Engineering Systems

This section shall comprise:

- Detailed technical information as published.
- Manufacturers drawings (where applicable) showing all components of the plant item with each component number in accordance with parts list.
- Parts list for each item of plant.
- Manufacturers addresses and telephone numbers.
- Complete instructions for ordering replacement parts in a manner that will prevent errors/misunderstanding including order number for plant.
- Colour coding identification schedule for each building services system.

Section 3 - Operating and Maintenance Procedures

- A step-by-step method of starting, operating and shutting down a system and how this affects other systems. The procedure for an emergency shut-down.
- A list of routine checks that should be made and frequency of the checks.
- A comprehensive schedule of routine maintenance based on Manufacturer's recommendations for items of plant etc. This program should state clearly what work should be done for each day, week, month, year or given number of hours.
- A list of tools and keys which will be required in the operation and maintenance of the systems.
- Fault finding procedures.

Section 4 - Commissioning and Test Report

The report for each system shall contain a record of all the parameters which affect the performance of the system at the time of commissioning. The report shall be comprehensive and shall contain a record of the settings of all valves and controls and any other adjustable components so that the system may be reset to the commissioned state by reference to the report.

Presentation

- **Indexing System**

Each volume shall be numbered and shall be divided into sections using an appropriate numbering system.

- **Paper Sizes**

The manual will contain manufacturer's literature which will be different sizes. Large pages will be folded and small pages will be fitted in plastic pockets with a reinforced edge punched for filing in A4 lever arch files. The page size shall be standardised for all volumes using A4 paper (210 x 297mm) with four holes punched centrally in the longer side 80mm apart.

- **Section Dividers**

Stiff cardboard section dividers with extended tabs shall be used; these shall be SUMMIT Ring Book Guides or equivalent.

- Files for Manual

A4 lever arch files with rigid plastic coated covers shall be used which shall be EMGEE or equivalent. Inlaid lettering on the front cover shall indicate the title, i.e. Operating and Maintenance Manual, the Name of the Project and Volume Number.

A label shall be fitted in the window on the spine of the file listing its contents.

Section 5 – As-built Drawings

The Contractor shall include for a complete set of as-built drawings which shall incorporate all works carried out and completed by the Contractor. All services, trunking/tray, routes and circuits within the building shall be identified on these drawings. To facilitate submission of record drawings, the Contractor shall keep on site a complete set of all drawings used on the Contract Works, on which he shall mark alterations to the designs shown thereon as such alterations are carried out.

Timescale and Working Hours

The proposed and anticipated timescale for the project is as follows:

The proposed and anticipated timescale for the project is as follows:

- Anticipated Project Start Date: *Monday 1st September 2026*
- Anticipated Project Completion Date: *Friday 30th April 2027*

It will be a condition of appointment that the Contractor can meet this programme.

Please note the following:

All works to be completed in the school building shall be completed after school operating hours. Any works to be completed in the school shall be completed after school operating hours while the school is unoccupied. The Contractor shall ensure that the rooms/areas that they are working are cleaned and are left in a fully functional and operating capacity so that the school can operate the next morning. All programming is to be agreed with the Employers Representative and client in advance.

It is proposed that discussions on programme will be held between all parties prior to any works commencing to agree an overall programme and timescales. The Contractor shall take this into consideration when tendering this project for

this deferral/phasing approach and all costs associated with it included within their tender.

For the duration of the works, the building will be occupied so all works shall be completed outside school operating hours and shall be completed between 4pm and 12am Monday to Friday except with the prior permission of the Employer's Representative and Client.

During the dates that the school shall be closed, the contractor will be able to work during the hours of 8am and 5pm Monday to Friday. This shall be liaised with the school to determine the exact dates where these works can be carried out.

The Contractor shall take this into consideration when tendering this project for all out-of-normal working hours and all costs associated with it included within their tender.

Each tendering contractor should allow fully with his tender price for sufficient resources for the safe execution of the contract for the anticipated programme as outlined above.

The project is programmed to be completed within a short timeframe and the Contractor must allow for the necessary resources to complete the works within this timeframe.

The Contractor shall be responsible to resource the project so that all works as identified on the tender drawings and specifications are completed in a safe and satisfactory manner before the proposed completion date.

In any event, the Contractor must allow for sufficient resources to complete all the works identified for the project and hand over to the client before the dates highlighted.

No additional cost will be paid for overtime working. The Contractor's Tender is deemed to include for the cost of all necessary overtime, attendances and all other expenses that may be necessary to execute and complete the works within the Contract Period.

(6-) ELECTRICAL WORKS

GENERAL

The Contractor shall be responsible for all electrical works as identified on the drawings. The Contractor shall employ a suitably qualified Electrical Contractor to carry out all necessary electrical works identified for this project. The Contractor shall employ a suitably qualified electrical contractor (RECI qualified and a member of the ECSSA) to carry out all necessary electrical work. The Contractor shall ensure that the full price for this work is included in the tender price.

This section of the specification outlines the electrical services installation and describes the particular requirements of the electrical services to be installed and the works carried out. This section is intended to be read in conjunction with all other technical and non-technical sections of the specification and with the tender drawings. Where this section is at variance with any other sections of the tender documents, the tenderer shall obtain clarification from the Employers Representative before tendering. Failure to do so will be deemed to imply that the most onerous requirements have been included for.

61.01 Decommissioning & removal of the existing emergency lighting system

The existing emergency lighting system including all emergency light fittings, cabling, etc. throughout the building shall be decommissioned and removed.

The Contractor shall allow for the decommissioning, stripping out and removal from site of the existing emergency lighting system, associated emergency light fittings, cabling, etc. throughout the building as indicated on the drawings. Refer to drawings for further information.

61.02 New emergency lighting system

Existing emergency lighting system in the building:

As indicated in 61.01, the existing emergency lighting system throughout the building shall be decommissioned and removed as part of the works. A new emergency lighting system as specified below shall be installed in replacement throughout the building.

Refer to the drawings for details and locations of all new emergency light fittings to be installed in the building.

New emergency lighting system to be installed:

In replacement of the existing emergency lighting system that shall be decommissioned and removed throughout the building, a new emergency lighting system shall be installed throughout the building, and this system shall be installed, commissioned and tested in compliance with I.S. 3217:2023.

The Contractor shall supply, install, connect, test and commission a new fully comprehensive operational emergency/escape lighting system for the building as indicated on the drawings.

The new emergency lighting system installation in the building shall be installed in conjunction with the new fire alarm system in the building. The objective of the system is to provide an efficient and effective emergency lighting system meeting the requirements of IS 3217:2023.

The new emergency lighting system throughout the building shall consist of standalone luminaires and exit signs, as indicated on the system drawings. In the event of circuit power failure the emergency fitting or exit sign shall illuminate for a period of 3 hours.

The emergency lighting system shall operate for a period not less than 3 hours following failure of the normal supply.

The Contractor shall supply and install an emergency lighting system for all areas of the building as indicated in compliance with IS 3217:2023, BS EN 50172 and IEC62034.

The system shall include all emergency lights and exit signs, and the Contractor shall take responsibility to ensure that all emergency luminaires are compatible with the chosen system.

Each emergency luminaire shall have a switching unit which shall automatically switch the luminaire to the emergency circuit in the event of local or mains power failure. The installation shall consist of self-contained maintained emergency exit signs with appropriate running man symbol.

Types of luminaires required for the various locations are shown on the drawings and described in the below.

The Contractor shall ensure that the luminaires are placed on order to suit the installation programme. However, approval of the Engineer shall be obtained before placing orders.

Existing Electrical Board:

All the new emergency light fittings shall be wired on the same circuits as the existing general lighting in the areas and building as indicated on the drawings. This ensures that the emergency lights will protect not just against a general power cut, but also against the failure of a lighting circuit.

If it desired to switch the normal lighting by a contactor; then this is done by the use of suitable multi pole contactors controlled as desired. The emergency lighting should be connected before the contactors, such that opening of the contactor won't discharge the batteries.

On the Contractors site survey, the Contractor shall note the number of lighting circuits in the electrical board in the building. The location and quantity of electrical boards are as indicated on the drawings.

New Emergency Lighting Test Units:

There are currently no emergency lighting test units in the existing electrical boards in the building for the emergency lighting system. As a result, the Contractor shall allow for supplying and installing new emergency lighting test units beside the existing distribution electrical boards in the School building to cater for the periodic testing of the emergency lighting luminaires throughout the building without having to switch off the relevant circuit.

In total, there are thirteen distribution boards in the school building and a new emergency lighting test unit shall be installed beside each board for the new emergency lighting system.

Refer to the drawings for the quantities and locations of the new emergency lighting test units to be supplied and installed throughout the building.

The emergency lighting system shall operate for a period not less than 3 hours following failure of the normal supply.

Each emergency lighting test unit shall be complete with interface units on the lighting MCB board as necessary.

Supplies to emergency sections of signs shall be taken from the interface unit beside the lighting MCB board fed from the MCB controlling the adjacent lighting circuit. Also, where sustained, a switched supply, taken from the same circuit, shall be run to the sustained section of the fitting together with a permanent supply.

Each emergency luminaire shall have a switching unit which shall automatically switch the luminaire to the emergency circuit in the event of local or mains power failure. The emergency lighting system shall operate for a period not less than 3 hours following failure of the normal supply.

Power to the central test unit shall be in 3 x 2.5mm² cabling in conduit from a separate circuit on the lighting circuits in the electrical board. Refer to drawings for locations and quantities.

Each new emergency lighting test unit shall be as follows and shall adhere to the following specifications:

- Shall be installed beside the existing electrical board.
- Shall have an on/off key switch for security.
- Power On Indication.
- Shall have pre-set test durations for selection with test periods of 10mins, 1 hour and 3 hours.
- Shall have LED indicators for tests.
- Shall have LED indicator for supply on.
- Audible warning on start of test and final 10 minutes of test.
- Automatic restoration of supply on completion of test.
- 220V/240V 50/60Hz, 20VA.
- CE marked.
- Conforms to EMC-89/336/EEC.
- Conforms to LVD-73/23/EEC.



Include for a metal back box for the mounting of the new central test unit beside each electrical board.

The recharge period for the batteries after full discharge shall not exceed 24 hours. A full discharge/recharge test must be performed for every luminaire during commissioning procedures.

Emergency Luminaires:

The Contractor shall supply, test and commission all the new emergency light fittings throughout the building.

Refer to the schedule of light fittings below in conjunction with the drawings for further information on all emergency light fittings to be supplied and installed in the building.

The Contractor shall ensure that all emergency luminaires (maintained and non-maintained as appropriate) shall be compatible with the emergency lighting test system.

Emergency lighting safety signs shall be positioned between 2000mm and 3000mm above finished floor level (measured to the base of the sign).

See 'Schedule of Emergency Light Fittings' below for information on all type, models and makes of emergency light fittings required for the installation.

LED Emergency Exit Signs & Control Modules:

LED Emergency Exit Signs shall be used in conjunction with remote Control Modules. The LED sign shall utilise a strip of LEDs.

Cabling:

All cable carrying mains voltage for the new emergency lighting services shall be LSZH. Wiring to all emergency light fitting shall be cabled in 3 x 2.5mm² LSZH which is installed in conduit.

Wiring to exit signs shall be also be installed in 3 x 2.5mm² LSZH in conduit to a surface outlet box over which the fitting shall be mounted.

All cabling shall low smoke and zero halogen (LSZH) insulated type, flame retardant to BS 4066, with stranded copper conductors, thermosetting insulation type E1.5 to BS 7655 all complying with BS 7211. All cabling shall be LSZH sheathed cable.

Refer to section 61.07 below for further information on cable containment and refer to section 61.07 below for further information on cabling.

All the new emergency light fittings shall be wired on the same circuits as the existing general lighting in the areas as indicated on the drawings. This ensures that the emergency lights will protect not just against a general power cut, but also against the failure of a lighting circuit.

If it desired to switch the normal lighting by a contactor; then this is done by the use of suitable multi pole contactors controlled as desired. The emergency lighting should be connected before the contactors, such that opening of the contactor won't discharge the batteries.

All new cables shall be supplied from the existing electrical distribution boards in the building.

Quantity and locations as indicated on the drawings.

Cable Carrier:

Refer to section 61.07 below for further information on cable containment.

Commissioning:

The Contractor shall make allowance for the specialist manufacturer to commission the emergency lighting system in the building in accordance with the manufacturer's recommendations.

The Contractor shall allow for fully testing and commissioning of the emergency lighting system throughout the building in full compliance with I.S. 3217:2023.

The Contractor shall allow for the following during the commissioning of the emergency lighting system for the building:

- Carry out a full test on the emergency lighting system in the building. A full discharge/recharge test must be performed for every luminaire during commissioning procedures.
- The test shall be carried out at night time when it is fully dark to see the effectiveness of the emergency lighting system in the building. Results shall be recorded and any discrepancies highlighted.
- The Contractor shall allow for the witnessing of the emergency lighting system by the Engineer in the building.
- Check all emergency light fittings in the buildings to ensure all lamps and LED indicators are operational.
- Verify sub-circuit monitoring in the building.
- Simulate power failure to each area in the building.
- Verify maximum 24-hour recharge. The recharge period for the batteries after full discharge shall not exceed 24 hours.
- Carry out a second full duration test in the buildings after the 24-hour recharge has elapsed.

Lux level check:

The Contractor shall allow for carrying out a test on the emergency lighting system in the building at night time to ensure that all lux levels are being achieved. The test shall be carried out at night time when it is fully dark to see the effectiveness of the emergency lighting system in the building. The results shall be recorded and any discrepancies highlighted.

After the test is completed, the Contractor shall confirm that all areas in the buildings are compliant with I.S. 3217:2023 and if not, what areas are not compliant.

The Contractor shall allow for the cost of labour for carrying this test outside of normal working hours.

Labelling:

The Contractor shall allow for labelling, numbering and identifying all the new emergency light fittings in the building. All fittings shall be adequately labelled with a dedicated ID number via a small adhesive sticker to identify fitting number and where it is wired from. For example, if an emergency light fitting is wired from the main electrical distribution board MDB-01, it should be labelled; MDB.01-EL-01 and MDB.01-EL-02 for the second fitting and so on. The unique label shall be highlighted on the record drawing as highlighted below.

Record Drawing:

The Contractor shall allow for preparing a record drawing of the installed emergency lighting system in the building which shall include all locations of emergency light fittings throughout the building. The Contractor shall also highlight on this drawing the location, type and ID of light fitting for the building. This record drawing shall be included in the O&M manual. It is the responsibility of the Contractor who installs the system to produce a relevant record drawing to the satisfaction of the Engineer.

Certificates:

When the system is commissioned and handed over to the Client, in compliance with I.S. 3217:2023, the Contractor shall provide the following certificates for the emergency lighting system for the building:

- Confirmation of Installation as highlighted in Annex C3 in I.S. 3217:2023.
- Confirmation of Commissioning as highlighted in Annex C4 in I.S. 3217:2023.
- Confirmation of Handover as highlighted in Annex C5 in I.S. 3217:2023.

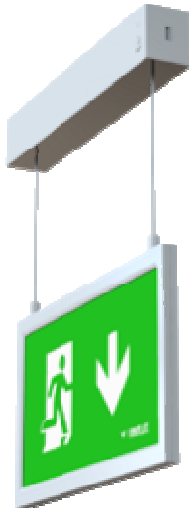
Warranties on emergency light fittings:

All emergency light fitting shall have a 6year warranty as a minimum. This warranty shall include battery replacement within the 6year warranty period.

Schedule of emergency light fittings:

The Contractor shall allow for supplying and installing the following light fittings for the emergency lighting installation in the building. All emergency light fittings shall be EMC compliant, CE Marked and manufactured to IS EN60598-2-22. See drawings for locations and quantities.

<u>Type</u>	<u>Description</u>
<u>E1</u>  Single-sided wall mounting emergency exit sign	New emergency exit light fitting with 3hr <u>maintained</u> emergency operation c/w status indicator. Light fitting shall adhere to the following: • Wall mounted emergency exit sign. • Single sided screen-printed legend panel in appropriate European signs directive format pictogram. Refer to drawing for directional arrows required. • Maintained • Body - flame retardant ABS. • Panel - flame retardant acrylic • Legend - Polypropylene • Batteries shall be rechargeable LiFePO4 Battery 6.4V 0.6Ah • Lamp Colour – 5700K • Lamp Life – L80 & B50 at 80,000hrs • IP40. • Finish shall be white (RAL 9016) • 1 watt LED strip. • Built-in downlighter (70 lumens) • Three-hour maintained. • Weight is 1.4Kg • 8-year warranty including battery • Fitting shall conform to the EN 61347-2-7, EN 61347-2-13, EN 60598-2-22 & EN 55015. • CE marked The proposed lighting fitting is <u>Ventilux Atlantic EB</u> (or equivalent).

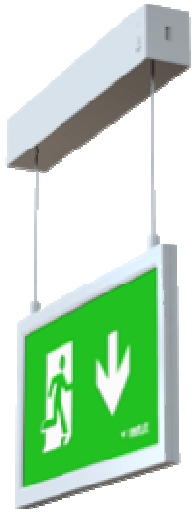
Type	Description
<u>E2</u>  Ceiling mounted hanging emergency exit sign (Double-sided)	New emergency exit light fitting with 3hr <u>maintained</u> emergency operation c/w status indicator. Refer to drawing for directional arrows required. Light fitting shall adhere to the following: • Ceiling mounted hanging emergency exit sign. • <u>Double-sided</u> screen-printed legend panel in appropriate European signs directive format pictogram. Include for legends both side of the light. • Maintained • Body - flame retardant ABS. • Panel - flame retardant acrylic • Legend - Polypropylene • Batteries shall be rechargeable LiFePO4 Battery 6.4V 0.6Ah • Lamp Colour – 5700K • Lamp Life – L80 & B50 at 80,000hrs • IP40. • Finish shall be white (RAL 9016) • 1 watt LED strip. • Built-in downlighter (70 lumens) • Three-hour maintained. • Weight is 1.4Kg • 8-year warranty including battery • Fitting shall conform to the EN 61347-2-7, EN 61347-2-13, EN 60598-2-22 and EN 55015 standards. • CE marked The proposed lighting fitting is <u>Ventilux Atlantic SP Gen 2</u> (or equivalent).

Type	Description
<u>E3</u>  Single-sided directional wall mounting emergency exit sign	New emergency exit light fitting with 3hr <u>maintained</u> emergency operation c/w status indicator. Light fitting shall adhere to the following: • Wall mounted emergency exit sign. • Single sided screen-printed legend panel in appropriate European signs directive format pictogram. Refer to drawing for directional arrows required. • Maintained • Body - flame retardant ABS. • Panel - flame retardant acrylic • Legend - Polypropylene • Batteries shall be rechargeable LiFePO4 Battery 6.4V 0.6Ah • Lamp Colour – 5700K • Lamp Life – L80 & B50 at 80,000hrs • IP40. • Finish shall be white (RAL 9016) • 1 watt LED strip. • Built-in downlighter (70 lumens) • Three-hour maintained. • Weight is 1.4Kg • 8-year warranty including battery • Fitting shall conform to the EN 61347-2-7, EN 61347-2-13, EN 60598-2-22 & EN 55015. • CE marked The proposed lighting fitting is <u>Ventilux Atlantic EB</u> (or equivalent).

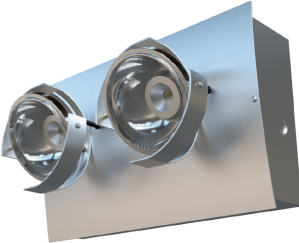
Type	Description
<u>E4</u>  Wall mounted IP65 rated emergency exit sign	New IP65 rated emergency exit light fitting with 3hr <u>maintained</u> emergency operation c/w status indicator. Refer to drawing for directional arrows required. Light fitting shall adhere to the following: • Wall mounted emergency exit sign. • Maintained • Housing - Polycarbonate • Panel - Polycarbonate • Gear tray - powder coated sheet steel. • Batteries shall be rechargeable high temp Ni-Mh 4.8V 1.3Ah • IP65 rated. • Finish shall be white (RAL 9016) • Lamp power – 1 watt • Lamp Life – L80 & B50 at 80,000hrs • Class I. • 188lumens in emergency • Lamp colour - 6500K • Three-hour maintained. • 8-year warranty • Fitting shall conform to the EN 61347-2-7, EN 61347-2-13, EN 60598-2-22 and EN 55015 standards. • CE marked The proposed lighting fitting is <u>Ventilux Visor Pro</u> (or equivalent).

Type	Description
<u>E5</u>  Surface mounted fitting with 'Open Plan' lens	New self-contained standalone surface mounted LED emergency light downlighter (<u>Open Area Version</u>). Fitting shall be a high performance LED light fitting. Light fitting shall be a <u>non-maintained</u> emergency operation c/w status indicator. Light fitting shall adhere to the following: • Surface mounted for open area version. Supplied with the <u>open plan lens</u> (symmetrical light pattern). • Self-contained. • Non-maintained • Dimensions of fitting is 150mm long by 150mm wide by 39mm high. • Lamp power - 4.0 Watt (2no x 2watt) • Lamp colour - 5000K. • Weight is 1Kg. • 510 lumens in emergency • Material of fitting is ABS. • Batteries (self-contained) – 6.4V, 3.2Ah LiFePO4 • Non-Maintained 3 hour duration • Class II. • IP40 • Colour shall be white RAL 9016 • Status indicator to indicate operational condition. • 8-year warranty. • CE marked. • Fitting shall conform to the EN 61347-2-7, EN 61347-2-13, EN 60598-2-22 and EN 55015 standards. The proposed lighting fitting is <u>Ventilux Delta SM (OP)</u> (or equivalent).

Type	Description
E6  Surface mounted fitting with 'Corridor' lens	New self-contained standalone surface mounted LED emergency light downlighter (<u>Corridor Version</u>). Fitting shall be a high performance LED light fitting. Light fitting shall be a <u>non-maintained</u> emergency operation c/w status indicator. Light fitting shall adhere to the following: • Surface mounted for corridor version. Supplied with the <u>corridor lens</u> (symmetrical light pattern). • Self-contained. • Non-maintained • Dimensions of fitting is 150mm long by 150mm wide by 39mm high. • Lamp power - 4.0 Watt (2no x 2watt) • Lamp colour - 5000K. • Weight is 1Kg. • 510 lumens in emergency • Material of fitting is ABS. • Batteries (self-contained) – 6.4V, 3.2Ah LiFePO4 • Non-Maintained 3 hour duration • Class II. • IP40 • Colour shall be white RAL 9016 • Status indicator to indicate operational condition. • *-year warranty. • CE marked. • Fitting shall conform to the EN 61347-2-7, EN 61347-2-13, EN 60598-2-22 and EN 55015 standards. The proposed lighting fitting is <u>Ventilux Delta SM (OP)</u> (or equivalent).

Type	Description
<u>E7</u>  Ceiling mounted hanging emergency exit sign (Single-sided)	New emergency exit light fitting with 3hr <u>maintained</u> emergency operation c/w status indicator. Refer to drawing for directional arrows required. Light fitting shall adhere to the following: • Ceiling mounted hanging emergency exit sign. • <u>Single-sided</u> screen-printed legend panel in appropriate European signs directive format pictogram. • Maintained • Body - flame retardant ABS. • Panel - flame retardant acrylic • Legend - Polypropylene • Batteries shall be rechargeable LiFePO4 Battery 6.4V 0.6Ah • Lamp Colour – 5700K • Lamp Life – L80 & B50 at 80,000hrs • IP40. • Finish shall be white (RAL 9016) • 1 watt LED strip. • Built-in downlighter (70 lumens) • Three-hour maintained. • Weight is 1.4Kg • 6-year warranty including battery • Fitting shall conform to the EN 61347-2-7, EN 61347-2-13, EN 60598-2-22 and EN 55015 standards. • CE marked The proposed lighting fitting is <u>Ventilux Atlantic SP Gen 2</u> (or equivalent).

<u>Type</u>	<u>Description</u>
<u>E8</u>  IP65 rated LED bulkhead fitting	New self-contained standalone wall/ceiling mounted LED emergency bulkhead with 3hr <u>non-maintained</u> emergency operation c/w status indicator. Ceiling or wall mounted version dependent on location. Light fitting shall adhere to the following: • Surface mounted bulkhead. • IP65 rated for external use. • Self-contained. • 8 high output white LED's • Lamp colour - 5000K. • Lamp power is 1W. • 120 lumens in emergency • Body - flame retardant ABS plastic. • Diffuser - flame retardant clear ABS plastic. • Gear Tray - powder coated sheet steel. • Batteries (self-contained) - 4.8V 1.3A/h Ni-Mh • Colours shall be White RAL 9016. • Class I. • 6-year warranty. • CE marked. • Fully compliant to EN60598-2-22 The proposed lighting fitting is <u>Ventilux Visor 120</u> (or equivalent).

<u>Type</u>	<u>Description</u>
<u>E9</u>  Surface mounted twinspot fitting	New self-contained standalone wall/ceiling mounted LED emergency bulkhead with 3hr <u>non-maintained</u> emergency operation c/w status indicator. Ceiling or wall mounted version dependent on location. Light fitting shall adhere to the following: • Surface mounted bulkhead. • IP40 rated. • Self-contained. • 8 high output white LED's • Lamp colour - 6000K. • Lamp power is 2 x 3W. • 2 x 300 lumens in emergency • Body – Powder coated steel • Lid – Stainless steel. • Reflectors – Polished Aluminium. • Batteries (self-contained) - 4.8V 4.5A/h Ni-Cd • Colours shall be chrome. • Class I. • 6-year warranty. • CE marked. • Fully compliant to EN60598-2-22 The proposed lighting fitting is <u>Ventilux Scout</u> (or equivalent).

Demonstration and handover:

The Contractor shall allow for the full demonstration and handover of the emergency lighting system in the building to the Engineer and the School Authority.

Completion record sheet shall be completed and returned to the Consulting Employer's Representative upon completion of initial handover demonstration.

61.03 Maintenance of the new emergency lighting system

The Contractor shall be responsible for the first years servicing and maintenance of the new emergency lighting system in the building once all new works are completed.

The Contractor shall include the cost of this in his submitted tender costs.

The emergency lighting system shall be maintained in compliance with I.S. 3217:2023 and shall include for four maintenance visits per year.

61.04 Decommissioning & removal of the existing fire alarm system

The existing fire alarm system including all smoke detectors, heat detectors, fire alarm interfaces, fire alarm panel, cabling, etc. throughout the building shall be decommissioned and removed.

The Contractor shall allow for the decommissioning, stripping out and removal from site of the existing fire alarm system, associated smoke detectors, heat detectors, fire alarm interfaces, cabling, etc. throughout the building as indicated on the drawings. Refer to drawings for further information.

61.05 New fire alarm system to be installed in the building

General:

As indicated above in 61.04, the existing fire alarm system throughout the building shall be decommissioned and replaced with a new fire alarm system.

The Contractor shall allow for the supply, installation and commissioning of a new fire alarm installation throughout the building as indicated on the drawings. The new fire alarm system shall be installed and commissioned in compliance with I.S. 3218:2024.

All new devices as indicated for the building shall be wired back and connected to the new main fire alarm panel which shall be located at the main entrance of the building. See drawings for the locations throughout the building where new fire alarm system devices shall be installed and the main fire alarm panel.

The fire alarm system to be installed in the building shall be a fully addressable L1 type fire alarm system that is fully in accordance with I.S. 3218:2024 and as identified in the drawings.

The system shall comprise ionisation and optical smoke detectors, heat detectors, combined heat detectors, combined smoke detectors, alarm beacons/sounders, visual alarm devices, manual call points, magnetic door contacts, fire alarm interfaces, short circuit isolators, aspiration fire alarm systems and similar alarm input devices, located as shown on the drawings.

The devices shall be connected in loops to the compact wall mounted addressable control and indicator panels located as indicated on the drawings.

The new fire alarm system for the building shall be an 'Open Protocol' system with unrestricted access to replacement components and software so that there is no impediment to its future maintenance by companies selected by the Client.

Main fire alarm panel at the main entrance in the building:

A new main fire alarm panel shall be installed at the main entrance to the building as indicated on the drawings. This panel shall be a compact wall mounted addressable control and indicator panel. All devices within the building shall be connected in loops, to this main fire alarm panel.

See drawings for the locations throughout the building where new fire alarm system devices shall be installed. Should any device within the building go into alarm or fault, the precise zone and state of that device shall be displayed in alphanumeric form on the liquid crystal display (with a minimum capability of 32 characters) of the main fire alarm panel.

The recommended maximum mounting heights for the fire alarm panel is 1800mm to the upper edge of the cabinet and 1400mm to the bottom of the cabinet.

The new fire alarm system for the building shall be an 'Open Protocol' system with unrestricted access to replacement components and software so that there is no impediment to its future maintenance by companies selected by the Client.

The main fire alarm panel shall adhere to the following specification:

- Type: Addressable and fully networkable.
- Quantity: 1no
- Proposed panel: Advanced MxPro 5401, or equivalent.
- Base Technology: Dual flash-based processors with real-time clock, trace diagnostics, programmable languages and character sets.
- Display: White backlit 240 x 64 graphical LCD.
- LED Indicators: 22 red (1 x Fire, 1 x More Alarms, 20 x Zonal Programmable), 1 green (Power), 13 amber and 12 bi-colour (Fault & System).
- Controls: Alpha numeric keypad permitting Navigation, Reset, Mute, Silence, Resound, Evacuate, and 4 x Programmable Push Buttons.
- Protocols: Apollo (Xp95 / Discovery), Argus Vega, Hochiki ESP.
- Number of Loops: 4-loop control panel.
- Loop cards: 2no.
- Devices per loop: Protocol dependent.
- Loop Current: 500mA per loop.
- On-Board Sounder Circuits: 4 x 1 Amp programmable.
- On-Board Relays: 2 x 1 Amp 30v AC/DC programmable.
- Auxiliary Supply: 1 x 24v 500mA.
- Programmable Input: 1 x monitored programmable input on-board.
- Programmable Key Switch Inputs: 8 volt free inputs.
- Total Available 5A maximum available for loop current + sounder.

- Output Current: outputs + auxiliary supply.
- Mains Supply: 200 - 240v 47-63 Hz AC (+10%, -15% tolerance)
1.4A max.
- Battery Capacity: 24V 4Ah internal (min), 24V, 18Ah internal (max),
deep enc. (D) - 24v, 45Ah internal (max).
- Charger Current: 2A temperature compensated.
- Serial ports: 1 x on-board RS232 connection for PC, modem, IP or
portable printer.
- USB Interface: 1 x USB B type connection for PC communication.
- Programming: On-board keypad or PC running Windows tools.
- Event Log: 5000 Event & Diagnostic + 500 Fire Networking.
- Plug-in
Network Card: Yes.
- GSM Card: Yes. For remote monitoring.
- Enclosure rating: IP30.
- Colour Steel: RAL7035.
- Temp range: -5°C to + 40°C.
- Humidity range: 10% to 90% RH (non condensing).
- Mounting: Surface mounted.
- Size H x W x D mm: 470mm x 450mm x 190mm.
- Warranty: 3 years.
- Approvals: I.S. 3218:2024, EN 54-2:1998, EN 54-4:1998 and
EN 54-13:2005.



The main fire alarm panel shall have provision to drive and monitor up to four repeater panels providing a repeat of the indications on the Control and Indicating Equipment display.

The fire alarm panel shall be capable of the following basic system functions:

- Monitor the status of all devices on the addressable loops for fire, short-circuit fault, open-circuit fault, fault tolerance, incorrect addressing, unauthorised device removal or exchange, pre-alarm condition and contaminated detector condition.
- Monitor the status of all internal connection and interfaces, including charger, battery and remote signalling functions.
- Monitor all critical system components and interconnections (internal and external). In the event of a failure occurring which prevents correct operation of the alarm.
- Provide text messages to indicate the precise location of where a fault has occurred in the system.
- The extract shall remain operational during a fire event.

Fire isolation switch at the main fire alarm panel in the building:

The Contractor shall allow for the supply and installation of a fire isolation switch for the isolation of the power supply to the main fire alarm panel in the building.

This switch shall provide a secure method of isolating the mains supply to the fire system control panel. Each fire isolation switch shall adhere to the following:

- Shall comply with BS5839 Part1.
- Shall be operated via a key only. Include for a spare key.
- Key removable in both ON and OFF positions.
- Durable fire red casing for easy visual identification.
- Power indication LED.



Zoning:

Addressable input and output devices shall be connected to addressable loops capable of accepting up to 99 devices. The fire alarm system shall have a minimum capacity for operating four fully loaded addressable loops.

Provision shall be made for each addressable loop to be sub-divided into a maximum of five geographical zones. The section of wiring corresponding to each zone circuit shall be protected from faults in other sections by line isolator modules. It shall be possible to allocate all 99 addressable devices on the loop to a single zone.

Smoke detectors:

The Contractor shall allow for the supply and installation of all smoke detectors throughout the building as indicated on the drawing. All new detector heads shall include a condition indicating LED light and the smoke detectors sensors shall be complete with bases. The Contractor shall supply necessary address flags and address labels for all devices.

All new automatic fire detectors shall generally be of the optical smoke detectors type.

These detectors shall have an address code setting and shall be addressable and suitable for an addressable fire alarm system. Separate addressable plugs for each detector shall be provided.

The Contractor shall label each detector and base with address number. The colour of detectors shall be white.

Detectors to be of the optical point type unless otherwise indicated on the drawings and shall be in accordance with B.S. 5446-1, I.S. EN 54-7 and I.S. 3218:2024. Sensitivity of the smoke detectors shall be set by the main panel control software. Wiring used for detectors shall be in compliance with I.S. 3218:2024. Smoke detectors shall adhere to the following specifications:

- Type: Addressable optical smoke detector
- Sensor Method: Light Scatter
- Sensor Element: IR Diode
- Conditioning light: Yes
- Operating Voltage: 20V d.c. to 35V d.c.
- System Voltage: 35V d.c.
- Quiescent Current: 200µA
- Alarm Current: 5mA
- Operating Temp: -10°C to + 55°C
- Storage Temp: -20°C to + 60°C
- Charging Time: 4 minutes
- Relative Humidity <RH95% non-condensing.
- I.P. Rating: IP40
- Addressing Method: Soft addressing, Non-Volatile EEPROM.
- Material: ABS
- EMC Conformance: EMC conformance to BSEN50130-4.
- CE Conformity: Yes
- Certification: EN54-7 / LPCB 041, I.S. 3218:2024, BS 5446-1, IS EN 54-7.



Multi detectors:

The Contractor shall allow for the supply and installation of all multi detectors throughout the building as indicated on the drawing. All new detector heads shall include a condition indicating LED light and the multi detector sensors shall be complete with bases. The Contractor shall supply necessary address flags and address labels for all devices.

All new automatic fire detectors shall generally be of the optical multi detectors type.

These detectors shall have an address code setting and shall be addressable and suitable for an addressable fire alarm system. Separate addressable plugs for each detector shall be provided.

The Contractor shall label each detector and base with address number. The colour of detectors shall be white.

Detectors to be of the optical point type unless otherwise indicated on the drawings and shall be in accordance with B.S. 5446-1, I.S. EN 54-7 and I.S. 3218:2024. Sensitivity of the multi detectors shall be set by the main panel control software. Wiring used for detectors shall be in compliance with I.S. 3218:2024. Multi detectors shall adhere to the following specifications:

- Type: Addressable optical multi detector
- Sensor Method: Light Scatter
- Sensor Element: IR Diode
- Conditioning light: Yes
- Operating Voltage: 20V d.c. to 35V d.c.
- System Voltage: 35V d.c.
- Quiescent Current: 200µA
- Alarm Current: 5mA
- Operating Temp: -10°C to + 55°C
- Storage Temp: -20°C to + 60°C
- Charging Time: 4 minutes
- Relative Humidity: <RH95% non-condensing.
- I.P. Rating: IP40
- Addressing Method: Soft addressing, Non-Volatile EEPROM.
- Material: ABS
- EMC Conformance: EMC conformance to BSEN50130-4.
- CE Conformity: Yes
- Certification: EN54-7 / LPCB 041, I.S. 3218:2024, BS 5446-1, IS EN 54-7.



Heat detectors:

The Contractor shall allow for the supply and installation of all new heat detectors throughout the building as indicated on the drawing.

All new detector heads shall include a condition indicating LED light and the heat detectors sensors shall be complete with bases.

The Contractor shall supply necessary address flags and address labels for all devices. These detectors shall have an address code setting and shall be addressable and suitable for an addressable fire alarm system. Separate addressable plugs for each detector shall be provided.

The Contractor shall label each detector and base with address number. The colour of detectors shall be white. Detectors to be of the optical point type unless otherwise indicated on the drawings and shall be in accordance with B.S. 5446-1, I.S. EN 54-7 and I.S. 3218:2024. Sensitivity of the smoke detectors shall be set by the main panel control software.

Wiring used for detectors shall be in compliance with I.S. 3218:2024.

Heat detectors shall adhere to the following specifications:

- Type: Addressable heat detector
- Sensor Method: Thermistor
- Sensor Element: Thermistor
- Conditioning light: Yes
- Operating Voltage: 20V d.c. to 35V d.c.
- System Voltage: 35V d.c.
- Quiescent Current: 200µA
- Alarm Current: 5mA
- Operating Temp: -10°C to + 80°C
- Storage Temp: -20°C to + 60°C
- Charging Time: 4 minutes
- Relative Humidity <RH95% non-condensing.
- I.P. Rating: IP40
- Addressing Method: Soft addressing, Non-Volatile EEPROM.
- Material: ABS
- EMC Conformance: EMC conformance to BSEN50130-4.
- CE Conformity: Yes
- Certification: EN54-5 / LPCB 041, I.S. 3218:2024, BS 5446-2, IS EN 54-7.



Combined smoke detectors and sounders:

A number of new sounders shall be combined with smoke detectors as indicated on the drawings. The Contractor shall allow for the supply and installation of all new addressable combined smoke detector and sounder heads throughout the building. Each head shall include a condition indicating LED light and a suitable base for the sounder. All new detector heads shall include a condition indicating LED light and the smoke detectors sensors shall be complete with bases.

See 'smoke detectors' section above for specification on smoke detectors.

The Contractor shall supply necessary address flags and address labels for all devices. Wiring used for detectors shall be in compliance with I.S. 3218:2024.

Combined smoke detectors and sounders shall adhere to the following specifications:

- Type: Addressable optical smoke detector and sounder
- Sounder Base: Yes
- Sound output: 96dB(A) at 1metre
- Sensor Method: Light Scatter
- Sensor Element: IR Diode
- Conditioning light: Yes
- Operating Voltage: 20V d.c. to 35V d.c.
- System Voltage: 35V d.c.
- Quiescent Current: 200µA
- Alarm Current: 5mA
- Operating Temp: -10°C to + 55°C
- Storage Temp: -20°C to + 60°C
- Charging Time: 4 minutes
- Relative Humidity <RH95% non-condensing.
- I.P. Rating: IP40
- Addressing Method: Soft addressing, Non-Volatile EEPROM.
- Material: ABS
- EMC Conformance: EMC conformance to BSEN50130-4.
- CE Conformity: Yes
- Certification: EN54-7 / LPCB 041, I.S. 3218:2024, BS 5446-1, IS EN 54-7, BSEN50130-4, EN54-7, EN54-2 and EN54-17.



Combined multi detectors and sounders:

A number of new sounders shall be combined with multi detectors as indicated on the drawings. The Contractor shall allow for the supply and installation of all new addressable combined multi detector and sounder heads throughout the building. Each head shall include a condition indicating LED light and a suitable base for the sounder. All new detector heads shall include a condition indicating LED light and the multi detectors sensors shall be complete with bases.

See 'multi detectors' section above for specification on multi detectors.

The Contractor shall supply necessary address flags and address labels for all devices. Wiring used for detectors shall be in compliance with I.S. 3218:2024.

Combined multi detectors and sounders shall adhere to the following specifications:

- Type: Addressable optical multi detector and sounder
- Sounder Base: Yes
- Sound output: 96dB(A) at 1metre
- Sensor Method: Light Scatter
- Sensor Element: IR Diode
- Conditioning light: Yes
- Operating Voltage: 20V d.c. to 35V d.c.
- System Voltage: 35V d.c.
- Quiescent Current: 200µA
- Alarm Current: 5mA
- Operating Temp: -10°C to + 55°C
- Storage Temp: -20°C to + 60°C
- Charging Time: 4 minutes
- Relative Humidity <RH95% non-condensing.
- I.P. Rating: IP40
- Addressing Method: Soft addressing, Non-Volatile EEPROM.
- Material: ABS
- EMC Conformance: EMC conformance to BSEN50130-4.
- CE Conformity: Yes
- Certification: EN54-7 / LPCB 041, I.S. 3218:2024, BS 5446-1, IS EN 54-7, BSEN50130-4, EN54-7, EN54-2 and EN54-17.



Combined heat detectors and sounders:

A number of new sounders shall be combined with heat detectors as indicated on the drawings. The Contractor shall allow for the supply and installation of all new addressable combined heat detector and sounder heads throughout the building. Each head shall include a condition indicating LED light and a suitable base for the sounder.

All new detector heads shall include a condition indicating LED light and the heat detectors sensors shall be complete with bases. See 'heat detectors' section above for specification on heat detectors. The Contractor shall supply necessary address flags and address labels for all devices. Wiring used for detectors shall be in compliance with I.S. 3218:2024.

Combined heat detectors and sounders shall adhere to the following specifications:

- Type: Addressable heat detector and sounder
- Sounder Base: Yes
- Sound output: 96dB(A) at 1metre
- Sensor Method: Thermistor
- Sensor Element: Thermistor
- Conditioning light: Yes
- Operating Voltage: 20V d.c. to 35V d.c.
- System Voltage: 35V d.c.
- Quiescent Current: 200µA
- Alarm Current: 5mA
- Operating Temp: -10°C to + 80°C
- Storage Temp: -20°C to + 60°C
- Charging Time: 4 minutes
- Relative Humidity <RH95% non-condensing.
- I.P. Rating: IP40
- Addressing Method: Soft addressing, Non-Volatile EEPROM.
- Material: ABS
- EMC Conformance: EMC conformance to BSEN50130-4.
- CE Conformity: Yes
- Certification: EN54-5 / LPCB 041, I.S. 3218:2024, BS 5446-2, IS EN 54-7, BSEN50130-4, EN54-7, EN54-2 and EN54-17.



Void Detectors:

New void detectors shall be installed in the ceiling void in the building to protect the ceiling void as indicated on the drawings.

Smoke or heat detectors above the ceiling shall be complete with a remote monitoring indicating LED. The remote monitoring LED indicator lamp shall be installed below the ceiling so that users of the building will know if the void detector above the ceiling is in alarm.

Allow for installing detectors in the ceiling spaces and subsequent LED indicators in the ceiling below the detector.

See 'smoke detectors' section above for specification on smoke detectors. The Contractor shall supply necessary address flags and address labels for all devices.

Wiring used for detectors shall be in compliance with I.S. 3218:2024.



Attic Detectors:

New smoke void detectors shall be installed in the attic to protect the attic/ceiling void as indicated on the drawings. These shall be installed at the highest point of the attic.

Multi, smoke or heat detectors in the attic shall be complete with a remote monitoring indicating LED. The remote monitoring LED indicator lamp shall be installed below the ceiling at low level so that users of the building will know if the void detector above the ceiling is in alarm.

Allow for installing detectors in the attic and subsequent LED indicators in the ceiling below the detector.

See 'smoke detectors' section above for specification on smoke detectors. The Contractor shall supply necessary address flags and address labels for all devices.

Wiring used for detectors shall be in compliance with I.S. 3218:2024.

Manual Call points (break-glass units):

The Contractor shall allow for the supply and installation of all new manual call points in the building as indicated on the drawing.

Manual call points shall be surface mounted as indicated on the drawings. All points to be fully resettable type via key operation. Break glass units will not be accepted as all manual call points shall be PVC. All call points shall be supplied c/w surface mounting back box to suit.

Call points to be installed 1100mm from the finished floor level and 150mm from doorframes.

Wiring used for manual call points shall be in compliance with I.S. 3218:2024.

Manual call points shall adhere to the following specifications:

- Type: Addressable manual call point
- Operating Method: Non Frangible, Resettable
- Operating Element: Microswitch
- Conditioning light: Yes
- Operating Voltage: 20V d.c. to 35V d.c.
- System Voltage: 35V d.c.
- Quiescent Current: 200µA
- Alarm Current: 2mA
- Operating Temp: -25°C to + 70°C
- Storage Temp: -25°C to + 70°C
- Charging Time: 1 minute
- Relative Humidity <RH95% non-condensing.
- I.P. Rating: IP24
- Addressing Method: 8 Way DIL switch
- Material: POM / Polycarbonate
- EMC Conformance: EMC conformance to BSEN50130-4.
- CE Conformity: EN54-11 & EN54-17
54-7.



Combined smoke detector, sounder and Visual Alarm Devices (VAD's):

Some smoke detectors in the building shall be combined with visual aid devices (VAD's) as indicated on the drawing as indicated on the drawings. These are indicated as 'VSS' fire alarm devices on the drawings and are installed in the toilets in the building as indicated on the drawings.

The Contractor shall allow for the supply and installation of all addressable combined smoke detectors and VAD's throughout the building in the locations as indicated which is mainly the toilet areas. All new detector heads shall include a condition indicating LED light.

See 'combined smoke detectors and sounders' section above for specification on the combined smoke detectors and sounders. The Contractor shall supply necessary address flags and address labels for all devices. Wiring used for combined detectors/sounders and VAD's shall be in compliance with I.S. 3218:2024.

The combined detector, sounder and VAD unit shall be ceiling mounted and shall be EN54-23 Compliant VAD and shall have low current consumption. The combined detector and VAD unit shall adhere to the following specifications:

- Mounting Height: 3m
- Mounting type: Ceiling mounted
- Sounder Base: Yes
- Sound output: 96dB(A) at 1metre
- Operating Temp: -20°C to + 50°C
- Ingress protection: IP21C
- Isolator: Yes
- Flash rate: Once per second
- Operating Voltage: 17-60V DC Polarity Sensitive
- Monitoring: Reverse Polarity
- Body Colour: White
- Flash Colour: White
- EN54-23 Coverage Code: C-3-8
- Coverage area: 8m cylinder diameter coverage
- Compliant with standards: EN54 Part 5, 7, 17 and 23
AS7240 15 (5&7) & 23

Wiring used for devices shall be in compliance with I.S. 3218:2024.



External Alarm Sounder and Beacon:

A suitable weather resistant LED beacon and electronic bell sounder shall be supplied and installed by the Contractor in the areas of the building as indicated on the drawing. External fire alarm sounders must have a distinct sound to any other sound activating unit such as intruder alarm system.

The sounders shall automatically silence after a period of 15minutes but the visual indicator on the external sounder shall continue to operate until the panel is reset.



Sounders shall adhere to the following specifications:

- Type: Weather resistant flasher & electronic bell sounder
- Sound level: 109dBa
- Operating Voltage: 18V d.c. to 35V d.c.
- Number of tones: 32
- Operating frequency: 440Hz to 2900Hz
- Flash rate: c. 1Hz
- Operating Temp: -20°C to + 70°C
- I.P. Rating: IP65
- CE Conformity: EN54-11 & EN54-17

Internal Magnetic Door Contacts:

The Contractor shall include for the supply and fitting of new magnetic door holders on fire doors in the corridors as indicated on the drawings.

All new magnetic door contacts shall be linked/interfaced to the fire alarm system and power supply units as required.

All magnetic door holders shall be complete with manual over-ride switches and power supply units. See drawing for quantity and location of magnetic door contacts.

Door holders shall hold fire doors in the open position in normal operation, releasing the door to swing closed on fire alarm activation or loss of mains power. Door holders shall be wall mounted magnetic type, metal robust construction, supplied with 12 or 24 volt transformer and incorporating a release switch accessible from floor level.

Each door holder shall be supplied with a receiver to be mounted on the door, with an articulated joint to ensure holding of the door by the wall magnet.

Door holders shall be suitable for releasing fire doors, with rated power size of 4 for an 100mm door leaf with shear force of 80kg in accordance with European Standards BS-EN: 1155. Wiring used for devices shall be in compliance with I.S. 3218:2024.



Aspiration smoke detection system for the lift:

General:

The Electrical Contractor shall include for the supply and fitting of a new aspiration smoke detection system for the lift. This aspiration smoke detection system shall be linked/interfaced to the fire alarm system and power supply units as required. The aspiration detection control panel shall be connected to the fire alarm system and upon activation of the aspiration system, a signal shall be sent to the main fire alarm system.

The aspiration smoke detection (ASD) control system shall adhere to the following parameters:

- 5 alarm levels (3 pre-alarms and 2 alarms)
- Response sensitivity settable from 0.002–10%/m
- Insensitive to dirt particles thanks to particle suppression
- Auto-learning function
- Low noise level, compliant with ISO 11690-1
- Low power consumption
- Individually Replaceable Components (Sensors, PCB's etc)

The aspiration smoke detection system shall include sampling pipes, detection panel and all associated cabling and wiring.

The aspiration smoke detection control panel shall be installed at high level outside the lift. This control panel shall be linked to a red tube that shall be installed in the lift shaft as indicated on the drawings. See drawing for the location of the aspiration smoke detection control panel and the aspiration tube in the lift shaft.

The aspiration smoke detection system shall comply with I.S. EN 54-20, BS 5839, BS 6266, ISO 7240-20 and I.S. 3218:2013+A1:2019

Wiring used for the system shall be in compliance with I.S. 3218:2013+A1:2019.

Aspiration System Pipework:

The sampling pipe shall be installed in red ABS pipe. Sampling pipe shall be red, with printed warning text to identify them as the air sampling pipe network of the aspirated smoke detector.

Pipework shall comply with I.S. EN 54-20 and EN 61386.

All sampling pipework shall be external diameter 25mm and shall be red ABS pipe.

Allow for all necessary adaptors, elbows, connection pieces, etc. in installing the pipework.

Refer to drawings for the quantity of 25mm red ABS fire aspiration tubing required for this project. Allow for all necessary joints, tees, joints, brackets, etc. for the successful installation of the aspiration pipework.

Refer to detail on the drawing for further information on the piping arrangement.

Aspiration pipework shall adhere to the following specifications:

- Pipe and Fittings shall be red ABS that is approved to BS EN ISO 9001, EN54 - 20 and EN61386-1 Class 1131
- Suitable for temperatures ranging from -40°C to 70°C
- Easy to Joint
- Red in colour
- 25mm in size

Test point:

The Contractor shall allow for a test point to be installed all the aspiration system pipework so that the system can be tested.

Refer to drawings for quantities of all test points required. Refer to detail on the drawing for further information.

These will be installed on the 25mm aspiration pipework.



Non-return end cap:

The Contractor shall allow for a non-return end cap on the end of the aspiration system pipework.

This will be installed on the 25mm aspiration pipework.

Refer to drawings for quantities of all non-return end caps required. Refer to detail on the drawing for further information.



Filter:

The Contractor shall allow for a filter on all the 25mm aspiration pipework as it enters the panel so that no dust is entering the panel. Refer to detail on the drawing for further information.



Manual blow through valve:

The Contractor shall allow for a manual blow through valve on the 25mm aspiration pipework as it enters the panel. Refer to detail on the drawing for further information.

Aspiration control panel:

The panel for the aspiration system shall be as a Vesda VEU-A10 panel, or equivalent.



The panel shall adhere to the following specifications:

- Robust IP40 rated enclosure equipped with a powerful aspirator that provides a total pipe length of 800metres.
- Panel shall feature a 3.5" colour touch screen display which shall provide a range of status information.
- Wifi connectable and Ethernet connectable.
- Supply voltage is 18-30 VDC (24V nominal)
- Dimensions is 350mm x 225mm x 135mm
- Weight is 5kg.
- Operation conditions is -20°C to 60°C
- Humidity conditions is 10% to 95% RH, non-condensing.
- Seven programmable relays

- Ultrasonic flow sensing
- VESDAnet networking
- Ultrasonic flow sensing
- VESDAnet networking

General fire alarm interface units (I/O units):

The Contractor shall allow for the supply and installation of all standard fire alarm interface units as indicated on the drawing and for the linking of these to the relevant systems as indicated. Interface units (Input/Output models) shall be provided as indicated on the system drawings. Short circuit isolators shall be installed where the loop wiring crossed a fire compartment wall and where the wiring enters another fire zone.

In addition to the items above, the following items shall be connected and interfaced to the fire alarm system and as a result interface I/O units will be required at all equipment:

- MCC controls panel
- Gas detection panel
- Door access controllers
- Any other items described on the drawings.



Internal Beacons:

In some areas of the building, internal flashing LED beacons shall be supplied and installed by the Contractor as indicated on the drawings.

All these LED beacons shall be IP67 rated and as a result shall be glanded from the bottom with an appropriate gland to prevent water ingress.

Beacons shall adhere to the following specifications:

- Type: Flashing xenon beacon
- IP rating: IP67
- Base diameter: 85mm
- Mounting Style: Ceiling mounted
- Lamp included: Yes

- Bulb type: LED
- Housing colour: Red
- Lens colour: Red
- Light effect: Flashing
- Operating Voltage: 24V d.c.
- Operating Temp: -20°C to + 40°C
- CE Conformity: Yes



Drawing/Map:

The Contractor shall allow for installing a laminated A3 drawing of the fire alarm system installation and devices in the building at the main fire alarm panel location to indicate where all fire alarm devices are located throughout the building.

This drawing shall indicate and identify the location of the fire alarm devices throughout the building i.e. on the alarm panel if it identifies that the device 45 has gone into alarm, you should be able to see on the drawing where device 45 is located.

Wiring:

General:

All new cabling used for the fire alarm system throughout the building shall meet classification 'PH120 Enhanced'.

A fire-resistant cable with a lesser PH classification than PH120 and if not of enhanced grade status shall not be permitted on this project.

The entire fire alarm system shall be wired in 2 x 2.5mm² 'Prysmian FP Plus' fire alarm cabling (or equivalent) as specified below. Cabling shall be 2core and earth type.

The fire alarm cable shall be rated at 120mins in compliance with BS 8432-2 (flame, shock and water spray). The fire-resisting cable shall have 2-hour fire rating according to IEC 331.

All cabling shall be manufactured by a BASEC approved manufacturer. Cables shall be installed strictly in accordance with the manufacturer's requirements.

The enhanced PH120 fire alarm cabling shall satisfy the following requirements for integrated water spray and mechanical shock:

Conductor:

Plain annealed copper. Solid 2 x 2.5mm² to meet the requirements of BS EN 60228 class 1 or class 2.

Insulation:

High performance, damage resistant enhanced insulation to meet BS EN 50363-5, Type EI5.

Overall metallic screen and CPC:

Polyester backed laminated aluminium or copper tape bonded to outer sheath to provide overall screen. In contact with full sized, tinned annealed copper circuit protective conductor and laid-up with the cores to provide automatic screen earthing.

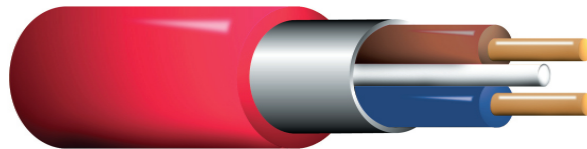
Sheath:

Robust thermoplastic low smoke, zero halogen and reduced flame propagation outer sheath. Suitable for outdoor installation with exposure to normal daylight UV. Sheath shall be coloured 'Red' for Fire Alarm System wiring indication.

Standards, Tests & Approvals:

- I.S. 3218:2024
- BS 8432-2 (120 minutes)
- BS EN 50200 (PH 120)
- BS 7629-1 Enhanced 120
- BS 60332-1-2
- BS EN 60754-1
- BS EN 61034-2
- BS EN 50200 PH30, PH60, PH120
- BS 8434-2 Flame, impact & water test for 'enhanced' cable
- BS 5839-1, 6, 8 & 9 'enhanced' fire resisting cable

- BS 5266-1 'enhanced' fire resisting cable
- BS 8519 'Category 2' control cable
- BASEC approved
- LPCB approved (specific products & fire tests only)



The Contractor shall allow for all necessary power supplies to the new fire alarm devices and equipment.

The Contractor shall ensure that any other attendances or modifications required to the installation in order to leave the whole of the completed installation in a satisfactory condition are included in his tender. All to the approval of the Employer's Representative.

Remote monitoring of the fire alarm system:

The Contractor shall ensure that the new fire alarm system for the building is monitored and linked to a remote 24-hour manned monitoring station.

The fire alarm panel shall be monitored so that when a fire alarm triggers, a fire alarm alert signal shall be transmitted to the 24-hour central station.

The Contractor shall provide a GSM card in the main fire alarm panel to transmit a signal to a 24-hour monitoring station **or** the Contractor shall allow for bringing a 2-pair copper multipair cable link between the new main intruder alarm panel in the building to the digi-dialler in the fire alarm panel for the remote monitoring of the fire alarm system.

The first year of monitoring shall be paid by the Contractor. After the 12 months defects liability period has expired, the Contractor shall allow for transferring the account over to the building.

Testing & Commissioning:

The Contractor shall allow for the testing and commissioning of the fire alarm system throughout the building. The Contractor shall test all items of equipment individually and shall commission the full installation as a unified system.

All testing and commissioning shall be carried out in the presence of and to the satisfaction of the engineer.

The Contractor shall give to the engineer seven days notice in writing before testing or commissioning is carried out. Commissioning shall comply with I.S. 3218:2024.

The Contractor shall allow for the following during the commissioning:

- Carry out a full test on the new fire alarm system in the building which includes all devices, panels, etc. to ensure that the items are fully operational.
- Test every device in situ including manual call points, sounders, detectors, interfaces, etc. To test each item the Contractor shall use appropriate test method/device.
- Confirm sound levels throughout the building. Audibility level readings shall be taken in each room using an instrument complying with BS 5969, type 2 with slow response and 'A' weighting.
- All trigger devices i.e. manual call points, heat, and smoke detectors shall be tested for correct operation.
- A mains failure test shall be carried out to verify and standby battery system complies with the requirements of this specification.
- The Contractor must confirm that the entire system all components operate satisfactorily. The Contractor shall test for:
 - Operation of each device function
 - Operation of integral indicators (LED's, etc)
 - Fire alarm panel indications and functions
 - Network functions

Certificates:

When completed, in compliance with I.S. 3218:2024 the Contractor shall provide the following certificates for the new fire alarm system for the building:

- Certificate of Installation as per Annex C2 on I.S. 3218:2024.
- Final Certificate of Commissioning as per Annex C3 on I.S. 3218:2024.
- Certificate of Handover as per Annex C6 on I.S. 3218:2024.

Cable Carrier for fire alarm cabling:

Cable Carrier:

Refer to section 61.07 below for further information on cable containment.

Conduits for fire alarm cabling:

All of the fire alarm installation in the building shall be surface mounted. All surface mounted conduit to be installed in the building shall be steel conduit.

Refer to section 61.07 for details on conduits required.

Location of surface mounted conduits to be discussed on site.

Clipping of fire alarm cabling on the cable carrier:

All new fire alarm cables installed on the tray shall be securely clipped to the tray via non-combustible metal clips. The metal clips/ties shall be installed every 500mm.

The fire alarm cabling shall be clipped to a dedicated metal tray with stainless steel cable ties shall be used.

61.06 Maintenance of the new fire alarm system

The Contractor shall be responsible for the first years servicing and maintenance of the new fire alarm system building once all works are completed. The Contractor shall include the cost of this in his submitted tender costs. The fire alarm system shall be maintained in compliance with I.S. 3218:2024 and shall include for four maintenance visits per year.

61.07 Cable carrier and cable containment

General:

The Contractor shall allow for supplying and installing a new cable carrier containment system for the new emergency lighting in the building as indicated on the drawings.

Trunking:

The primary trunking routes for the building are as indicated on the drawings but these primary electrical routes are to be finalised and decided by the Electrical Contractor in conjunction with the Engineer.

All new wiring for the emergency lighting and fire alarm systems in the building shall be installed in metal conduit, trunking, etc. as described below. Cable containment shall be Uni-trunk or equivalent.

All new primary cable containment runs for the emergency lighting and fire alarm in the building shall be installed in two-compartment trunking. All tray and trunking to be installed in the building shall be manufactured from mild steel pre-galvanised.

Trunking shall meet the requirements of BS EN 50085-1:2005 and BS EN 50085-2-1:2006.

Tray systems shall meet the requirements of BS EN 61537:2007.

The new containment routes on the drawings are indicative only. The Contractor shall allow for all necessary bends, offsets, crossovers, additional labour, etc. in installing the new cable containment in conjunction with the existing services and items in the attic space.

The Contractor shall allow for visiting the site during the tendering period to review all necessary works that are involved in supplying and installing the necessary cable containment for the new electrical services.

The Contractor shall allow for all necessary brackets, unistrut, threaded rod, etc. in hanging the cable containment.

Cable containment shall be properly aligned and securely fixed at regular intervals at 1000mm on straight runs. Where bends, angles or offsets occur, additional fixings shall be supplied at a distance not exceeding 150mm on each side of the accessory.

A space factor of minimum 40% must be allowed in all carrier systems. Overloading and under sizing of the cable carrier system will not be permitted.

Where trunking/tray systems pass through fire compartment boundaries, the Contractor is responsible for the internal fire stopping with a suitable approved material, and also the provision of a lid to cover cable tray at such points.

Before setting to work, the Contractor shall confirm with the Engineer the exact routes for conduits and final location of all wall-mounted devices. Particular care shall be taken to co-ordinate all services on site with the Consulting Engineer before commencing work.

A system of galvanised steel trunking shall be installed to distribute emergency lighting and fire alarm wiring throughout the building in accordance with the ETCI National Rules for Electrical Installations.

Cable capacities of conduit and trunking systems shall not exceed the requirements of the ETCI Specifications. It is the responsibility of the Contractor to verify that the trunking system as designed satisfies these regulations. If cables exceed the trunking capacities, the Contractor must bring this to the attention of the Engineer prior to order or installation of the trunking system.

Trunking and cable tray systems shall be free of sharp corners, edges or burrs, where cable insulation could be damaged. Cables shall be installed in a manner that will not damage or put undue physical strain on them.



Conduits:

The majority of the electrical installation below the ceiling in the building to new emergency light fittings and fire alarm system shall be surface mounted and as a result, all conduits shall be surface mounted throughout the building.

All surface mounted conduit to be installed in the building shall be steel conduit. Location of surface mounted conduits to be discussed on site. All conduits shall be galvanised welded steel to BSS 31 Class E for heavy gauge tubing as manufactured by ASCM or approved equal.

16mm outside diameter is the minimum size to be used. All inlet boxes, conduits shall be plugged or capped whilst waiting for further items to be attached.

The ends of every fitting, tube length or nipple are to be reamed and all threads to be coated with aluminium paint after assembly. All fittings shall be installed so as to facilitate easy re-wiring. Inspection fittings shall be fitted at all bends, tees and elbows.

Back entry elbows or tees shall be used, if necessary, to enable easy of accessibility without disturbing any plasterwork. Inspection fittings shall be flush with the plasterwork and floorboards over conduit fittings shall be screwed in position.

The complete conduit installation shall be finished before any wiring is pulled through.

The minimum spacing of conduit supports shall be as follows:

<u>Nominal Conduit Size</u>	<u>Spacing of Supports</u>
25 mm. and less	1.75 metres
25 mm. to 40 mm.	2.00 metres
Exceeding 40 mm.	2.50 metres



Conduit Fixing and Fittings

Surface conduit, where used, shall be run parallel to building elements and shall be fixed to the structure by means of galvanised spacing saddles affording a clearance of 3mm min. and spaced at 100mm min. Saddles shall be fixed with wooden plugs or rawl plugs as the surface permits.

Where conduit is to be concealed in plasterwork, it shall be fitted using galvanised pipe hooks. Conduit boxes shall be fitted using brass round head screws. Where conduits are fixed under flooring, which is supported on joists, cutting away shall be kept to an absolute minimum.

The approval of the Employer's Representative must be sought prior to any notching.

61.08 Cabling, wiring and cable sizes

General installation:

All final sub-circuit cables for new emergency lighting shall adhere to the following specifications:

1. All cabling shall be run in metal cable containment and shall be run in conduit, trunking, tray etc. See section 61.07 for further information.

2. All final sub-circuit cables for lighting shall be single core low smoke and zero halogen (LSZH) insulated type, flame retardant to BS 4066, with stranded copper conductors, thermosetting insulation type E1.5 to BS 7655 all complying with BS 7211. All cabling shall be LSZH sheathed cable.
3. All cables to be class Cca-s1, d2, a1. All cables to be CPR 2017 compliant.
4. Multicore unscreened cables for control and signalling requirements shall be of the unarmoured type with copper conductors, PVC insulation and PVC sheath to BS 7655 all in accordance with BS 6004/BS 6346 (as appropriate).
5. All cables shall be 450/750 volt rated and no cable less than 2.5mm² in cross section shall be used without the permission in writing of the Engineer.
6. Only insulated cables shall be installed in conduit and/or trunking and cabling for different services shall not be installed in the same conduit without the permission in writing of the Engineer.
7. Joints on cables in trunking shall not be permitted. The cables of different circuits run in trunking shall be taped together at not greater than 3 metre centres.

LSZH Cabling:

All final sub-circuit cables for lighting shall be single core low smoke and zero halogen (LSZH) insulated type, flame retardant to BS 4066, with stranded copper conductors, thermosetting insulation type E1.5 to BS 7655 all complying with BS 7211. All electrical cabling shall comply with I.S. 10101:2020.

All cabling shall be LSZH sheathed cable. All LSZH or LSOH cabling shall adhere to the following specifications:

Product features:

- Flame-retardant according to IEC 60332-1-2 (flame spread on a single cable)
- No flame-propagation according to IEC 60332-3-22 and IEC 60332-3-24 respectively IEC 60332-3-25 (Flame spread on vertical cable or wire bundle)
- Halogen-free according to IEC 60754-1 (amount of halogen acid gas)
Corrosiveness of combustion gases according to IEC 60754-2 (degree of acidity)

- Low smoke density according to IEC 61034-2.
- UL Cable Flame Test.
- All cables to be class Cca-s1, d2, a1. All cables to be CPR 2017 compliant.

References/Approvals:

- UL AWM style 21089.
- Based on EN 50525-3-11.
- Based on EN 50525-2-51.

Product Make-up:

- Fine-wire strand made of bare copper wires.
- Core insulation: Halogen-free.
- Cores twisted in layers.
- Outer sheath: Special halogen-free compound, grey (similar to RAL 7001).
- All cables to be class Cca-s1, d2, a1. All cables to be CPR 2017 compliant.

Cable Sizes

All conductors carried in conduits shall be single core LSZH cabling as specified in 'point 2' above. All cable sizes are to be a minimum of 2.5mm². Conduit capacities as set down in Appendix 12 of the I.E.E. regulations latest edition are not to be exceeded.

Joints in conductors between terminating points will not be permitted. See also electrical schematics for specific cable sizes.

Cable sizes shall be as follows:

- Lighting final circuits (1kW max load): 2.5mm²/2.5mm² CPC
- Emergency light fittings: 2.5mm²/2.5mm² CPC

61.09 Earthing and bonding of new cable containment and existing cable containment

All new metal cable containment to be installed in the building and all existing metal cable containment in the building shall be effectively earthed and bonded in accordance with ETCI rules and as described below.

This shall include all new and existing conduit, tray, trunking, etc. or any metal work whatsoever adjacent to the electrical equipment.

All items shall be bonded together and earthed to a main earthing terminal on the existing electrical boards in the building.

The objective of the system is to provide an effective system to minimise danger to life and equipment arising from:

- Faults between line conductors and non-current carrying metal work.
- Atmospheric discharges.
- Accumulation of static charges.
- The design parameters are defined within the ETCI National Rules for Electrical Installations.
- The system requirements are as defined on the system drawing.

Bonding cables shall be run in conduit throughout the installation, terminating at the bonding point in surface or flush conduit box. Final connection shall be from a bushed outlet or outlet plate to the bonding point.

Main bonding clamps shall be fitted with approved labels. The use of perforated strip is not permitted, use only proprietary bonding clamps.

61.10 Protective floor covering to be installed in the building

In order to protect the floors in the building the Contractor shall allow for supplying and installing protective floor covering throughout the floor in certain areas of the building.

The protective floor covering shall be black 'Corriboard Floor Protector'. The sheets of black corriboard shall be 2.4metres long X 1.2metres wide X 2.1mm thick.

The Contractor will need to complete the following:

- Refer to drawings 69(E003) and 69(E004), for areas in the building where the protective floor covering shall be installed.
- Where the protective floor covering is to be installed, the Contractor shall allow for totally covering the floor with the corriboard. The corriboard shall completely cover the floor with no gaps.
- The corriboard protective floor covering shall be taped together to form one piece.

- Once all works are completed, the Contractor shall allow for totally removing the protective coriboard floor covering throughout all areas.



61.11 Taking down of the existing suspended ceiling the building

As indicated on drawings 69(E001) and 69(E002), in order to install the new runs of electrical containment above the ceiling in the building, some of the the existing suspended ceiling tiles and associated grid in some areas will need to be removed and reinstalled to complete the works.

This existing ceiling in the building is a modular suspended ceiling with a 600mm x 600mm ceiling tile.

In order to install the necessary electrical cable containment above the ceiling in the building as indicated on the drawings, the Contractor will need to complete the following:

- Refer to drawings 69(E001) and 69(E002), for areas in the building where the existing suspended ceiling tiles are to be taken down. Allow for all works as listed below.
- Allow for removing all the 600mm x 600mm modular ceiling tiles from the existing suspended ceiling throughout the areas where new electrical containment is to be installed above the ceiling as indicated on the drawings. The grid shall remain in place and the Contractor shall only remove the tiles in the areas where works are to be carried out.

- Safely store the removed 600mm x 600mm modular tiles that is to be taken down from the existing ceiling in a secure area in the building.
- Complete all necessary mechanical and electrical works in the building.
- Once all mechanical and electrical works have been completed, allow for re-installing all the existing ceiling tiles in the existing ceiling grid.

61.12 New fire alarm cabling installed in underground duct between the new fire alarm panel in the main building and the external building

General:

The Contractor shall allow for the supply and installation of a fire alarm cable between the fire alarm system in the main building and the fire alarm devices in the External building.

The Contractor shall allow for the supply and installation of this fire cable as specified in section 61.03.

The majority of this fire alarm cable shall be installed overground but some shall also be installed underground in a uPVC duct between the buildings. Refer to the site services drawing 66(E002) for further information on routes and layout of trenching and underground ducting installed between the buildings for the underground fire alarm cable.

The approximate distance between the between the two buildings is approximately 20metres so allow for a fire alarm cable of that length. Approximately 20metres of that fire alarm cable shall be installed underground in a uPVC duct. Refer to drawings for routes and locations of equipment.

Fire alarm cable specification:

Refer to section 61.03 for the type, size and specification of the fire alarm cabling required between the buildings.

Trenching and underground ducting:

All trenching and underground uPVC ducting required for the new underground fire alarm cabling shall be completed by the Contractor as part of these works. The Contractor shall allow for all attendances, labour, materials, etc. in excavating the underground trench and supply of the necessary uPVC ducting in the trench. Include for draw wires in the ducting so that cables can be pulled through the ducts at a later stage.

See detail on drawing 66(E002) for information on the trenching and ducting requirements for the underground fire alarm cabling. Routes and information on trenching required is highlighted on the site services drawing.

The Contractor shall allow for all attendances, labour, materials, etc. in installing the cable in the underground trench and ducting and shall provide all cable supports and cable glands necessary for correct installation and termination of the cables.

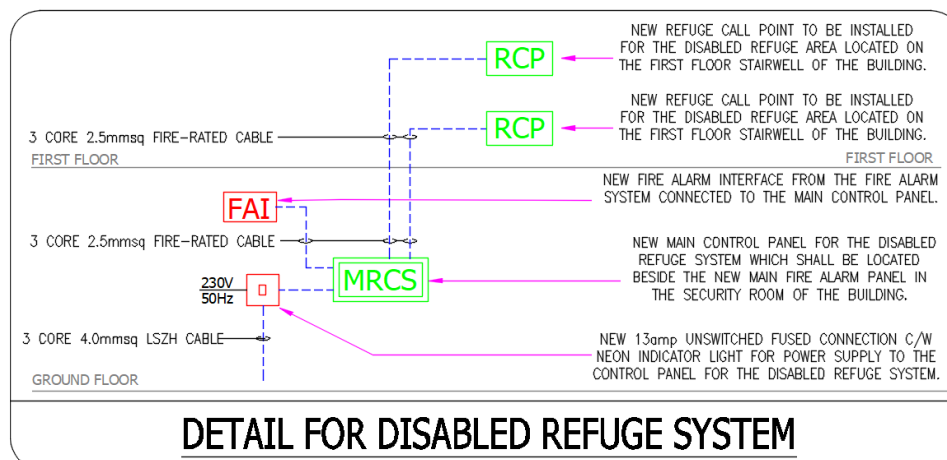
61.13 Disabled refuge system

General:

The Contractor shall allow for the supply and installation of a disabled refuge call system for the building as indicated on the drawings. The system shall be fully compliant with BS5588 part 11, BS9999:2008 and BS5839-9:2011.

The system shall be battery backed for 24 hours in quiescent mode then 60 minutes in full power and also be fully monitored. The system shall be able to control up to eight remote call points.

See detail below (which is also indicated on the drawings) of the disabled refuge system schematic.



Main Disabled Refuge Control Panel:

A main disabled refuge control panel shall be installed for the building in the main entrance lobby on the Ground Floor beside the main fire alarm panel. See drawing for the location.

This panel shall be a compact wall mounted control and indicator panel. All remote call points within the building shall be connected back and wired to this panel.

The main disabled refuge control panel shall be wall mountable and housed within a unit with a lockable clear glazed door to allow simple access to the control unit and easy viewing of the display.



The control panel shall have the following features:

- 4-way control panel.
- Surface mounted.
- Black finish (RAL 9005)
- Clear LCD screen with rotary encoder/control
- Red handset with hearing aid compatible earpiece. Handset shall be mounted in a lockable compartment
- Speech steered for disabled refuge outstations
- All-in-one system.
- Fully monitored and battery-backed (24 hours quiescent and three hours functional) for use in the event of mains power failure
- Fully networkable. Networked panels are wired in a loop configuration using 2 x two core (fire resisting enhanced) cable.
- Allows operators to communicate with up to four disabled refuge or fire telephone outstations.
- Link to fire detection system to prevent hoax disabled refuge calls. To avoid hoax calls, the disabled refuge remotes shall be programmed to be 'in standby' until the master panel is triggered by the fire panel during an emergency.
- Facilitates compliance with BS5839-9 when correctly installed.
- Mains supply 230V 50/60Hz.
- Dimensions is 430mm wide x 310mm high x 130mm deep.

- IP Rating IP20.
- Weight 9kg.
- Operating conditions/temperature -10°C to +40°C.
- Max relative humidity: 95%.

The main control panel shall be mounted at 1400mm from finished floor level to the centre of the panel. See drawings for quantities.

Control panel shall be as Balwin Bowall Care 2 EVC (C2CB4), or equivalent.

Remote lamp buzzer:

The Electrical Contractor shall allow for installing a remote lamp buzzer at the main control panel to indicate a call on the system. The strobe shall be blue and shall be located beside the main panel.

Remote lamp buzzer as Balwin Boxall BVOCCA, or equivalent.



Remote Call Unit/Switch:

Remote call units/switches shall be installed throughout the building as indicated to provide two-way communication between the main console at the main entrance beside the fire alarm panel in the building and person(s) occupying a 'Refuge Area' during an emergency evacuation. Quantities and locations of devices as indicated on the drawings. In total there are two remote call units to be installed throughout the building which shall be installed in the disabled refuge area at the top of each stairwell.

A remote call unit/switch shall be installed on the stairwells as indicated on the drawings. Each remote call unit select switch shall have the following features:

- Type B outstation (an outstation using an intercom. Intended for use by disabled people in refuge areas).
- User simply presses the button to initiate call (occupy area). Further communication is hands free at the refuge point or by the user at the control panel.

- Intercom shall features a 'Push to Call or Answer' button, a 'Call in Progress' LED, buzzer, microphone and loudspeaker.
- The system shall give an indication of an incoming call by means of an LED indicator and a tone.
- Stainless steel finish in green colour (RAL 6024)
- Surface mounted.
- Offer true duplex speech.
- Compatible with the main refuge panel.
- Meets the requirements of BS 5839-9.
- The front panel of the remote unit will have LED's showing System Healthy and Occupied.
- Key operated reset switch.
- The occupant will be able to alert the main control panel by simply talking into the unit. Once the unit has been activated the main panel can simply listen in to refuge areas – this link must remain open until the remote unit is reset.
- Dimensions of unit is 134mm wide by 134mm high by 44mm deep.
- CE marked.

The remote units shall be mounted at 1000mm from finished floor level to the centre of the unit. Remote control unit shall be as Balwin Boxall C2RRG, or equivalent.



Cabling:

All new cabling used for the disabled refuge communication system throughout the building shall meet classification 'PH120 Enhanced' fire alarm cable.

The entire disabled refuge communication system shall be wired in 2 x 2.5mm² 'Prysmian FP Plus' fire alarm cabling (or equivalent) as specified below. Cabling shall be 2core and earth type.

The fire alarm cable shall be rated at 120mins in compliance with BS 8432-2 (flame, shock and water spray). The fire-resisting cable shall have 2-hour fire rating according to IEC 331.

The fire alarm cabling used for the disabled refuge system cabling shall be the same fire alarm cabling that is used for the new fire alarm system.

Refer to section 61.03 for specification and type of fire alarm cabling to be installed for the disabled refuge system as it shall be the same cable and requirements as highlighted in section 61.03 for 'Wiring' for the fire alarm system.

Cable Carrier:

A new cable carrier shall be installed for the new disabled refuge communication system installation in the building.

A system of galvanised steel cable tray shall be installed to distribute the fire alarm cabling throughout the building.

All new fire alarm cables and distribution shall be installed in a steel conduit/tray system. All fire alarm cables on trays above the ceiling shall be securely clipped to the tray via metal clips.

The majority of main runs of the cable containment shall be installed at high level exposed along the wall of the building, and as a result, shall be exposed. Refer to the drawings for further information.

Some of main runs of the cable containment shall be installed at high level above the ceiling in the ceiling void, and as a result, shall be hidden. Refer to the drawings for further information.

All new conduits below ceiling level shall be hidden within the fabric of the building. Where trunking or cable tray systems pass through fire compartment boundaries, the Electrical Contractor is responsible for the internal fire stopping with a suitable approved material, and also the provision of a lid to cover cable tray at such points.

Refer to section 61.07 for details on cable containment.

61.14 Moving of tables, chairs and furniture in the rooms

The contractor shall allow for moving all of the tables, chairs and furniture in each of the rooms to accommodate the installation of the new fire alarm and emergency lighting system in the building.

The chairs, tables and furniture will be moved into an area of the room that won't cause any issue when the installation is taking place in the building. The contractor shall also allow for covering all of the chairs, tables and furniture to ensure there is no dust left in any area of the building.

Allow for moving all of the chairs, tables and furniture back to their original location once works are completed.

61.15 Protection of the smart TV's in Classrooms

The contractor shall allow for protecting all of the smart TV's throughout the building for the duration of the works. This shall include covering all of the screens with heavy duty plastic to ensure that they are not damaged.

61.16 Working out of hours for duration of project

All works to be completed in the school building shall be completed after school operating hours. Any works to be completed in the school shall be completed after school operating hours while the school is unoccupied. The Contractor shall ensure that the rooms/areas that they are working are cleaned and are left in a fully functional and operating capacity so that the school can operate the next morning. All programming is to be agreed with the Employers Representative and client in advance.

The contractor shall allow for price associate with the project to be completed out of working hours for the duration of the project.

61.17 Replacement ceiling tiles in the building

Ceiling Tile:

New ceiling tiles shall be installed in the existing suspended ceiling where ceiling tiles are damaged in the building. The Contractor shall allow for 10 packets of ceiling tiles for tendering purposes.

The new ceiling tile for this existing suspended ceiling shall adhere to the following specifications:

- Size: 600mm x 600mm
- Thickness: 15mm
- Type: Square-edged tile. Fully painted reinforced edges.
- Material: Mineral Fibre
- Sound absorption: 0.6 α_w
- Sound absorption class: C
- Sound attenuation: 0.5 NRC
- Light reflectance: 85%
- Recycled content: 44%
- Humidity resistance: 85% RH
- Fire reaction: Euroclass A2-s1, d0
- Colour: Global white
- Cleanability type: Damp sponge, Dry cloth
- Wipeable: No
- Acceptable tile: 'Dune eVo' from Armstrong Ceiling Solutions or equivalent.