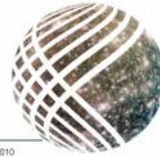


**New Plumbing Workshop
Banagher Further Education Training Centre, Main Street, Banagher,
Co. Offaly**

**Volume A.2.4
OF THE WORKS SPECIFICATION**

Electrical Services Particular Specification

Tender Issue (T1)



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PART 1: PRELIMINARIES & GENERAL ITEMS

1.1 Introduction and Intent

The intent of this specification and the contract drawings issued is to describe and provide for a complete, fully tested, and operational electrical services 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 small individual item, circuit component, containment path, or auxiliary accessory involved may not be specifically mentioned or described.

The Contractor shall allow for all materials, accessories, and labour necessary for an entire and functional installation and shall not avail of any unmentioned error or omission should such exist. The works entail the electrical installations, fit-out, and refurbishment of the new Plumbing Workshop at Banagher Further Education Training Centre.

All works shall strictly follow all relevant Building Regulations, Irish Standards, European Standards, ETCI/Safe Electric guidelines, and Good Engineering Practices. The Contractor shall ensure all necessary flexibilities and engineering resources are available to the project to meet active construction deadlines and design programmes. The Contractor shall take all reasonable care to ensure all site workers and visitors are not endangered by any element of their works.

1.2 Site Visit Prior to Tender Submission

The Contractor shall be deemed to have carried out a thorough site visit prior to the completion and formal return of his tender to ascertain for themselves the full extent, routing variables, load profiles, and physical nature of the works. The Contractor shall ensure that all installation factors, local site conditions, and architectural constraints are fully taken into account, allowing for what items are necessary in order to complete the installation and to leave same in a complete working condition to the absolute satisfaction of the Employer's Representative.

No extras, retrospective claims, or cost variations shall be allowed for additional work that could have been easily ascertained by visiting the site during the tendering window. 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.

1.3 Standards, Acts, and Regulations

Unless specifically stated otherwise, or approved in writing by the Engineer, all execution methods, raw materials, and electrical plant shall be in accordance with the relevant Irish,

European, International, and British Standards and Codes of Practice, whether indicated in this Specification text or not. The electrical services installation shall fully comply with:

- The Safety, Health and Welfare at Work Act, 1989.
- Requirements of the Health and Safety Authority (HSA) / S.I. 138.
- Requirements of the local Fire Officer.
- All Irish Building Regulations including Building Control (Amendment) Regulations (BC(A)R), S.I. 9 of 2014.
- Factories Act / Statutory Instruments.
- National Rules for Electrical Installations, I.S. 10101:2020.
- Code of Practice for Emergency Lighting, I.S. 3217:2023.
- Fire Detection and Alarm Systems for Buildings, I.S. 3218:2013+A1:2019.
- The Tender Drawings and Contract Preliminaries.

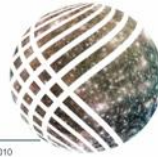
The tender figures must be based on the Acts and Regulations current on the date for the return of tenders. If these legislative acts or building regulations are amended after that date, the Contractor shall inform the Engineer immediately.

1.4 Setting Out of Works and Coordination

The Contractor shall set out the whole of the electrical works and be held individually responsible for the correctness of the spatial positions, levels, and dimensions of the several lines. All openings, structural sleeves, brackets, bases, and holes to be cut or formed in the building structure shall be positioned and marked out on-site by the Electrical Contractor in sufficient time to avoid construction delays.

The tender drawings are diagrammatic and indicative only. The Contractor shall allow for a practical layout on-site, allowing for the setting around structural obstructions and other minor modifications which may or may not be apparent from the architectural, engineering, structural, or services drawings. The exact courses and positions of all containment tracks, conduits, trunking, sub-mains cabling, and final circuit drops shall be duly laid out and marked on the job by the Contractor and approved before execution, having regard to external fields and the proximity to other mechanical and structural services plant.

Before any works are started on site, the Electrical Contractor shall hold formal coordination meetings with the Mechanical Contractor to integrate the M&E installations. No adjustments will be made to the contract sum where additional work is required due to poor inter-trade coordination.



1.5 Conflict Between Documents

In the event of there being an apparent conflict or contradiction between the drawings and this specification, the tenderer shall obtain formal clarification from the Engineer before submitting his tender. Failure to do so will be deemed to imply that the most onerous, rigorous, and expensive requirements have been included for within the returned tender price.

Claims raised post-tender in relation to contradictions shall not be entertained, and the onus remains with the contractor to highlight any such design issues during the tendering period. This in no way overrides the order of precedence of information as defined within the contract. Plant and equipment which is installed and which conflicts with existing work or installations will be removed and reinstalled without expense to the client by the Contractor.

1.6 Materials and Workmanship

All materials used in the works shall be new, fit for the use for which they are intended, and suited for the environmental conditions in which they are to operate. All construction products must bear a clear CE/UKCA mark in accordance with the provisions of the Construction Products Regulation (CPR) and adhere to the following:

- Comply with an appropriate harmonized standard, European technical approval, or national technical specification as defined in active construction directives.
- Comply with an appropriate Irish Standard or Irish Agreement Board Certificate or with an alternative national technical specification of any member state of the European community, which provides in use an equivalent level of safety and suitability.

The electrical installation shall be carried out and maintained in the best, most substantial, and workmanlike manner by fully qualified, competent, and certified registered electrical contractors (REC). Workmanship shall comply with British or Irish Standards and the relevant codes of practice. No lines, containment services, or concealed conduits shall be hidden, bricked in, or covered up prior to formal inspection and witness sign-off by the Employer's Representative. Wherever a proprietary name is used to specify a material, it shall be deemed to have the term "or equal equivalent" appended to it, indicating the standard of construction, durability, and appearance acceptable to the client.

1.7 Plant Warranties and Liability for Defects

Where a manufacturer's equipment warranty applies, the warranties on all electrical plant, switchgear, solar components, and inverter assemblies shall officially commence from the date of final commissioning and formal acceptance of the plant by the Engineers.

Works showing operational defects or physical damage, whether caused by negligence on behalf of the Contractor or not, discovered during the progress of the works or within the subsequent defects liability period, shall be made good by the Contractor at his own expense. On refusal to do so, the Employer shall be entitled to carry out the work necessary and recover the expenses associated with such work. Allow for maintaining the complete installation in perfect condition for a period of 12 months after the issue of the Certificate of Substantial Completion.

1.8 Conditions of Site and Property Damage

The Electrical Contractor shall note that any damage caused to the existing walls, doors, ceilings, windows, floor coverings, external yards, main entrances, grassed areas, access roads, or paved areas arising during the construction stage of the project and caused by construction works, transport vehicles, or installation staff, is to be made good to the satisfaction of the Client at no extra cost. The Contractor shall provide all necessary protection to existing paved, grassed, and landscaped areas around the site.

The work is not to interfere in any way with public roads. In particular, the roadways are to be left free of all dirt, debris, and builder's materials, and shall be thoroughly cleaned as and when required. Any damage caused to surrounding public roadways shall be made good to the satisfaction of the Local Authority or Client at the Contractor's expense. The Contractor shall pad ladders, protect surfaces, and shield finished elements so that the structure is not stained by oil, grease, or tool scores. Remove all rubble and waste as it arises to keep the site clean, safe, and tidy.

1.9 Trade Union Rates and Agreements

The Contractor must be in full compliance with all relevant Trade Agreements and shall pay all employees connected with the electrical project current trade union rates of pay. If the Contractor appoints approved sub-specialists to complete specific elements of work (such as the solar PV package), they too shall be compliant with current trade union agreements. This will be actively monitored on-site, and all employees and sub-contractors must carry their union cards on them at all times.

1.10 NZEB/BER Compliance

This building needs to be Nearly Zero Energy Building (NZEB) compliant. An NZEB compliance report and calculation has been carried out for this project based on all the plant, equipment, and materials as specified below. The Contractor shall ensure that all specified electrical items, daylight harvesting sensors, high-efficiency luminaires, and the solar photovoltaic array are installed exactly as described.

If the Contractor proposes alternatives, they must ensure that these items match the specified criteria. If the Contractor installs any item that isn't an equivalent or isn't formally approved by the Engineer, they shall be required to carry out an individual

NZEB/BER assessment at their own expense. If the alternative plant and materials do not match and the NZEB assessment does not pass, the Contractor will be liable for removing the item and replacing it with the specified equipment to ensure NZEB compliance.

1.11 Building Control Regulations (BC(A)R)

All works shall be carried out to the new Building Control (Amendment) Regulations (BC(A)R), S.I. 9 of 2014. The Contractor shall allow for the following obligations across all contract stages:

- **Commencement Stage:** Familiarise themselves with the drawings, specifications, and documents lodged with the Commencement Notice. Ensure a competent person is assigned to oversee construction works.
- **During Construction:** Install the electrical services and construct the building in accordance with the plans and specifications. Ensure workmanship and selected materials comply fully with the Building Regulations. Co-operate with the design team, Assigned Certifier, and other certifiers for the implementation of the site inspection plan. Give the Engineer at least 5 days' notice to carry out any necessary inspections. All services to be hidden or concealed shall be left exposed until inspected. Prior to closing up services in walls, ground, trunking, or attics, all pre-commissioning isolation and continuity tests shall be completed and signed off.
- **Upon Completion:** Sign the Certificate of Compliance (Completion). Provide the Assigned Certifier with all technical documentation, confirmations, Safe Electric validation logs, and product test certificates required to collate particulars for handover, certification, and submission to the Building Control Authority. Maintain all project records. No cost variations will be accepted for time delays or opening up for inspections if these procedures are not strictly followed.

PART 2: PARTICULAR SPECIFICATION BY SYSTEM TYPE

2.1 Electricity Distribution Systems (Uniclass: Ss_70_30)

Sub-Main Distribution Board (SMDB): Supply, install, and connect a Form 3A, multi-phase Sub-Main Distribution Board (SMDB) to feed the workshop layout. The board

structure must be a modular, rigid, folded sheet-steel box profile finished with an electrochemical grey epoxy powder coat matching RAL 7035 (or equal equivalent) providing an IP31 minimum internal protection rating.

Technical Parameters: The board must utilize a fully rated, joint-bolted hard-drawn, high-conductivity (HDHC) copper busbar configuration running the complete internal length of the array, certified to carry continuous load parameters tested to IEC 439 and BS 150 parameters. Connections tracking up to 63A may be executed using braced conductors, whereas any branch routing above 63A must use rigid rectangular HDHC copper bars. The main incoming device must provide a minimum symmetrical fault withstand capacity of not less than 40kA at 0.2 power factor, incorporating an electronic trip unit, and certified to P2 category IEC 157-1 breaking standards.

Circuit Protection Inventory: Plug-in format Type B, C, or D thermal-magnetic circuit breakers conforming to I.S. EN 60898 breaking rules must be pre-fitted. Final power networks and single-phase tool bench socket loops must track through combined double-pole operated, high-sensitivity 30mA Residual Current Breakers with Over-Current (RCBOs) to guarantee absolute discrimination.

Earthing and Surge Protection: Absolute compliance with I.S. 10101:2020 is mandated for earthing configurations, RCD selection, and thermal safety metrics. Provide Type 1 and Type 2 Combined Lightning and Surge Protection Devices (SPDs) designed to withstand direct lightning current waveforms up to 25kA (10/350µs) per single pole and maximum internal discharge fault transients of 40kA (8/20µs) across a multi-mode lines network (line-to-line, line-to-neutral, line-to-ground) matching standard EN 61643-11 guidelines. The protective configuration must maintain a maximum let-through surge voltage threshold (UP value) of less than 1.5kV and feature active hot-swappable tracking cartridges, built-in thermo-dynamic failure isolation switches, remote changeover alert links, and a distinctive solid red module chassis to differentiate the device from local over-current circuit breakers.

Labelling, Metering, and Charting: All interior component spaces, outgoing feeder lugs, and breaker rows must be permanently marked with screw-fixed, multi-layer laminated plastic circuit labels (such as Traffolyte or equal equivalent, black on white background) detailing current rating, operational duty, and supply origin. Integrate a digital check meter matching the specification of a PowerLogic PM5000 series (or equal equivalent) device equipped with Modbus communication links, multi-tariff tracking configurations, and harmonic distortion tracking modules analyzing up to the 31st harmonic. A heat-sealed, clear plastic circuit schedule card must be secured to the internal face of the panel door.

2.2 Cable Management Systems (Uniclass: Ss_70_30_10)

Linear Measurement Rules: In strict compliance with ARM 5, all cable trays, baskets, ladders, and trunking runs are measured lineally over all fittings. Bends, tees, and intersections are completely covered in the linear rate rules and must not be itemized as separate components.

Galvanized Steel Carrier Track Layout: All power loops, lighting branch wiring, and extra-low-voltage (ELV) data lines must run inside hot-dip galvanized steel containment systems.

Cable Tray Tracks: Perforated, heavy-gauge galvanized steel tray profiles, manufactured by Uni-Trunk (or equal equivalent), must be anchored to walls or suspended from ceiling joists using 10mm threaded rods spaced at intervals not exceeding 1000mm. All tray runs across structural fire compartment walls must be fitted with structural lids and internally packed with certified intumescent fire-stopping materials.

Metal Conduit Infrastructure: Surface-mounted conduit installations must utilize galvanized, welded, heavy-gauge steel tubing matching BS 31 Class E standards, maintaining a minimum outside diameter profile of not less than 16mm. All couplings must be screwed threaded connections, and open ends must be protected with brass bush fittings to prevent cable sheath tearing during wire drawing cycles.

Feeder Matrix Sizing: All internal power routing feeds and sub-mains cables tracking across high-level containment pathways must be low-smoke, zero-halogen, armoured copper networks insulated with cross-linked polyethylene (CU/XLPE/LSZH/SWA/LSZH). Sub-mains feeders over 16.0mm² require a 4-core copper configuration with an explicit external Green/Yellow insulated circuit protective conductor (CPC). Armoured feeder cables must maintain long turning arcs not less than 18 times the overall armoured outer cable diameter across all structural tray intersections.

2.3 Workshop Power & Mechanical Interfaces

Workshop Bench Isolation Controls & Emergency Stopping: Surface-mount industrial, heavy-duty, latching mushroom-head emergency stop buttons adjacent to workshop escape doors. All push stop buttons must exhibit a bold red button head centered over a yellow circular warning plate labelled: 'EMERGENCY STOP'.

Contact Interlocks: Activating any emergency button loop must trip a multi-pole contactor network inside the workshop supply panels, isolating all multi-phase (110V / 230V / 3PH) branch circuits serving workshop tool benches. The emergency network logic must be structured in accordance with BS EN 13850, BS EN 60204-1, and current HSA rules. System reset must be prohibited following emergency button release until a keyed master validation switch located on the main panel front plate is manually actuated.

Mechanical Equipment Power Drops: Supply, route, and connect power circuits to all mechanical plant items shown on Mechanical Plant Layout Drawing (or equal equivalent). Final connections to local sub-sink electric water heaters (EWH) matching the parameters of an Ariston Andris10U or Andris15U (or equal equivalent) must use a minimum 4.0mm² single-core copper conductor run inside welded steel conduits, terminating at a unswitched fused spur fitted with an active neon running indicator, high-density polyurethane insulation, titanium enamelled tank components, and an absolute ErP Class A thermal efficiency profile. Final flexibility links tracking directly to device terminal nodes must use robust, heat-resistant flexible cabling.

Extract Fan (CFF) & Fan Inverter (FI) Loops: Radial wiring feeds supplying power to local centrifugal workshop extraction fans matching the parameters of a Nederman Model 14522028 (or equal equivalent) driven by a 4.0 kW, 3-phase motor block must utilize 4.0mm² single-core copper loops run through metal conduit drops. The circuit must track through a high-level fused isolation switch and coordinate with associated localized variable frequency fan speed inverter modules matching a Nederman 1452137 (or equal equivalent).

Gas Safety Solenoid Valves (EGS/EPS): Automatic mechanical safety interlocks must link the active workshop fire alarm relay interface directly with the incoming gas line solenoid control valve. Any active fire signal or emergency step sequence must immediately strip power from the loop, activating the automatic gas shut-off matrix.

2.4 Design-Aligned Lighting & Safety Controls (Uniclass: Ss_70_80_45)

Luminaire Performance Schedule & Lighting Calculations

Design Benchmark and Compliance: Deliver a complete internal and external architectural luminaire layout in strict accordance with CIBSE Code for Lighting, SLL Lighting Guide LG5 (Lighting for Education), and National NZEB operational parameters. All light fittings must be CE and UKCA marked and backed by independent photometric data files (.ldt or .ies formats) verifying luminous efficacy.

Unified Glare Rating (UGR): All luminaires deployed across learning fields, office spaces, and work benches must achieve an overall Unified Glare Rating of UGR < 19 to reduce ocular fatigue and visual stress.

Colour Rendering and Ingress Protection: Internal learning fixtures must exhibit a minimum colour rendering index of CRI > 80 Ra with an exact nominal colour temperature of 4000K (Cool White). External envelope units must be rated to IP66 with an impact protection scale rating of IK10.



Target Illuminance Vector Mapping: Fittings scheduled on Reflective Ceiling Lighting Plan Drawing (or equal equivalent) must be provided, wired, and structurally suspended to meet or exceed the following localized metric boundaries:

Luminaire Tag	Spatial Application	Light Source Matrix	Enclosure / IP Sizing Specification	Minimum Target Illuminance (Lux)
Type A	Workshop Circulation Areas	High-Flux LED Array	Industrial Suspended Linear – Dust Shield Housing (IP20 Min)	300 Lux at 700mm AFFL
Type B	Dedicated Work Booths	High-Flux LED Array	Low-Glare Task Suspended Conductor Profile (IP40 Min)	500 Lux at 700mm AFFL
Type C	Office Enclosure Space	Low-Glare LED Grid	Recessed Micro-Prismatic Panel UGR <19	500 Lux at 700mm AFFL
Type D	WC / Accessible Toilets	Compact LED Module	Moisture-Proof Recessed Downlight – IP44 Minimum	200 Lux at Floor Level
Type E	External Building Envelope	High-Flux LED Engine	Polycarbonate Bulkhead Cover – Weatherproof IP66 / IK10	Dusk-to-Dawn Control Perimeter
Type F	Dedicated Escape Paths	High-Flux LED Array	Suspended Industrial Linear – Integrated Emergency Module	150 Lux Main / 1 Lux Escape

Automated Control Logic, Daylight Harvesting, and Sensor Calibration

Sensor Matrix Infrastructure: All general luminaires located within the core Workshop space (Type A), Training Work Booth zones (Type B), and Office enclosure (Type C) must be fully controlled via ceiling-mounted, multi-functional Occupancy (PIR) and Daylight Harvesting Sensors to minimize operational carbon profiles.

Absence/Presence Logic Mapping: The system must be configured for Absence Mode (Manual-On / Auto-Off) operation. Users must initiate the local lighting loop using momentary push-to-make retractive wall grid switches. The internal sensor array will continuously dim or scale the luminaire lumen output to maintain a constant baseline lux target relative to fluctuating external natural daylight inputs.

Timeout Delay Thresholds: The lighting circuits must automatically de-energize and transition to a zero-power off state exactly 15 minutes after structural occupancy ceases within the monitored zone.

Accessible WC Logic: Luminaires serving the accessible toilet facility (Type D) must trigger automatically via a 360° PIR sensor module, utilizing a dedicated 15-minute structural run-on delay timer to ensure occupant protection.

External Dusk-to-Dawn Sequence: External wall bulkheads (Type E) must bypass internal motion logic, tracking instead through an independent external photocell matrix linked with an adjustable 7-day digital time-clock fitted inside the SMDB.

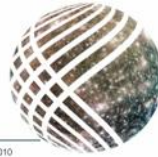
Integrated Emergency Lighting Framework (I.S. 3217:2023 Compliance)

Core Standards Alignment: The emergency lighting installation must provide safe egress visibility across all exit paths, open areas, and hazard zones in strict compliance with I.S. 3217:2023 (Irish Code of Practice for Emergency Lighting) and I.S. EN 1838:2024 structural criteria.

Emergency Output Performance Criteria:

- *Defined Escape Paths:* Emergency escape luminaires (Type F) must maintain a minimum horizontal illuminance of 1 Lux along the centerline of the designated evacuation path at floor level.
- *Open Area (Anti-Panic) Zones:* Core open-floor workshop zones not containing defined corridors must achieve a minimum illuminance profile of 0.5 Lux across the entire floor surface, excluding a 0.5-meter peripheral boundary wall zone.
- *High-Risk Task Zones:* Training Work Booths represent a high-risk educational workspace due to localized tool layout and welding equipment. Emergency lighting inside these booth cells must deliver a minimum of 10% of the normal illumination target (50 Lux minimum continuous output) at the work bench plane to allow safe shutdown processes.

Battery Power Autonomy: Every emergency light fitting, self-contained directional exit sign, and escape bulkhead shown on Emergency Lighting Layout Drawing No. BFETC-ELE-008 (or equal equivalent) must be equipped with an internal high-temperature sealed Nickel-Cadmium (Ni-Cd) or Lithium Iron Phosphate (LiFePO₄) backup battery pack. This battery array must independently drive the luminaire at full emergency output for a minimum duration of 3 continuous hours (180 minutes) following an absolute loss of local mains electricity supply.



Circuit Protection Isolation Protocol: Final power connections tracking to emergency units must use single-core 2.5mm² low-smoke zero-halogen (LSZH) copper conductors run inside heavy-gauge steel conduit frameworks. To prevent structural blindness during localized wiring faults, all emergency units must be connected directly to the unswitched live phase conductor derived from the exact same final sub-circuit supplying the general, standard luminaires of that specific zone.

Centralized Test Control Matrix: An independent Emergency Lighting Key-Switch Test Module matching the standard of an MK Masterseal grid switch array (or equal equivalent) must sit adjacent to the electrical distribution panel. This device must feature defined multi-duration spring-return test switches to allow facilities personnel to manually initiate localized 30-minute functional checks or comprehensive 3-hour duration discharge test cycles without de-energizing neighbouring general final circuits.

Visual Status Indicators: Every individual emergency luminaire must incorporate a high-visibility, surface-recessed green LED status indicator light. This LED must glow continuously under normal conditions to confirm that the local mains charging circuit is active and that the internal battery monitoring system has verified cell continuity.

Label Tracking System: Every emergency fitting shown on Emergency Lighting Layout Drawing (or equal equivalent) must display a bold, permanent, and legible alphanumeric identifier label (e.g., *SMDB-EL-01 / TY-F*) fixed securely to the luminaire chassis. This ID index must match the engineering records, commissioning logs, and structural maps contained within the final project handover files.

2.5 Safety, Alarms, & Assistance Networks

Addressable Fire Alarm Infrastructure (I.S. 3218:2013+A1:2019): Deliver a standalone, fully compliant layout for the fire detection and alarm extension as detailed on Protective Services Layout Drawing (or equal equivalent). Loop paths must use multi-core copper core conductors carrying a verified PH120 Enhanced fire-resistance rating matching the standard of Prysmian FP Plus (or equal equivalent), capable of withstanding joint fire, water spray, and mechanical impact for a minimum 120-minute operational window under BS EN 50200 and BS 8434-2 parameters.

Containment & Mounting: All fire detection conductor paths must run within dedicated galvanized steel tray networks or independent steel conduit drops. Secure cable lines using non-combustible zinc-plated steel clips spaced every 500mm; plastic ties are prohibited.

Breaker Isolation Loop: The panel's local power drop must connect via a dedicated, lockable fire isolation switch housed in a bold red enclosure, key-operated, and labelled: 'FIRE ALARM SYSTEM - DO NOT SWITCH OFF'.

Accessible WC Emergency Assistance Call Network (Part M Aligned): Deliver an emergency call system matching BS 8300-2 and TGD Part M guidelines as laid out on Protective Services Layout Drawing (or equal equivalent). The calling pull-cord assembly must utilize a heavy-duty, anti-microbial cord containing two distinct red pull handles, with the bottom handle sitting at a fixed position between 50mm and 100mm above the finished floor line to ensure access for a fallen occupant. Activating the cord must trigger a combined visual strobe and acoustic sounder over the WC door, resettable only via a local manual reset station installed inside the WC cubicle between 700mm and 1100mm AFFL.

Intruder Alarm Infrastructure (I.S. EN 50131-1 / I.S. CLC/TS 50131-7): Deliver a fully integrated intruder alarm extension as detailed on the Intruder Alarm Layout Drawing, complete with intruder alarm panel/expansion equipment, keypad, panic alarm push buttons, external sounder and strobe, internal sounder, magnetic door contacts, dual-technology passive infrared/ultrasonic detectors, 360° passive ceiling-mounted infrared detectors and associated wiring, containment and ancillary equipment. The new installation shall be fully compatible with and interconnected to the existing intruder alarm system serving the main Banagher FET building, utilising a wired or secure wireless connection as indicated on the drawings and agreed with the Client. All equipment, detection devices, communication paths and associated components shall be designed, installed, tested and commissioned in accordance with I.S. EN 50131-1 and I.S. CLC/TS 50131-7, with system grading and device performance appropriate to the application and Client/insurer requirements. Where the interconnection is routed externally, cabling shall be suitably rated for the installed environment and protected against moisture, mechanical damage and electrical interference. Provide permanent mains supply and standby battery backup to maintain operation during mains failure, together with all necessary isolation, surge protection and interface equipment. The external audible/visual alarm shall incorporate automatic sounder cut-off and strobe operation in accordance with the applicable requirements. Installation, programming, testing and commissioning shall be undertaken by an appropriately licensed contractor, with the completed system fully integrated, labelled, tested and handed over with as-installed documentation, updated zone schedules and certification of compliance.

2.6 Structured Data Network Criteria

Conductor Specification: All internal network points and data communication outlets must be wired using premium unshielded twisted pair Category 6A (CAT 6A) horizontal cabling as detailed on ICT Data Infrastructure Plan Drawing No. BFETC-ELE-006 (or equal equivalent).

Separation Requirements: Data tracks must run on an independent cable tray route, maintaining distinct separation offsets from parallel low-voltage power paths. Where

power and data trays cross, they must intersect at a strict 90-degree right angle to eliminate crosstalk interference.

Termination Points: Final data drops must be presented via patch RJ45 faceplates secured inside 35mm deep metal clad back-boxes matching the MK Metalclad Plus series (or equal equivalent).

PART 3: CONTRACTOR DESIGNED DEVELOPMENT WORKS (ARM 5 INDEX 0.1.7)

3.1 Scope Boundaries and Specialist Sub-Contractors

Specialist equipment and sub-systems containing unresolved design risk or requiring specialist sub-contractor layout completion at the time of tender launch are explicitly isolated here. The Main Electrical Contractor shall secure an SEAI-registered specialist solar installation contractor to complete the engineering, layout, and construction of the roof-mounted Solar Photovoltaic (PV) array as indicated on Solar PV Layout Drawing (or equal equivalent).

3.2 Fixed Engineering Performance Parameters

The specialist sub-contractor's engineer must design the system to meet or exceed the following fixed criteria:

Array Layout Configuration: Sized in a dual-row structure (18 modules total, 9 modules per row) optimized on a South-West facing aspect at an exact 30-degree pitch angle to achieve a target yield of circa 9,350 kWh/annum, as specified on Solar PV Layout Drawing (or equal equivalent).

Module Construction: Monocrystalline N-type panels matching the technical parameters of the Jinko 78HL4-BDV module matrix (or equal equivalent), featuring a power rating of up to 650W per panel, carrying CE/UKCA Markings, and certified to IEC 61730 safety parameters for heavy snow zones, structural wind loading, and coastal salt-mist corrosion resistance.

Roof Anchoring & Clamp Mechanics: The support framework must be secured to the roof rafters using high-tensile structural anchors and M8 stainless steel framing components in compliance with TGD Part A structural weight rules. Mid-array modules must use robust aluminium T-clamps, while fringe panels must be anchored using structural end-clamps fitted with double-contact anti-slip face teeth.

Grid-Tied Solar Inverter Criteria: The solar array must loop to a high-efficiency 3-phase utility grid-tied solar inverter matching the performance metrics of a SolarEdge SE25K

(or equal equivalent) featuring a Weighted European Efficiency index of not less than 98%, incorporating built-in ground-fault tracking, integrated anti-islanding loop checks, and a hardwired Modbus communication path to output data. Provide a dedicated exterior fire-safety rotary isolation switch next to the array to isolate DC power during plant service cycles.

PART 4: BUILDERS WORK IN CONNECTION & FIRESTOPPING

4.1 Work Section 17: Builders Work in Connection (BWIC)

Structural requirements are decoupled and isolated here for Quantity Surveyor clarity, rather than being embedded inside technical electrical system sections:

Containment Paths & Openings: Detail all structural penetrations, wall/floor chases, and opening frames required across structural zones to facilitate cable tray, conduit, or sub-mains underground trench network installation. Low-voltage (LV), medium-voltage (MV), telecommunication, water, and gas services routed within trenches must respect standard horizontal and vertical duct separation boundaries, keeping a minimum horizontal offset of 260mm between LV conduits and MV mains, and a 300mm isolation zone relative to gas service runs.

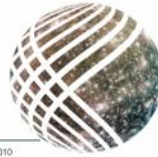
Equipment Supports: Itemize physical requirements for heavy plant plinths, external transformer bases, and specialized overhead containment support frames required to mount the SMDB, inverter, or heavy cable tray segments.

4.2 Work Section 18: Firestopping

Fire compartment sealing is decoupled entirely from the general electrical containment and cable installation scopes to ensure specialist procurement paths:

System Integrity: All cable tray, conduit, trunking, or uncontained cable runs passing through fire-rated compartment walls or floors must be sealed using certified intumescent fire-stopping mastic, pillows, or composite block materials.

Performance Metrics: The firestopping configuration must match or exceed the fire-resistance hours, acoustic dampening requirements, and structural testing standards of the surrounding barrier wall or floor assembly, verified in compliance with TGD Part B (Fire Safety). All structural slab penetrations must incorporate surface-mounted intumescent fire collars on plastic conduits exceeding 500mm inside diameter, delivering



a certified 2-hour (120 minutes) thermal and smoke containment barrier tested in accordance with BS 476 Part 20 and EN 1366-3.