
Section 3 **Particular Specification**

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3.0 Particular Specification

The installations are generally as outlined on the drawings and as specified herein. It shall be the responsibility of the electrical services sub-contractor to co-ordinate their services with those of other trades to avoid clashes. Any abortive work which occurs as a result of a clash due to lack of co-ordination shall be resolved without cost to the Client or his representatives.

Before submitting a tender, the electrical contractor shall examine and survey the existing site to ensure that all work specified or which can reasonably be inferred from the drawings and specification including incidental work is included for in the tender submission and the electrical contractor is fully aware of the nature, accessibility etc of the site and premises.

Tenderers are required to visit the site and familiarize themselves with access, existing conditions, and challenges that could affect how the contract work is done.

By submitting a tender, the electrical contractor is automatically confirming that they:

- Have carried out the required site visit and examination.
- Fully understand the work scope and conditions.
- Include all necessary costs in their price.

3.1 Enabling Works associated with the Electrical Installations

3.1.1 General

The *Electrical Contractor* is advised that they should allow for visiting the site prior to submitting their tender prices to ensure that they are fully aware of the extent of the works and the existing services which are to be removed, replaced and reinstated as part of these works.

The Electrical Contractor shall carry out all necessary enabling works associated with the electrical installations. This shall include the safe disconnection of electrical equipment to facilitate the proposed Science Blocks upgrade works and the subsequent reinstatement of such equipment upon completion. Prior to any alterations, the Electrical Contractor shall verify and record the operational status of all affected electrical systems and shall carefully label, record, and store each item to ensure correct reinstatement.

The Electrical Contractor, in conjunction with the Main Contractor and Mechanical Contractor, shall undertake all necessary visual inspections of the existing electrical installations that may be affected by the proposed works. The findings of these inspections shall be recorded and reported to the Design Team prior to commencement of the Main Contract Works.

Where required, the Electrical Contractor shall liaise with the incumbent supplier or specialist contractor responsible for any specialist electrical systems to verify, safely disconnect, reinstate, and fully commission those systems in accordance with the manufacturer's requirements and relevant standards.

Prior to carrying out any modifications, the Electrical Contractor shall provide a report to the Design Team confirming the operational condition of all existing electrical equipment to be altered. Unless otherwise identified in this report, it shall be assumed that all existing electrical services that may be affected by the works are fully operational and shall be reinstated and left fully operational on completion of the Project.

3.1.2 Guidance for major/important modification to Distribution Board in Existing Installations or Upgrading Customer tails

The Electrical Contractor (REC) must adhere to the guidelines as details in Safe Electric technical information guidelines

RECs working on installations which are more than 10 years old shall issue a recommendation that an Electrical Installation Condition Report (EICR) or Periodic Inspection Report (PIR) shall be carried out. It should be noted in the comments box on the certificate that this recommendation has been issued.

RECs working on existing distribution boards or upgrading customer meter tails or certifying MIC increases, shall take cognisance of the installation in its entirety. A Test Record Sheet shall be completed for the new work and the following non-exhaustive, items shall be reviewed while undertaking this work:

- Visual Inspection of existing installation.
- Verify Polarity.
- Adequate size of meter tails.
- Main Protective Conductor Continuity Verified (Neutralising Link).
- Earthing Conductor (to Earth Electrode) Continuity Verified.
- Main, Supplementary, and local equipotential bonding verified.
- Check terminals are tightened to correct torque (Refer to Manufacturers instructions).
- Ensure fuse Carriers are tight and correct gauge rings are fitted.
- Avoid cut outs in distribution board covers and utilise top/rear entry for routing of new cables.
- Ensure all voids are appropriately fitted with blanking plates.
- Ensure that withdrawn or notified faulty devices are replaced (DZ3 fuses and faulty switch fuses).
- Ensure RCDs / RCBOs are in place where required.
- Verify / Test operation (Trip Time) of all existing RCDs and RCBOs in line with the wiring rules (These tests should be completed prior to the circuits being placed back into service).
- Carry out an overall Live + Neutral to Earth Insulation Resistance test at 250 volts to ensure that an existing Insulation Resistance fault does not impair the safety of the new work. (Rule 6.4.1.5 of the Wiring Rules, as shown below).

“6.4.1.5 It shall be verified that an extension, addition or alteration to an existing installation complies with the I.S. 10101 and does not impair the safety of that installation, and that the safety of the new installation is not impaired by the existing installation”.

Should any of the above or other hazards identified remain to be sub-standard, the REC shall either rectify the problem or issue a Notice of Potential Hazard form to the customer, as per [Section C clause 4.7 page 76 of the criteria Document](#), and proceed with the certification of the new works.

“4.7.1 Where the REC discovers what he/she considers to be an unsafe installation that REC shall inform the customer or the person responsible for the premises/installation and the SSB, by immediately issuing a “Notice of Potential Hazard” form”.

When completing certificates RECs are required to insert the relevant values for Insulation Resistance, fault Loop Impedance, ZE and RCDs / RCBOs trip times. These values shall be transcribed from the associated Test Record Sheet. Where Test values are for existing circuits and not installed by the REC, the test values shall be entered on the Test Record Sheet and a note entered in the comments section advising the results are for existing circuits.

Further details can be found on Safe Electrics website

<https://safeelectric.ie/contractors/tech-information/guidance-for-major-important-modifications-to-distribution-boards-in-existing-installations-or-upgrading-customer-meter-tails/#:~:text=RECs%20working%20on%20installations>

3.1.3 Existing Sub Distribution Boards

The electrical contractor shall allow for verifying and identifying the existing sub-mains distribution to the Science Room Boards and shall replace or re-use as is necessary to provide the new sub-main distribution to the new Science Room Distribution Boards.

The electrical contractor shall identify and verify all sub-distribution circuits which emanate from the existing science room distribution boards prior to disconnection and in particular any sub mains circuits which supply equipment outside of the science rooms shall be identified and protected.

All alteration works that may affect the existing operation of existing services must be conducted 'out of school hours and the timing of any 'out of hours' work must be outlined within the Main Contractors phasing programme and agreed with the Client's Representative and Design Team, prior to any works taking place.

The Electrical contractor should arrange to visit the site and visually inspect this Sub- Distribution Board to ensure that the full extent of the work required is included for prior to submitting a Tender price.

3.1.4 Existing Lighting

Existing lighting within the existing 2No. Science Rooms, Geography Room, Prep Room & Science Store room are to be removed entirely and replaced with new LED Dali controlled lighting.

The existing lighting within the classrooms is fixed to high level trunking which is suspended from the ceilings. It is intended that the existing lighting is removed and the trunking is to be retained and re-used for the new lighting installations

All existing light fittings, lamps and equipment and associated wiring shall be completely stripped out and disposed of in accordance with WEEE Ireland recommendations using suitably appointed recycling specialists.

3.1.5 Existing Fire Alarm Installation

The existing school main Fire Alarm Panel is located at the Main Entrance and is currently being maintained by North West Alarms Tel 0749721687

All works to the existing fire alarm system must be agreed with the Principle, Main Contractor and design team and should be carried out by the specialist fire alarm installer.

The electrical contractor should allow for meeting with the incumbent fire alarm specialist on site to review the works required and verify the capacity of the existing fire alarm system for any proposed modifications or alterations. The findings of this report should be presented to the design team prior to commencing any works to the panel.

The electrical contractor will be responsible for engaging with the incumbent fire alarm specialist and shall allow for recommissioning of the fire alarm panel each time an alteration is made to the system.

Any alterations to the existing fire alarm system must be in accordance with European Standards EN54, Local Fire Authority requirements and Public Authority requirements. The fire alarm system shall be of the L2/3 type conforming to IS 3218:2013

3.1.6 Existing Security Installation

The electrical contractor shall take care to protect any existing security equipment during these works

3.1.7 Existing WiFi Access Points

The electrical contractor shall allow for disconnecting the existing Wifi Access Points and handing over to the schools IT department. The electrical contractor shall allow for re-installation of the Wifi Access Points into the same classrooms once the works are completed

3.1.8 Existing PA / Class Change

Prior to commencement of the Main Contract Works, the Electrical Contractor shall liaise with the incumbent specialist PA /Class change specialist contractor to determine the full extent of works required to facilitate the proposed building fabric upgrade works. The findings of this liaison, together with any relevant information regarding the condition and operational status of the existing PA installation, shall be verified and reported prior to the commencement of the Main Contract Works.

The Electrical Contractor shall be responsible for ensuring that the existing PA system speakers are verified as working before safely being disconnected & handed to the school for future use

The new PA Speakers to be installed shall be fully compatible with the existing PA system and shall fully commissioned in accordance with the manufacturer's requirements and all relevant standards.

Confirmation that the system is working as per before the works commenced must be signed by the school principal

3.1.09 Existing Electric Water heaters

The existing Water Heaters including all associated electrical wiring are to be safely removed and disposed of electrical contractor shall allow for safely disconnecting the power supply and fully removing the associated cables

3.1.10 Existing Photovoltaic (PV) Installation

The electrical contractor should ensure that solar pv power is safely isolated from any works as required to allow for making the necessary modification to the existing electrical installation

3.2 Element (61) Electrical Supply and Main Distribution

3.2.1 New Sub-Distribution Boards

Sub-distribution board shall be surface mounted steel enclosures with 125A rated busbars, IP3X rated with plain lockable steel door. Fully shrouded busbar rated 25kA short circuit conditional circuit complete with suitably rated incomer (as per the drawings) and surge suppression. Complying with BS EN 61439-3 & BS EN 60439-3.

The number of ways shall be as detailed the schedules below but as a minimum shall be 24-way TP&N and shall have 25% spare capacity for future expansion.

All rcbo/mcb switch fuse devices shall be from the same manufacturers as the distribution boards to ensure full compatibility

Each Distribution Board shall be

- Manufactured in accordance with BS EN 60439-3.
- Epoxy polyester finished in an industrial non-marking grey finish – RAL 7004 or similar.
- Constructed complete with heavy gauge (2 mm) top and bottom removable flat gland plates. Distribution boards should be manufactured with welded case end or similar and not rely on ground plates to provide rigidity.

- When locked, all devices including the front cover retaining screws will be inaccessible to prevent unwanted access.
- Main door cover will be removable to aid installation and commissioning.
- Provided with an insulated (removable shroud) neutral bar and earth bar. A removable neutral link will be provided as part of the assembly.
- Provided with suitably rated integral switch.
- Provided with a circuit chart.
- Fitted with "Traffolyte" labels, one engraved in black to indicate the purpose of the board and another engraved in red "DANGER 400 VOLTS" when accommodating more than one phase, screwed to the outside of the door.

3.2.2 Sub-Mains Cabling

Sub mains XLPE/SWA/LSF type cable shall be installed, fixed to the containment system and/or the building structure to the proposed location of the Distribution Boards, Control Panels and mechanical plant equipment.

The contractor shall be responsible for ensuring all cable sizes are suitable with appropriate voltage drop allowances with regards installation lengths on site. XLPE/SWA/LSHF stranded copper conductor cables will be used to supply the distribution boards, control panels, items of control equipment and items of plant - all as indicated on the drawings and as sized in the schedules associated with this document. The Sub-Contractor will allow for the careful pulling and installation of all cables on cable ladder containment. All sub-mains and all other distribution cables will be accompanied by a separate circuit protective conductor sized in accordance with I.S. 10101: National Rules for Electrical Installations Edition 5.0.

XLPE/LSF/SWA/LSF cables shall be:

- 600/1000 volt grade of the sizes detailed in the schedules/drawings with high conductivity plain copper wires.
- Insulated with extruded XLPE
- Cores shaped, numbered or coloured for identification and sheathed with LSHF.
- Armoured with a single layer of galvanised steel wires, sheathed overall with LSHF.
- In accordance with BS 6724
- **DCA s2, d2, a2 in accordance with EN50399.**

3.2.3 General Power & Lighting Cabling

6491b/ho7z-r insulated non sheathed single core cables shall be installed in trunking and conduit extending from the Distribution Boards to outlets and equipment.

Sub-Circuit wiring shall be BASEC approved and drawn in concealed galvanised steel conduit and/or galvanised steel trunking. Multiple cables run within service voids shall be installed in galvanised steel trunking, single or multi-compartment trunking shall be utilised to complement the existing installation. Lighting & Power cables shall be installed in accordance with the Manufacturer's recommendations.

The contractor shall be responsible for ensuring all cable sizes are suitable with appropriate voltage drop allowances with regards installation lengths on site. - all as indicated on the drawings and as sized in the schedules associated with this document. The Sub-Contractor will allow for the careful pulling and installation of all cables containment.

Cables shall be:

- 450/750 volt grade of the sizes detailed in the schedules/drawings with high conductivity plain copper wires.

- Single core cable. Solid or stranded plain copper conductor, Thermosetting Zero Halogen Low Smoke (OHLS®) insulated. Cores shaped, numbered or coloured for identification and sheathed with LSHF.
- In accordance with BS7211, BS EN 50268, IEC 61034, BS EN 50267-2, IEC 60754-2, BS EN 50265, IEC 60332-1, BASEC
- DCA s2, d2, a2 in accordance with EN50399.

3.2.4 Fire Alarm Cables

Fire Alarm Cables shall also comply with, at least, the requirements of BS EN 60332-1-2, BS EN 50399, BS EN 61034, and BS EN 60754 and products classified as non-flame propagating may be installed without special precautions. Cables not complying, as a minimum, with the resistance to the flame propagation requirements of BS EN 60332-1-2 shall, if used, be limited to short lengths for connection of appliances to permanent wiring systems and shall, in any event, not pass from one fire segregated compartment to another.

Cables shall be:

- FP200 Enhanced
- Fully screened
- Full size CPC in direct contact with screen
- Tough Insudite® insulation compliant with EI5 to BS EN 50363-5
- Low Smoke, Zero Halogen (LSOH®) sheath
- Easy termination
- A 120 minute duration of survival when tested to BS EN 50200 (PH 120) for both fire alarms and emergency lighting circuits. 'Enhanced' cables must also meet 120 minute duration of survival when tested to BS 8434-2, with its additional water spray test.

3.2.5 Structured Cabling/ ICT Cables

Structured Cabling / ICT Cables shall comply with, the ISO, CENELEC and TIA standards and supplied in 305 m box.

Copper Cables as a minimum shall be

- Category 6A (IEC) 4pair screened U/FTP LS0H
- 4-pairs of 23AWG solid core copper individually wrapped in foil
- Flame retarding according to IEC 60332-1-2
- Minimum rating Dca/s2/d1/a1 according to EN 13501-6
- NVP Value 75%
- Outer Diameter 7.2mm

3.2.8 Containment

The electrical contractor shall allow for the supply and installation of galvanised steel trunking and conduit installations for the installations of power circuits for the lighting and power associated with mechanical equipment as shown in the drawings.

The electrical contractor shall allow for the supply and installation of galvanised steel trunking and conduit installations for the installations of controls wiring associated with the BMS systems as shown in the drawings.

The contract drawings show the main primary containment routes, although they are reasonably accurate, they should be confirmed on site as no additional costs will be allowed for any discrepancies, all secondary containment including cable tray, trunking, basket and conduits shall be designed and installed by the electrical contractor.

The electrical contractor shall be responsible for co-ordinating of all containment with existing services and equipment and other trades prior to final installation.

All electrical cables shall be mounted in cable trunking or conduit- the clipping of cables to the building structure is not permitted.

Containment systems, complying with I.S. 101010:2020, comprising of galvanised steel tray, basket, trunking and conduits shall be installed for the containment of all electrical cables throughout.

	Type	Containment	Description
1	Sub Mains Cables	Medium Duty Galvanised Steel Cable Tray	XLPE/SWA/LSF cables extending at high level on cable tray from the existing Main Switch Board to the new local distribution boards, control panels and equipment
2	LV Power & Lighting	Galvanised Steel Trunking & Galvanised Steel Conduit	LSZH 6491b/ho7z-r Single cables extending horizontally at high level within trunking on main horizontal routes and extends in conduit: i. above ceilings and vertically surface mounted to the outlets ii. horizontally within floor fabric extending to island desk units
3	Fire Alarms Cables	Galvanised Steel Cable Tray & Conduit	Extends horizontally at high level on cable tray and vertically in conduit to the devices and Fire Alarm panel.
4	ICT Cables	Galvanised Steel Cable Basket & Conduit	Extending horizontally at high level on cable tray/basket on main horizontal routes and extends in conduit to the outlets.
5	ELV Controls Cables	Galvanised Steel Cable Tray & Conduit	Extending horizontally at high level on cable tray/basket on main horizontal routes and extends in conduit to the outlets.
6	Teachers Desk Vertical Trunking	uPVC 3-Compartment Trunking	170(w)x50(d) 3-Segregated Compartments extending Vertically from ceiling void at Teacher's wall for Power, ICT and Controls cables to Switches, controllers and outputs
7	Island Desks	Flexible GS conduit	Adaptaflex PVC covered liquid resistant galvanised steel conduit 20mm to extend from the steel conduit in the floor to the socket outlet mounted on the desk

All trunking shall be manufactured to the standards described in EN50085-1:2005 Constructed from mild steel and hot dipped galvanised to EN 10346:2009 complete with factory manufactured bends, tees, elbows, crossovers, risers, reducers, endcaps and brackets etc.

The Contractor shall arrange trunking to allow access to wiring. Locate covers on top or sides of trunking if practicable. Arrange access so covers are on a continuous face and cables can be laid in throughout the length of the trunking.

All steel conduit shall be screwed heavy gauge hot dipped galvanised inside and out Class 4, in accordance with BS 4568, utilising couplings.

All containment shall be labelled using a coloured 'Traffolyte' label as per the ID Colour (Final colours shall match the existing containment labels) above engraved with 10mm white letters using the code for each function of the containment. All horizontal containment shall be labelled every 5mtrs.

Supports for cable trays or ladders shall be provided in accordance with the manufacturer's recommended loading and span distances.

Sizing of trunking and conduit shall be carried out in compliance with Annex 52A of ET101: 2008, which deals with conduit and trunking capacity factors. It is the responsibility of the

electrical contractor to ensure that space factors are not exceeded. The electrical contractor shall be deemed to have taken account of this in his tender price and no adjustment to the tender price will be accepted for his failure to do so.

Where cables trays, cable trunking or cables pass through walls and/or roof, a specialist contractor shall be employed for sealing major cable openings to prevent the passage of fire or hazardous gases from one area to another.

The electrical contractor shall allow for the provision and installation of a suitable support system to carry all trunking and tray installations throughout as necessary. This shall be achieved by means of suitably sized proprietary hanger support system. These hangers shall be spaced at intervals of not greater than 1.8m and when fully loaded shall not deflect more than 10mm between supports.

The hangers shall be constructed from galvanised steel and shall be screwed to the building fabric. The threaded rods shall be 10 or 8mm diameter mounted and fixed using anchors suitable for each application.

Hangers shall be mounted within 300mm of all fire walls.

The electrical contractor shall coordinate all containment drops and openings as required for this installation

The electrical contractor shall allow for the installation of suitable intumescent fire pads or pillows within electrical trunking systems to protect fire compartment as required to comply with the current IS10101:2020 regulation.

Full details of the fire compartmentation can be found on the architect drawings.

The electrical contractor shall co-ordinate with the main contractor regarding final positions of all openings required for electrical containment.

3.3 Element (62) Small Power

3.3.1 General

The small power installation wiring shall be by means of 6491b/ho7z-r insulated non sheathed single core cables contained in trunking and enclosed in steel conduit surface installation from the RCBOs within the local new sub-distribution boards.

Note all electrical sub-mains, small power and lighting, communication and controls cables shall comply fully with CPR EN50575 and shall be a minimum of Class Dca s2 d2 a1.

Wiring to general socket outlets will generally be carried out in 4mm lszh cables in radial circuits and protected via 20Amp RCBO/30mA in the local distribution board.

No more than 6No. double sockets or 10No. single sockets shall be on any one circuit.

The provision of all small power requirements and quantities and locations of associated accessories shall be in accordance with the Department of Education & Skills Technical Guidance Documents including TGD-003, TGD-005, TGD-023, TGD-026, TGD-031, TGD-033 and Post Primary School Specialist Accommodation for Pupils with Special Educational Needs, associated addendum 1 and room layouts as well as the relevant Design Guidance room layouts.

Any aperture within a fire rated wall or curtain shall be sealed to the degree of fire resistance prescribed for the respective building element in accordance with the latest version of the NSAI

IS10101 - National Rules for Electrical Installations. This will be achieved by the use of fire rated back boxes and/or intumescent pads incorporated into back of outlet boxes where required, in compliance with ISEN 1364-1.

3.3.2 Accessories

All general small power & lighting accessories that are to be installed on the 3-Compartment Trunking, shall be flush mounted Part M Charcoal with white rocker switches and shall all be from the same manufacturers range.

All general small power & lighting accessories, that are not installed on the 3-Comartment Trunking, shall be surface mounted metal clad type with white rocker switches and shall all be from the same manufacturers range.

All general small power accessories shall have the following features:

- Constructed from a high impact material with metallic powder paint finish.
- All Double Socket outlets to have outboard rockers
- All switched units shall be double pole with neutral pole contacts 'making' and 'breaking' first and last.
- All terminals shall be in-line to ensure easy wiring.
- All accessories with fuse carriers shall have tamper proof screws for use within toilets, changing rooms etc.
- Have a 20-year guarantee.

All small power accessories manufacturer is to be assessed to EN ISO 9001, OHSAS 18001 and ISO 14001.

All mechanical plant equipment rotary isolators shall be min IP44 (external plant IP65) and shall comply with IEC/EN 60947

3.3.3 Water Heaters

Wiring shall be carried out in 2.5 mm² LSF cables and 2.5 mm² CPC within conduit extending from local distribution board. Cables will be installed from 16 amp SP&N Type B MCB to terminate in a 20 amp SP&N double pole switch fused connection unit with LED indicator, at worktop level engraved "Water Heater" as required. From this point flexible cables will be installed within conduit to the water heater via a surface mounted flex outlet plate mounted at low level adjacent to the water heater.

The electrical contractor shall allow for the supply of a single module seven-day 24 hour astro/solar time switch to control the water heater supply, set to eliminate standing losses out of school hours. The timer shall be located at the distribution board and shall be clearly labelled.

Timers shall be as Sangamo Sun tracker single Channel 7 day solar timer or equal and approved

Final connections to the Water Heater shall be by the electrical contractor.

3.3.4 Fridge/Freezer

Wiring shall be carried out in 2.5 mm² LSF cables and 2.5 mm² CPC within conduit extending from local distribution board. Cables will be installed from 16 amp SP&N Type B MCB to terminate in a 20 amp SP&N double pole switch fused connection unit with LED at worktop level engraved "Fridge" as required. From this point cables will be installed within conduit to a 13 amp unswitched socket outlet located at 450 mm above finished floor level.

Final connections to the Fridge shall be by the electrical contractor.

3.3.5 Dishwasher

Wiring shall be carried out in 2.5 mm² LSF cables and 2.5 mm² CPC within conduit extending from local distribution board. Cables will be installed from 16 amp SP&N Type B MCB to terminate in a 20 amp SP&N double pole switch fused connection unit with LED, at worktop level engraved "Dishwasher" as required. From this point cables will be installed within conduit to a 13 amp unswitched socket outlet located at 450 mm above finished floor level.

Final connections to the Dishwasher shall be by the electrical contractor.

3.3.6 Washing Machine

Wiring shall be carried out in 2.5 mm² LSF cables and 2.5 mm² CPC within conduit extending from local distribution board. Cables will be installed from 16 amp SP&N Type B MCB to terminate in a 20 amp SP&N double pole switch fused connection unit with LED at worktop level engraved "Washing Machine" as required. From this point cables will be installed within conduit to a 13 amp unswitched socket outlet located at 450 mm above finished floor level.

Final connections to the washing machine shall be by the electrical contractor

3.3.7 Carbon Dioxide Monitors

The electrical contractor shall supply and install a CO₂ monitor with LCD display (min size 8.5cm²) within each teaching space. The LCD display shall have 3 colours, Green, Amber & Red, and shall be set as follows:

Carbon Dioxide Traffic Light Display Indicator Ranges		
Green	Amber	Red
<1000ppm	1000 to 1500ppm	>1500ppm

The electrical contractor shall supply and install a switched fused spur for the connection to the CO₂ monitor.

CO₂ monitor shall be as per Duomo C02MC Wall mounted sensor range or equal and approved.

3.3.8 Emergency Stop Buttons Electrical Sockets

Key release emergency stop button complying with ISO 13850:2015 shall be installed near to the teachers desk and will be provided to control the electrical supply to the socket outlets within the classroom. These shall be Labelled EMERGENCY STOP ELECTRICAL SOCKETS

The Emergency Stop button shall be wired through a 25A Contactor for each socket circuit being controlled

Note The electrical stop should only de-activate the power to the Socket Outlets. Power other circuits including the Gas Proving Units and associated Motorised valves, fridges, washers and lighting should not be de-activated.

3.3.9 Small Power Associated with Mechanical Services

The electrical contractor is responsible for the supply, installation and termination of control wiring

Mains voltage circuits should generally be wired using LSF insulated single core cables drawn into galvanised steel cable trunking and/or conduits with separate, equally-sized circuit protective conductors provided for each circuit.

Extra low voltage circuits associated with control elements (thermostats, sensors, valve actuators etc.) should generally be wired using LSHF insulated single core cables drawn into galvanised steel cable trunking and/or conduits kept entirely separate from mains voltage circuits.

To facilitate ease of maintenance, where mains voltage equipment or control elements are located within suspended ceiling voids the fixed wiring should terminate into suitably rated and poled local socket arrangements and final connections should be made using PVC insulated and sheathed flexible cable and a compatible plug.

Where communications grade cabling is required for control elements associated with the building management system this should be drawn into galvanised steel cable trunking and/or conduits completely segregated from both the mains voltage circuits and any ELV circuits. The cabling may be screened or unscreened and should be strictly as specified by the supplier of the BMS equipment.

Every local isolator in the installation should be provided with a permanent engraved label to indicate function and the control panel that the equipment is supplied from.

3.3.10 Gas Proving Panels

Gas Proving Control Panels shall be supplied by the mechanical contractor and wired to be the electrical contractor

Key release emergency stop button complying with ISO 13850:2015 shall be installed near to the exits and will be connected to the Gas Proving Control Panel. They shall be labelled LPG EMERGENCY SHUT DOWN VALVE (as per the image below)



3.3.11 Room Thermostats

The Room thermostats shall be supplied by the Mechanical contractor and shall be installed and wired to by the electrical contractor

The electrical contractor shall supply and install a switched fused spur for the connection to the Room Thermostats.

The electrical contractor shall supply and install the controls cabling for the connection to the Room Thermostats to the room control valves.

The electrical contractor shall supply and install all conduits and containment associated with the Room Thermostats.

3.3.12 Extract Fans

The Electrical Contractor will electrically connect all fans as supplied and installed by others and provide suitably rated 3 Pole isolators to the fans and fan controllers as necessary. Wiring will be from adjacent lighting circuit via triple pole isolator, over-run timer and controlled by PIR unless otherwise indicated.

3.3.13 Main Equipotential Bonding

The Electrical Contractor shall carry out equipotential bonding from the main earth bar, to all locations necessary as detailed within NSAI IS10101 - National Rules for Electrical Installations Edition 5.0.

The earth bond shall be Green/Yellow XL-LSF cable installed using LSF covered metal tie-wraps. The cable shall be identified at every change of direction and every 10 metres.

3.3.5 Supplementary Bonding

The Electrical Contractor shall carry out supplementary bonding from the local distribution board earth bars, to the following locations as necessary:

- exposed metal pipe work
- metal tanks
- metal plant
- raised floor supports
- metal floors
- ducting
- sinks
- taps
- metal partitions
- metal door frames
- metal skirtings
- ceiling grids
- support structures
- fixed metal shelving
- containment, etc.

In plant rooms, supplementary equipotential bonding is to be applied across pipe work, ductwork and metalwork and across pumps.

The earth bond shall be Green/Yellow LSF cable installed using LSF covered metal tie-wraps. Earth bonds shall also be routed within galvanised steel conduit to the necessary locations.

All fixing of bonds shall be carried out using suitable clamps with 'Safety Electrical Connection Do Not Remove'.

3.3.14 Testing and Commissioning

The electrical services as detailed within and on drawings shall be inspected, testing and commissioned in accordance with the requirements of the following:

- CIBSE Commissioning Code C: Automatic Controls
- CIBSE Commissioning Code L: Lighting
- CIBSE Commissioning Code M: Management
- NSAI IS10101 - National Rules for Electrical Installations Edition 5.0
- IS 3217: 2023 Emergency Lighting
- IS 3218: 2024 Fire Alarm

Schedule of Tests

The following will give guidance to the Electrical Contractor on the inspection & testing to be carried out and therefore should not be limited to as detailed below:

1	Containment	Record of inspection of first fix installation
2	Earth Continuity Tests	Record of inspection for installation of cables
3	Electrical Wiring	Record of inspection for second and third fix installation
4	Electrical accessories	Record of inspection
5	Lighting	Record of lighting levels for each room/area
		Compliance with the TGDs
		Record of controls and settings for each room/area
6	Emergency Lighting	Record of emergency lighting levels for each room/area

		Compliance with IS 3217:2013
		Inspection and testing requirements with I.S.3217:2013
7	Fire Alarm	Recording of point numbers
		Recording of dB sound pressure levels
		Recording of wiring routes and zones
		Fire Alarm Matrix produced
		Compliance with IS 3218:2013
		Inspection and testing requirements with I.S.3218:2013
8	Structured Cabling	Recording of Outlet Port numbers/ Dissemination Charts
		Testing in compliance with ISO/IEC 11801-1:2017

3.4 Element (63) Lighting

Refer to Ipsum Drawing PL-E63-001

3.4.1 Strip Out of Existing services

All existing light fittings, lamps and equipment and associated wiring shall be completely stripped out and disposed of in accordance with WEEE Ireland recommendations using suitably appointed recycling specialists.

3.4.2 General

The electrical contractor shall allow for the supply and installation of all light fittings as specified in the Schedule of Lighting Fittings forming part of this Specification and indicated on the drawings. The contractor shall allow for ordering, taking possession, storing, installing, lamping and setting to work all light fittings within the project.

The luminaires proposed shall generally be surface mounted to suit the Architect's choice of ceiling and surface finish and shall be c/w all necessary fixings and supports.

The LED lighting shall meet the following performance specification:

Light Source	LED
Ingress protection	IP4x
Colour Rendering Index	>80
Colour Temperature	4000k
Minimum Luminaire Efficacy	131 lm/W
Median Useful Life (IEC 62717) Ta 25oC (50,000 hrs)	L80 B50
Minimum Driver Lifetime (Max ambient temp 35oC)	50,000hrs
MacAdam Step	3
UGR	<19

Luminaires throughout all areas shall utilise LED technology. All Light fittings shall have Photometric data measured and tested in accordance with IES LM-79-08 "Electrical and Photometric measurements of Solid of state lighting products.

All luminaires to have CE marked components as per EU directives.

The lighting installation wiring shall be by means of single core LSF type cables contained in trunking and enclosed in in Heavy Gauge Galvanised screwed steel conduit above ceilings and within / on walls, from RCBOs with the new local sub-distribution boards.

Final connections to the luminaires shall be carried out using plug in "Klik" type ceiling roses with max 1.5mtr Isoh heat resistant cables. All light fittings shall be securely fitted using threaded rods to support fittings on suspended ceilings.

In teaching spaces automatic lighting controls shall be based on manual on/off switching, absence detection and daylight sensing, so that lights will need to be switched on manually and will then dim/turn off automatically depending on the signals from the automatic controls.

All lighting installations operating in conjunction with automatic dimming to "Off" lighting controls and absence detection must have manual "On/Off/ dimming" switching arrangements via push type retractable light switches.

The teacher shall override the sensors by pushing the retractable switch to lower or raise lighting levels the retractable switch shall operate as follows:

- A short push up switches the luminaires on to the last light level.
- A longer push up gradually raises the light level.
- A short push down switches the luminaire off.
- A longer push down gradually dims the light level.

When the room is unoccupied after a pre-set time the absence detector will switch fitting off within each space.

Toilets shall be manual on/off with automatic absence detection.

Lighting in multi-sensory room shall be manual dimming control only.

Automatic lighting controls in specialist rooms with high speed cutting machinery should be avoided

Other areas will be controlled via PIR sensors which will activate the lighting in the space when the area occupied or switch fittings off when the area is unoccupied.

Illumination levels for the complete building will comply with the requirements of the as follows where applicable:

Room Type	Lux Level		Operating Range	Time Lag (Min)	Working Plane AFFL
Science Classroom	500lux @ 0.9m	Manual on/off Retractive Switch-daylight sensing and absence detection.	7m	10min	900mm
Geography Room	500lux @ 0.7m	Manual on/off Retractive Switch-daylight sensing and absence detection.	7m	15min	700mm
Prep Room	500lux @ 0.7m	Manual on/off Retractive Switch-daylight sensing and absence detection.	7m	15min	700mm
Stores	200lux@0.7m	Manual on/off switch and presence detection.	3m	5min	700mm

Classroom Presence detectors should be located in the centre of the ceiling and incorporate Photo Cell Control, Day Light Control and Absence Control.

Note: Classrooms/ Set Rooms designated as SEN should not automatically switch off-on. The EC contractor shall confirm operation for all rooms with the principal prior to commissioning.

The electrical contractor shall allow for providing full demonstration to teaching staff on the control and operation of the classroom lighting to take place at 3No. separate times to be agreed with the school.

The lighting system shall be tested commissioned and certified and certificates as per this specification Commissioning Schedules.

Lighting controls shall be hard wired utilising conduit and concealed BESA boxes.
The Contractor shall ensure that all lighting controls are commissioned by a specialist contractor and a certificate is issued to this effect.

Commissioning of systems will take place in after school hours and in the presence of the building services engineer.

The Lighting Commissioning team shall also re-visit the school after it has been occupied and in use for a minimum of 12 months to re-check that each detector is operating correctly. Where this isn't the case, the individual detectors should be re-commissioned and a new Part: B Certificate issued to the school for inclusion in the Operation and Maintenance Manual

3.5.3 Emergency Lighting

The emergency lighting system shall be in accordance with I.S.3217:2023 and incorporate standalone self-contained emergency luminaires and maintained exit signs supplied from the local lighting circuits. The system will be designed to provide a minimum of three hours duration during the event of mains failure. Testing of the system shall be in the form of central test units located within the sub-distribution board(s).

All luminaires shall be CE marked in accordance with the Low Voltage Directive and the EMC Directive and shall be manufactured within an ISO 9001 / 9002 quality control system. All emergency exit sign legends shall be of the European style pictogram in accordance with the Safety Signs Directive (90 / 664 EEC).

Testing of the system shall be in the form of central test units located within the distribution board(s).

It is a statutory requirement that emergency lighting systems are to be serviced as required by I.S. 3217:2023. The servicing and maintenance of these life safety systems is the responsibility of the school management body.

To ensure servicing is carried out from handover, the Department requires that the first year of servicing of the Emergency Lighting System is included within the scope of works in the tender package and that it is the responsibility of the Main Contractor to provide this service for the first year. After one year from practical handover the school board of management must exercise its responsibility to ensure a contract is in place for the servicing and maintenance of these life safety systems. This must be brought to the attention of the school at handover and again on expiration of the 1 year maintenance period by the Design Team.

3.6 Communications

3.6.1 Structured (ICT) Cabling Installation

The Electrical Contractor shall employ a Structured Cabling Specialist to supply, design, install, test and commission **Cat6A U/FTP** cables extending from new outlets as shown in the drawings to to new 24 port Cat6A patch panels within the existing comms cabinets

The specialist Structured Cabling installer must be an Approved Installer for Structured Cabling products being used and must be able to provide a full system end to end manufacturer's 25year warranty for the entire installation.

The electrical contractor and specialist structured cabling contractor shall liaise with the ICT provider to agree the locations for new patch panels and for the provision of patch leads including agreeing the sizes and colours to be provided.

The structured cabling system must meet the ISO/IEC 11801-1:2017 Information technology - Generic cabling for customer premises: Part 1 General Requirements

All elements of the structured cabling system shall be compliant to the relevant component specification of ISO 11801-1/ISEN 50173-1 for Cat6A U/FTP.

The new ICT structured cabling installation shall be Cat.6A U/FTP "S" foil cables CPR Class Dca-s1a-d1-a1. Cat6A cable shall be maximum diameter 6.7mm as Excel U/FTP "S" Foil or equal and approved.

No more than 2No. cat6A cables may be installed in 25mm higgs conduit

For the purposes of tendering allow for the supply of 100% 1mtr; 50% 2mtr & 50% 3mt Cat.6A patch cords.

Final details including colours and confirmation of lengths of the patch cords shall be agreed prior to completion.

Permanent link tests, using calibrated permanent link adapters, shall be carried out to the latest ISO/IEC 11801 standard and to the recommendations as set out by the manufacturer as required for the manufacturer's 25 year warranty.

The entire Cat.6A installation shall be tested using a calibrated Fluke DSX 5000 or equivalent network tester. Full & Summary Test results will be provided in PDF format. Test results from non-calibrated equipment will not be accepted.

The testing and verification shall be witnessed by the electrical consultant engineer and the specialist installer must notify the electrical consultant engineer at least 7 days prior to beginning testing so that a suitable time for this can be arranged.

3.7 Element (67) Fire Alarm

3.7.1 Fire Alarm System

Refer to Ipsium Drawings PL-E67-001

The electrical contractor shall allow for the alterations to the existing fire alarm installation as part of these works including for employing a suitably qualified fire alarm specialists to carry out and certify all alterations required.

All works to the existing fire alarm system must be agreed with the Principle, Main Contractor and design team and should be carried out by the specialist fire alarm installer.

The electrical contractor will be responsible for engaging with the fire alarm specialist and shall allow for recommissioning of the fire alarm panel each time an alteration is made to the system.

The existing school main addressable Fire Alarm Panel is located at the Main Entrance and is currently being maintained by Northwest Alarm Ltd T 0749721687

Any alterations to the existing fire alarm system must be in accordance with European Standards EN54, Local Fire Authority requirements and Public Authority requirements. The fire alarm system shall be of the L2/3 type conforming to IS 3218:2013.

The electrical contractor should allow for a minimum of 4No. visits to site by the specialist fire alarm contractor to recommission the fire alarm panel during the construction period of these works.

The electrical contractor shall allow for making adequate protection of all ceiling mounted devices during the proposed works.

Interface Relay Units

Electrical contractor shall allow for the supply and installation of 2No. new interface (i/o) devices for connection to the new plant room control panel and bms

The electrical contractor shall allow for provision of 240v power supply via suitably rated fused spur for each i/o device details to be advised by the electrical contractors fire alarm specialist

All interface units shall be soft pattern and contain all necessary micro-processors, electronic components/circuitry for direct connection to the circuits and operate in conjunction with the system circuitry/operational requirement.

All containment and segregated cabling shall be supplied and installed by the Electrical Contractor.

The loop wiring shall be via 1.5mm² PH120 enhanced fire-resistant cabling; in galvanised steel conduit and tray.

Testing & Commissioning

All modifications to the existing fire alarm system must be commissioned by a suitable qualified fire alarm specialist including for updating the fire alarm log book, provision of installation, modification and commissioning certificates, to the latest IS3218 standard requirements.

Should any test result not prove to the satisfaction of the Engineers, the contractor shall take immediate steps to deal with the matter in an approved manner to the satisfaction of the engineer.

This sub-contractor shall give notice, in writing, to the Engineer of the date on which they shall be ready to carry out tests on completion and shall provide him with every facility for witnessing any such tests. The Employer and/or Maintenance Engineer may also wish to attend such tests and should be afforded similar facilities.

Contractor to Forward Maintenance Certificates for all alterations and additions to the fire alarm system including for updating the fire alarm log book, zone charts and as fitted drawings as required

3.8 Element (68) Security & Communication Systems

3.8.1 Security Systems

The electrical contractor shall allow for the alterations to the existing security systems as part of these works including for employing a suitably qualified specialists to carry out and certify all alterations required.

The intent is that existing security motion detectors and CCTV wherever present within the proposed refurbishment areas are retained in situ protected during the works and re-installed once the works are near completion

3.8.2 Classroom PA System

The electrical contractor shall allow for the removal of the existing PA Speakers and handing over to the school for future use as part of these works including for employing a suitably qualified specialists to carry out and certify all alterations required.

The New PA Speaker installation shall include for the installation of speakers and associated cabling for each science classroom and prep room that form part of the works

New speakers shall be TOA 6W 100V Wall Mount Speaker as TOA BS-678 or equal and approved

3.8.3 Classroom Interactive Whiteboard (IWB) Installation

The electrical contractor shall allow for the supply and installation of 5m Ultra High Speed HDMI cable for each classroom interactive whiteboard. HDMI cable shall be as per LINDY 37604 or equal and approved

The electrical contractor shall allow for the supply and installation of 5m USB High Speed cable for each classroom interactive whiteboard. Usb cable shall be as per LINDY 2.0 High Speed or equal and approved

The electrical contractor shall supply and install a brushed plate behind each IWB and a brushed plate at each teachers desk and shall allow for extending the HDMI and USB cables in containment to extend to the IWB input ports allowing for adequate slack at the teachers desk to allow for connecting to a laptop device

The electrical contractor should get approval of the HDMI and USB cables from the IWB Specialist and School prior to ordering same to ensure that they will be compatible with the IWB and input devices

3.9 COMMISSIONING, COMPLIANCE WITH CONSTRUCTION PRODUCTS REGULATION AND BUILDING CONTROL AMENDMENT REGULATIONS 2014

3.9.1 General

The Commissioning Engineer shall be an independent commissioning specialist, appointed as a Specialist Sub-Contractor by the Electrical Contractor and shall be responsible for fully managing the commissioning process for all of the Building Services Installations. He shall carry out all necessary liaisons with other contractors, specialist installers and design team members and compile the operation and maintenance manuals, as installed drawings and building log book.

The Electrical Contractor shall work with the independent commissioning specialist to ensure that all items of the Electrical Installation commissioning are managed by the independent commissioning specialist.

3.9.2 Detailed requirements

The role of the Commissioning Engineer and the interface requirements are set out in section 1.60 of the Services Preliminaries.

3.9.3 Building User Guide

The Contractor shall provide all system details in an agreed set-up with the specialist to ensure that the compiled document represents all building services in common format that complies with BREEAM requirements.

3.9.4 Programme

The Contractor shall provide a programme for the Commissioning of the plant. This shall be built up from individual systems then integrated in overall system tests to prove operation of the build environment. Each stage of the commissioning shall be co-ordinated and integrated with the Main Contractors works to ensure a fully managed completion and handover of the project.

The services contractor shall produce a commissioning programme no less than eight weeks prior (may be required sooner depending on site requirements) to project handover for review by the

design team. This shall indicate an individual item for each installation detailing all dates etc. when equipment will be tested, commissioned and made available for demonstration to the Design Team/Client.

3.9.5 Roles and Responsibilities

This section summarises the duties of the various parties for some of the main activities.

Activity	M/E Contractor/s	Commissioning Engineer
Review drawings and specifications for all engineering services, and advise the Employer.	-	Execute
Prepare detailed commissioning method statements.	Execute	Assist and comment
Construction stage meetings relating to commissioning.	Attend	Attend and issue progress report.
Witness function tests at manufacturers works.	Arrange, attend and execute.	Attend if required by Contractor/Employer
Carry out pre-commissioning.	Execute	Witness and co-ordinate.
Carry out commissioning.	Execute	Witness and co-ordinate.
Setting to work.	Execute	Witness and co-ordinate.
Performance testing and fine-tuning	Execute	Assist, witness and co-ordinate.
Employer assistance after handover.	Assist	Execute
Prepare and issue O & M manual.	Co-ordinate and compile	Issue information
Prepare and submit Commissioning Manual.	Issue information	Co-ordinate and compile
Issue Record Drawings.	Prepare and issue	Assist
Demonstrate systems to the Employer/Tenant	Execute	Devise programme, co-ordinate and attend
Labelling and identification of systems.	Provide and fix labels	Devise and co-ordinate an integrated labelling system

3.9.6 Compliance with the Construction Products Regulation (CPR)

The Contractor shall ensure compliance with the Building Regulations, in this regard all works should be carried out using “proper materials...which are fit for the use for which they are intended and for the conditions in which they are to be used” to ensure compliance with the Building Regulations. To this end CE marking is required on all products used in and on this project and the Client and the Design Team will expect to receive all requested certification of conformance from the Contractor and his suppliers in this regard. If certification is not available, the Client and the Design team may demand to have a suitable replacement product installed at no extra cost to the contract.

3.9.7 Provision of Co-ordinated Services Working Drawings by Electrical Contractor

The electrical services contractor shall provide full and detailed co-ordinated working services drawings which are to be undertaken in conjunction with the electrical services contractor (who will take the lead in the process) and main contractor in order to ensure a co-ordinated approach to services distribution ensues throughout the existing school building and through the new accommodations, taking into account the building fabric, structure and building services intent shown on the Ipsum drawings.

The electrical contractor shall assist the mechanical contractor in the production of the drawings for approval and inputting with their own working drawings and these shall not be limited to:

1. 1: 100/1:50 scale GA drawings showing routing and plan throughout existing and new school.
2. 1:20 scale sections demonstrating integration with the structure and fabric particularly at any pinch points.
3. 1:100/1:50 scale reflected ceiling plans with services shown including lighting.
4. Demonstrate confirmation of co-ordination of services on internal elevations