

**RONAN MEALLY CONSULTING ENGINEERS  
1 CITY WALL,  
JAMES STREET  
KILKENNY**



**PROPOSED EXTENSION  
ACDAL CRECHE  
ALLENWOOD  
CO KILDARE**

**CONTRACT SPECIFICATION**

**ELECTRICAL BUILDING SERVICES**

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## 1. INTRODUCTION

This Specification specifically relates to the Electrical Building Services and must be read in conjunction with the rest of the General Specifications, drawings, preliminaries and accompanying documents.

**This document must be fully completed and submitted with the tender return by the main contractor. The figures from this document should be carried forward into the main pricing document.**

### **THE ELECTRICAL CONTRACTOR SHALL BE A DOMESTIC SUB-CONTRACTOR TO THE MAIN CONTRACTOR**

This project is governed by the BUILDING CONTROL (AMENDMENT) REGULATIONS 2014, the electrical sub contractor shall allow for the provision of data sheets for all items associated with the electrical installation including cabling, containment, light fittings, electrical accessories, fire alarm devices, security devices etc.

**2. CONTRACT PRELIMINARIES****2.1 General**

The following initials, words and phrases shall have the following meanings:

- (i) IS - Irish Standard Specification.
  - (ii) BS (EN) - British, European Standard Specification.
  - (iii) CP - Standard Code of Practice.
  - (iv) CIBSE - Chartered Institution of Building Services Engineers.
- 'The Works' - The whole of the Works envisaged by this Contract including the works of All Sub-contractors or Suppliers, Local Authority and Utilities Providers unless specifically stated otherwise.
- The work - That part of the Works dependent upon or subsequent to the statement.
- 'Instruction' - Instruction by the Architect or Engineer.
- 'Inspected' - Inspected by the Architect or Engineer.
- 'Submitted' - Submitted to or submit to the Architect or Engineer.
- 'Engineer' - Refers to the Mechanical & Electrical Consulting Engineer.

'Agreement', 'Acceptance', or 'Approval' by the Architect or Engineer shall have the following limitations:

(a) When given in respect to samples of materials, workmanship or methods of construction submitted in accordance with the requirements of the Specification, shall not be interpreted as denoting any degree of satisfaction with the materials used in, or the execution of the Works.

(b) When given in respect of Drawings, documents, or schemes called for by the Specification or proposed by the Electrical Sub-Contractor is only for conformance with the design concept and design information given in the Contract Documents or contained in subsequent Architect or Engineer's Instructions.

**2.1.1 Responsibility:**

Any Approval, Agreement or Acceptance by the Architect or Engineer shall have no effect unless given in writing. No such Approval, Agreement or Acceptance shall in anyway relieve or diminish the obligations of the Electrical Sub-Contractor under this Contract.

**2.1.2 Currency Of Documents:**

All publications referred to shall be the latest edition thereof, together with any amendments current ten days before the date fixed for the return of Tenders.

**2.1.3 The Site**

Description Of The Site And The Anticipated Ground Conditions:

The site is located at: Allenwood, Co. Kildare

The Electrical Sub-Contractor shall verify with the Public and Statutory Authorities and others the extent and location of all their buried, surface and aboveground services, which may be affected by the Works.

**2.1.4 Electrical Sub-Contractor's Visit To The Site:**

The Electrical Sub-Contractor shall at the time of tendering, make himself familiar with the nature of the building construction and the site.

A site visit is highly advisable in order to view the existing building services and the scope of work contained therein.

No claims resulting from failure to do so will be considered.

**2.1.5 Site Conditions:**

The Electrical Sub-Contractor will be deemed to have visited the site and assessed for himself the nature of the ground and water conditions, materials to be excavated, access and any other features which may affect his programme or methods of carrying out the Works.

The Electrical Sub-Contractor shall immediately notify the Architect or Engineer should conditions encountered on the site be significantly different from those generally described in the Contract Documents.

## 2.2 The Works

This contract document outlines the scope of the electrical works only to be carried out in the proposed extension to Scoil San Treasa, Mount Merrion, Co Dublin.

This Specification, Documents and drawings detail the work to be carried out by the appointed Electrical Sub-Contractor for this project.

This includes, but is not limited to, the following main areas: -

- Installation of a new Sub Main Distribution Boards
- Installation of General Service's outlets.
- Installation of normal internal and external lighting and emergency lighting.
- Installation of new data installation and interface with existing network
- Extension of existing Fire alarm system.
- Extension of existing Alarm System
- Installation of New Panic Alarm
- Installation of Door Access Controls and CCTV
- Installation of Wire ways for power and control wiring as necessary.
- Testing, commissioning, and setting to work the complete Electrical services package.
- Production of As-Built Drawings and Operation and Maintenance Manuals

The appointed Electrical Sub-Contractor shall be responsible for the supply and installation of all Electrical equipment shown and/or described in this document, on the data sheets or on the drawings. The installation shall be in accordance with the general specification.

The Electrical Sub-Contractor shall include for all supports, brackets, hangers, etc necessary for the above installation.

All works shall be carried out in accordance with This Document, the General Specification, the Drawings and Data Sheets.

Any discrepancies between the Specification and Drawings must be brought to the attention of the Engineer.

The Electrical Sub-Contractor shall make no assumptions. Variations as a result of assumptions will not be paid. Requests for Information (RFI's) must be issued to the engineer.

## 2.3 BCAR Requirements

### 2.3.1 PI Insurance Requirements

All specialists supplying design products & ancillary design certificates, to the works, are to carry Professional Indemnity insurance to the value of €6.5 million.

### 2.3.2 Ancillary Electrical Design Certificates to be provided to the M&E Consultant by the Contractor:

Electrical Design Certificate for all necessary design work for the installed systems not explicitly designed (as presented in the tender documentation) by the consultant, consultant design altered in any way or initial design impacted by final equipment selection, this includes but is not limited to:

- Cable Sizing
- Utilities Related Design
- Lighting System Design
- Emergency Lighting System Design
- Fire Detection & Alarm System Design
- Soils and Wastes Design
- All Temporary Designs

Note: is the contractor's responsibility to ensure all design work and certification is carried out by competent persons.

### 2.3.3 Electrical Completion Certificates:

The contractor will provide a completion certificate for all electrical works, that they have been completed in compliance with the tender package and design certification and where there is any degree of interpretation that the contractor has completed the works in accordance with building regulations. Completion certification is to be provided at least six weeks in advance of substantial completion.

The contractor will support this certification with the following non-exhaustive list of data:

- 2 no hard copies and 1 no electronic copy of the O&M manuals are required which shall include the following information as a minimum.
- As Built drawings including copies of all valve charts and all control panel wiring diagrams
- Installation Description
- Systems operations
- All relevant suppliers, sub-contractors names, addresses and contact nos.
- Manufacturers maintenance recommendations
- Full Spare parts lists
- Daily, weekly, monthly, seasonal, annual and other periodic maintenance duties
- Comprehensive access recommendations for all relevant plant and equipment.
- Safety file and any relevant health and safety information
- All commissioning certificates
- Signed Client Demonstration & Handover Acceptance Sheets
- Thermal overload settings
- All manufacturers' specification sheets and installation, commissioning & maintenance recommendations.
- Any other relevant testing and commissioning certificates / results

2.3.4 Sample Certificates



ANCILLARY CERTIFICATE OF COMPLIANCE: DESIGN

( COMMENCEMENT NOTICE / 7 DAY NOTICE )

*To be completed by a Specialist or Unregistered Consultant*



BUILDING CONTROL AUTHORITY : \_\_\_\_\_

PRE-VALIDATION REFERENCE NUMBER : \_\_\_\_\_

1. This certificate relates to the following Building Works:  
 \_\_\_\_\_ (project name)  
 at \_\_\_\_\_ (address)  
 element: \_\_\_\_\_ (insert as appropriate)
2. This certificate has been prepared in accordance with the Code of Practice for Inspecting and Certifying Buildings and Works [as published by the Minister under section 3(7) of the Building Control Act 1990] or equivalent.
3. We confirm that we have been commissioned by \_\_\_\_\_ (insert as appropriate) to design, in conjunction with others, the works described above in 1 and to certify our design.
4. We confirm that we are competent to carry out our design and to coordinate and integrate the design with that of others as (insert specialist skill) \_\_\_\_\_: based on \_\_\_\_\_ (insert accreditation and basis of competence)
5. We confirm that we have the Professional Indemnity Insurance required in our appointment: the renewal date of this policy is \_\_\_\_\_ (date)
6. We confirm that our plans, calculations, specifications and particulars included in the Schedule to the Commencement / 7 Day Notice to which this certificate is relevant, and which have been prepared exercising reasonable skill, care and diligence, have been prepared to demonstrate compliance with the requirements of the Second Schedule of the Building Regulations in so far as they apply to the building works concerned.
7. Under our Conditions of Engagement we are responsible for co-ordinating and integrating within our overall design of designated elements of the works the design of such parts of the works as will be designed to the requirements of our performance specifications by specialist suppliers and/or sub-contractors and our certification is contingent on the design of such parts and proprietary products being in compliance with the requirements of our performance specifications and of the Second Schedule to the Building Regulations insofar as they apply to the elements concerned.
8. We certify, having exercised reasonable skill, care and diligence that, having regard to plans, calculations, and specifications which have been prepared by us and having relied on ancillary certificates and particulars referred to at 6 and 7 above, our proposed design of those elements of the works for which we are responsible to the owner is in compliance with the requirements of the Second Schedule to the Building Regulations insofar as they apply to the elements concerned.

Company Name & Address: \_\_\_\_\_



Date: \_\_\_\_\_ Tel: \_\_\_\_\_ Fax: \_\_\_\_\_ E-Mail: \_\_\_\_\_

Company or Practice Registration No. \_\_\_\_\_ (where relevant)

Company or Practice Stamp

Signature (to be signed by a Principal or Director) Name: \_\_\_\_\_ Signed: \_\_\_\_\_



ANCILLARY CERTIFICATE OF COMPLIANCE: DESIGN

(COMPLETION)

*To be completed by a Specialist or Unregistered Consultant*



BUILDING CONTROL AUTHORITY: \_\_\_\_\_

COMMENCEMENT/7 DAY NOTICE REF NO.: \_\_\_\_\_

- This certificate relates to the following Building Works:  
 \_\_\_\_\_ (project name)  
 at \_\_\_\_\_ (address)  
 element: \_\_\_\_\_ (insert as appropriate)
- This certificate has been prepared in accordance with the Code of Practice for Inspecting and Certifying Buildings and Works [as published by the Minister under section 3(7) of the Building Control Act 1990] or equivalent.
- We confirm that we have been commissioned by \_\_\_\_\_ (insert as appropriate) to design, in conjunction with others, the works described above in 1 and to certify our design.
- We confirm that we are competent to carry out our design and to coordinate and integrate the design with that of others as (insert specialist skill) \_\_\_\_\_: based on \_\_\_\_\_ (insert accreditation and basis of competence)
- We confirm that we have the Professional Indemnity Insurance required in our appointment: the renewal date of this policy is \_\_\_\_\_ (date)
- We confirm that our plans, calculations, specifications and particulars included in the Schedule to the Commencement Notice / 7 Day Notice and Completion Certificate to which this certificate is relevant, and which have been prepared exercising reasonable skill, care and diligence, have been prepared to demonstrate compliance with the requirements of the Second Schedule of the Building Regulations in so far as they apply to the building works concerned.
- Under our Conditions of Engagement we are responsible for co-ordinating and integrating within our overall design of designated elements of the works the design of such parts of the works as were designed to the requirements of our performance specifications by specialist suppliers and/or sub-contractors and our certification is contingent on the design of such parts and proprietary products being in compliance with the requirements of our performance specifications and of the Second Schedule to the Building Regulations insofar as they apply to the elements concerned.
- We certify, having exercised reasonable skill, care and diligence that, having regard to plans, calculations, and specifications which have been prepared by us and having relied on ancillary certificates and particulars referred to at 6 and 7 above, our design of those elements of the works for which we are responsible to the owner is in compliance with the requirements of the Second Schedule to the Building Regulations insofar as they apply to the elements concerned.

Company Name & Address: \_\_\_\_\_



Date: \_\_\_\_\_ Tel: \_\_\_\_\_ Fax: \_\_\_\_\_ E-Mail: \_\_\_\_\_

Company or Practice Registration No. \_\_\_\_\_ (where relevant)

Company or Practice Stamp

Signature (to be signed by a Principal or Director) Name: \_\_\_\_\_ Signed: \_\_\_\_\_



ANCILLARY CERTIFICATE OF COMPLIANCE ON COMPLETION  
( ANCILLARY COMPLETION CERTIFICATE - INSPECTION )



*To be completed by a Specialist or Unregistered Consultant*

BUILDING CONTROL AUTHORITY : \_\_\_\_\_

COMMENCEMENT/7 DAY NOTICE REF NO. : \_\_\_\_\_

1. This certificate relates to the following Building Works:  
 \_\_\_\_\_ (project name)  
 at \_\_\_\_\_ (address)  
 element of work \_\_\_\_\_ (insert as appropriate)
2. This certificate has been prepared in accordance with the Code of Practice for Inspecting and Certifying Buildings and Works [as published by the Minister under section 3(7) of the Building Control Act 1990] or equivalent.
3. We confirm that we have been commissioned by \_\_\_\_\_ (insert as appropriate) to design, in conjunction with others, the works described above in 1 and to certify our design.
4. We confirm that we are competent to carry out our design and to coordinate and integrate the design with that of others as (insert specialist skill) \_\_\_\_\_ : based on \_\_\_\_\_ (insert accreditation and basis of competence )
5. We confirm that we have the Professional Indemnity Insurance required in our appointment: the renewal date of this policy is \_\_\_\_\_ (date)
6. Under our Conditions of Engagement we undertook to prepare, in respect of those elements which we designed / specified, an appropriate Preliminary Inspection Plan. We confirm that, taking into account the Code of Practice for Inspecting and Certifying Buildings and Works and exercising reasonable skill, care and diligence, we prepared a Preliminary Inspection Plan which we gave to the Assigned Certifier for inclusion in the overall Preliminary Inspection Plan. We also specified, by reference to national standards or otherwise, for inclusion in the building contract(s), testing to be carried out by contractors/suppliers to demonstrate compliance of building materials, elements and workmanship.
7. We now confirm that our Inspection Plan drawn up having regard to the Code of Practice for Inspecting and Certifying Buildings and Works, or equivalent, referred to above has been undertaken by us, having exercised reasonable skill, care and diligence, and/or, where appropriate, by other competent persons, on the basis that all have exercised reasonable skill, care and diligence.
8. Based on the above and on "Part A" of the Completion Certificate, and relying on the ancillary certificates scheduled and the test results, we now certify, having exercised reasonable skill, care and diligence, that those elements of the project works which we designed/specified are in compliance with the requirements of the Second Schedule to the Building Regulations in so far as they apply to the elements concerned.

Company Name & Address: \_\_\_\_\_



Date: \_\_\_\_\_ Tel: \_\_\_\_\_ Fax: \_\_\_\_\_ E-Mail: \_\_\_\_\_

Company or Practice Registration No. \_\_\_\_\_ (where relevant)

Company or Practice Stamp:

Signature (to be signed by a Principal or Director) Name: \_\_\_\_\_ Signed: \_\_\_\_\_

## 2.4 COVID-19

The tenders shall allow in his tender for working on site in line with the CIFs Standard Operating Procedure (SOP) and allow in the tender, where indicated, for any additional time and cost incurred to accommodate the imposition of C19 restrictions.

Ensure all directly and indirectly employed staff have undergone the CIF's COVID-19 safety induction programme and have a digital card.

Follow the instructions of the main contractors COVID-19 compliance officer.

## 2.5 Design Drawings:

The Electrical Design Drawings shall be read in conjunction with all relevant Specifications. These drawings are as identified on the drawing issue register.

A full set of all structural and architectural design drawings, documentation and copies of any revised design drawings can be obtained from the Main Contractor.

Revisions to design may be in the form of sketches and the Electrical Sub-Contractor shall not rely on these changes being available in CAD format.

It is recommended that the Electrical Sub-Contractor shall obtain a complete set of Architectural/Mechanical/Electrical and Structural Drawings to assist in completing this Tender.

One set of Electrical Services Design Drawings will be issued to the Electrical Sub-Contractor. Further copies will be made available at a rate of €3 per A1 drawing.

## 2.6 Tender Return

The Electrical Sub-Contractor shall be deemed, before tendering, to have made a thorough examination of the Drawings, Specifications, Conditions of Contract, the Site and other things affecting the proposed works to ascertain precisely the nature and extent of same and the conditions under which the proposed works will have to be executed.

The Electrical Sub-Contractor shall be deemed to have obtained full information on all matters which could in any way influence this Tender.

The Tender Return Form at the back of this document shall be completed and returned with the Tender in accordance with the cover letter included with this tender.

### **Late and / or Faxed Tenders Cannot be Accepted.**

The Tenderer shall identify as shown, the various elements within the Tender. Elements should not be grouped together.

The Tenderer shall also refer to the General Requirements in Conditions of Tendering in the Main Contract Document.

### **2.6.1 Interpretations**

In the Contract, except where the context otherwise requires, "give notice", "submit", "supply", "furnish", and similar expressions shall mean give notice, submit, supply, furnish and the like to the Architect/Engineer.

### **2.6.2 Discrepancies**

When this section is at variance with any other sections of the tender documents the Tenderer shall obtain clarification before tendering.

Failure to do so will be deemed to imply that the most onerous requirements have been included for.

### **2.6.3 Dimensions**

All Dimensions abstracted from the Electrical Services Design Drawings should be verified both on Site and with the Architect's drawings.

### **2.6.4 Standards, Codes & Authorities**

All work shall meet all the Requirements of National and Local Statutory Authorities and shall be in accordance with, and not limited to, the following: -

1. Irish Building Regulations
2. Electrical Supply Board Regulations.
3. All Applicable Irish, British and European Standards.
4. All Health and Safety Authority Requirements.
5. All Local Council Rules and Regulations.
6. CIBSE - Chartered Institution of Building Services Engineers - Recommendations
7. Safety, Health and Welfare at Work Act.
8. Safety, Health and Welfare at Work Act, (General Applications) Regulations.
9. IEE Wiring Regulations (Current Edition).
10. IS10101:2020 NATIONAL RULES FOR ELECTRICAL INSTALLATIONS (Current Edition)
11. National Rules for Electrical Installations Part 3-7 – Supplementary Requirements for Low Voltage Synchronous Generator Installations.
12. National Rules for Electrical Installations in Potentially Explosive Atmospheres ET105: 2000.
13. IS 3218: 2013 – Code of Practise for Fire Detection and Alarm Systems for Buildings.
14. IS 3217: 2023 - Code of Practise for Emergency Lighting.
15. BS 6651: 1999 – Code of Practise for the Protection of Structures Against Lightning.
16. BS 7430:1001 – Code of Practise for Earthing.
17. Building Control (Amendment) Regulations 2014

### **2.6.5 Quality of Equipment and Materials**

All equipment and materials shall be new unless otherwise noted.

Unless otherwise specified, all materials, plant and equipment, and the installation thereof, shall comply with the Irish Standards and Codes of Practice, Institutional Regulations, Statutory Requirements, National and Local By-laws where applicable.

Allow for proper packaging and delivery of all equipment and materials and for returning re-useable packaging to the suppliers as appropriate.

Allow for proper storage and protection of all equipment and materials on Site.  
Workmanship shall be of the best quality, and shall be produced by skilled and responsible craftsmen fully experienced in their respective trades.

All equipment shall be installed only to manufacturer's recommendations.

### **2.6.6 Equipment Mounting**

Insert a damp proof membrane wherever metal comes into contact with concrete, including all Electrical equipment, supports etc.

### **2.6.7 Alternatives**

The Equipment and Plant Priced in the Tender Return must reflect those specified in the Datasheets. Alternatives may be identified on the Alternative Equipment Schedule provided in the Datasheets.

### **2.6.8 Passing or Approvals**

The Passing or Approval of any aspect of ' the Works' by the Architect/Engineer does not relieve the Electrical Sub-Contractor of his responsibility under this contract to provide the specified systems, plant and equipment.

Any works or materials deemed unsatisfactory and/or not in compliance with the intent of the Specification and documents shall be removed and replaced with satisfactory work and materials at the Electrical Sub-Contractor's cost.

The Electrical Sub-Contractor shall issue details of all specified equipment and plant for approval prior to placing order.

All equipment and plant shall be approved on site by the engineer prior to installation.

### **2.6.9 Safety of Installation**

The Installations shall in all events operate in "fail-safe" mode i.e. if there is a failure or malfunction of a piece of plant or equipment, a consequential dangerous situation shall be prevented by automatic control. All necessary devices and interlocks shall be allowed for in the Tender whether specified in detail or not.

### **2.6.10 Maintenance of Installation**

The Electrical Services Installations shall be installed such that all components of the Installations are accessible and easily maintainable.

Factory trained service networks shall support all equipment used in the Installations.  
All spare parts shall be available factory ex-stock for a period of 5 years from purchase date.

**2.6.11 Existing Services**

The Electrical Sub-Contractor shall be responsible for ensuring that all existing services on the site, such as gas, communications, water and electricity are undamaged during the works.

The Electrical Sub-Contractor shall be liable for any compensation claimed by unrelated parties in the event of an inadvertent break in the existing services that occurs as a result of the construction work.

**2.6.12 Certificates and Payments**

The Electrical Sub-Contractor shall refer to the Certificates and Payments Clauses of the Main Contract Document.

The Electrical Sub-Contractor must submit Detailed Progress Statements for each Claim and Interim Certificate Amounts may be at the Engineer's Discretion.

**2.6.13 Guarantees and Warranties**

All manufacturers guarantees and warranties on plant, equipment, etc., shall be valid up to the end of the Defects Liability Period.

**2.6.14 Defects Liability**

Refer to the Conditions of Tendering in the Main Contract Document.

**2.6.15 CE Marking**

All electrical equipment, systems supplied and installed shall conform to the appropriate EU Directives and shall carry the applicable CE Marking.

## **2.7 Related work by Other Trades**

### **2.7.1 Builders Works**

All builders' work such as cutting of holes in walls and floors (of size greater than 100mm in any dimension) the provision of foundation for plant and machinery, etc., will be carried out by the Main Contractor. The Electrical Sub-Contractor shall, however, be responsible for the correct marking out and providing all builder's works information/drawings to enable the Main Contractor to fulfil his obligations with regard to Builder's Attendances.

The Electrical Sub-Contractor shall produce Builder's Work Drawings and submit to the Engineer for comment and submit to the structural engineer for approval.

Where services pass through partitions (floors, walls, ceilings) the Electrical Sub-Contractor shall maintain the fire rating if applicable within the services e.g. Fire dampers in ductwork etc. The Electrical Sub-Contractor shall refer to the Architect to identify all Fire Walls within the building.

The Main Contractor shall be responsible for making good of all builder's work open around services and ensuring that the making good does not damage the services installed.

Work to be carried by others: -

- Safe Disposal of construction/debris
- Lifting/Hoisting Electrical plant and equipment
- Trenches for incoming Gas/water and outgoing drainage
- Excavating/Backfilling of all trenches as identified.
- OPES for passage of pipe work and ductwork
- Fire stopping and filling of OPES
- Painting of exposed conduit etc
- Chasing for Electrical Services
- Temporary Lighting and Power for Construction

### **2.7.2 Services Demarcations**

Definition of demarcations shall not absolve responsibility of the Electrical Sub-Contractor to perform the whole of the Contract works in a manner satisfactory to the Architect/Engineer.

## **2.8 Contract Documentation Delivery**

The Electrical Sub-Contractor shall allow for supplying copies of all Electrical Services RFI's (Request For Information), Drawings and any other Electrical Services Documentation directly to the Architect/Engineer. This flow of information shall be simultaneous to all parties.

A4 information may be faxed.

Overnight courier should send all other information over the size of A4.

All costs for this delivery process shall be included in the contract sum.

## **2.9 Testing and Commissioning**

The Electrical Sub-Contractor shall ensure that sufficient time is allowed in the Main Contractor's programme to carry out the testing, pre-commissioning and handing over of the installation.

### **2.9.1 Testing and Setting to Work**

On completion of works or parts of the works the Electrical Sub-Contractor shall test the various installations in accordance with standard test procedures set out in the I S, BS and European Standards and Codes of Practices.

The various sections may not all be carried out together and the Electrical Sub-Contractor shall include in the contract sum for testing phases to suit the progress of the building.

Where suppliers appointment includes for testing, the Electrical Sub-Contractor shall be responsible for ensuring that all tests are properly carried out and test/commissioning certificates to be included in the O & M Manuals.

The Electrical Sub-Contractor shall serve at least seven days notice on the Engineer before carrying out the test to allow the Engineer or his representative to witness the test if he so wishes.

Nevertheless the Electrical Sub-Contractor shall forward to the Engineer fully completed and signed Test Certificates for all installation works.

## **2.10 Construction Programme And Co-Ordination**

### **2.10.1 Programme**

The Electrical Sub-Contractor shall include within his Programme, details of his intended timing and order for the construction of the Electrical Services Works and the dates by which any significant items of information will be required from the Main Contractor.

The Programme shall make all necessary allowances for submissions and Approvals and any other specific requirements of the Specification, including allowances for any standing time and time for work under provisional and contingency sums, which may affect the progress and shall be arranged such that actual progress may be recorded against each item.

The Programme shall indicate the start dates and times on site for the various utilities and service supply companies whose works the Main Contractor is responsible for co-ordinating.

### **2.10.2 Sequence Of Construction**

The Electrical Sub-Contractor shall submit in writing his proposals for the sequence of construction, diversions, connections and reconnections before the work begins.

Where a sequence of construction is described or shown on the drawings or other schedules the Electrical Sub-Contractor may, if he so wishes, submit his own proposals not less than two weeks before the work begins.

### **2.10.3 Submissions For Acceptance Or Approval**

Where submissions for Approval are specified, the Electrical Sub-Contractor shall prepare and submit with his Programme a schedule of such submissions, co-ordinated with the Programme and including agreed time allowances for submission and Approval before the related work commences.

Working Drawings and Calculations to support details and components chosen and any other relevant information shall be submitted not less than two weeks before manufacture begins.

The Electrical Sub-Contractor shall check that all Working and Installation Drawings are complete and co-ordinated.

The Electrical Sub-Contractor shall confirm in writing to the Main Contractor and Engineer that he has done so.

### **2.10.4 Availability Of Named Goods And Materials**

Within two weeks of the commencement of the Contract the Electrical Sub-Contractor shall determine the availability of all named goods and materials specified in the Contract Documents, and shall notify the Main Contractor and Engineer of his findings in writing.

### **2.10.5 Availability Of Utilities And Service Supply Companies**

Within two weeks of commencement of the Contract the Electrical Sub-Contractor shall determine the availability of all relevant Utilities and service supply companies detailed in the contract documents, and shall notify the Main Contractor and Engineer of his findings in writing.

### **2.10.6 Bulk Ordering**

Bulk orders for materials shall not be placed before any Approvals required by the Specification for sources and samples have been given, or satisfactory results of any preliminary tests required by the Specification have been submitted.

### **2.10.7 Specialist Trades**

The Electrical Sub-Contractor shall ensure that specialist trades responsible for work necessary for the proper execution of the works or for related work, are present on site when required.

The Electrical Sub-Contractor shall ensure that all units, components or assemblies are available in time for incorporation in the Works.

## **2.11 Drawings**

### **2.11.1 Construction Drawings**

The Electrical Sub-Contractor shall check all Drawings and Specifications to ensure in good time that he has sufficient information to carry out the work and that all the instructions, Drawings and Specifications he has been provided with compatible information on the work to be carried out.

If the Electrical Sub-Contractor considers additional details are required, he shall notify the Main Contractor and Engineer immediately.

In the event of any discrepancy being found between such Drawings and Specifications, the Electrical Sub-Contractor shall notify the Main Contractor/ Engineer immediately.

### **2.11.2 Working Drawings**

The Electrical Sub-Contractor shall keep on site a full set of the Construction Drawings, on which he shall record and note the actual layout of all the Electrical services installations as installed, including routes.

The Electrical Sub-Contractor shall show all pipe work and ductwork routes and final locations of equipment and outlets on his Working Drawings, which he will submit to the Engineer for appraisal prior to installation.

The Electrical Sub-Contractor shall record all alterations, variations, additions and omissions.

The Electrical Sub-Contractor shall include the contract sum for the maintenance of up to date working drawings on site during the course of the project.

### **2.11.3 As Built Drawings**

The Electrical Sub-Contractor shall include for the preparation of final marked-up drawings, at practical completion stage.

The drawings shall be completed in current CAD format and accurately show all equipment/plant locations and Electrical service routes.

The Electrical Sub-Contractor shall on completion, submit to the Engineer a draft copy of the full complement of As-Built Drawings and allow two weeks for comment of same.

### **2.11.4 Co-ordination and Co-ordination Drawings**

The Mechanical Sub-Contractor shall produce a Co-ordinated set of Mechanical and Electrical plans identifying the Co-ordination of all Services.

The Electrical Sub-Contractor shall work closely with the Mechanical Sub-Contractor to provide such Drawings in A1 format.

All runs and locations will generally be as shown on the Mechanical & Electrical Services Drawings, but changes shall be effected when and as required to co-ordinate with other trades.

No allowances will be made to the Electrical Sub-Contractor for changing of work built-in or fabricated, that conflict with other trades.

The Electrical Sub-Contractor must co-ordinate and must work in close co-operation with all the other Contractors/Tradesmen to determine runs and locations free from interference, prior to installation.

### **2.12 Temporary Services**

It is the responsibility of the Main Contractor to provide adequate temporary water, power and lighting supply for the duration of the Construction period.

The Electrical Sub-Contractor may enter into an agreement with the Main Contractor to provide these services, the payment of which will be made by same.

Adjustment to the Contract sum will only be considered for alteration in works to be done, in excess of normal requirements for temporary Electrical services required for construction.

## **2.13 LABOUR**

### **2.13.1 General**

The Electrical Sub-Contractor shall ensure that all employees are registered for PAYE / PRSI.

The Electrical Sub-Contractor shall provide all necessary evidence to confirm the qualifications and competence, of any workmen to be employed on the works.

If so requested by the Project Manager/Architect, the Electrical Sub-Contractor shall provide a written List of all personnel proposed to be employed on the works.

The Electrical Sub-Contractor shall ensure that all employees have successfully completed a SafePass course

### **2.13.2 Personnel**

The Electrical Sub-Contractor shall at all times provide sufficient and adequate numbers of skilled men and labourers to carry out and maintain each and every part of the Works in a proper and expeditious manner, and shall provide all materials, tools, equipment, plant and everything necessary for the proper execution, completion and maintenance of the Works.

### **2.13.3 Working Hours**

The Electrical Sub-Contractor shall allow for executing any work, which, in the Project Manager/Architect's opinion is likely to cause annoyance or inconvenience to occupants in the vicinity, at such times during normal working hours as the Project Manager/Architect may direct.

The Electrical Sub-Contractor shall not execute any work outside normal working hours without the prior written consent (Site Instruction) of the Project Manager/Architect or Engineer. Normal working hours exclude Night Work and Sundays.

### **2.13.4 Removal of Workmen from Site**

The Architect/Project Manager shall have the power without redress to have removed from Site any Workmen who misconduct themselves or who are incompetent or negligent.

### **2.13.5 Commencement of Work**

No item of work shall be commenced until satisfactory results of any related preliminary tests required by the Specification have been submitted.

### **2.13.6 Day works**

The Electrical Sub-Contractor shall submit as part of the tender return a Schedule of Day Works as determined under the Main Contractor's Conditions of Contract, shall be accepted as a basis for valuing work, only when the main contractor or Engineer has issued written instructions to the Electrical Sub-Contractor to that effect.

All day works variations must be ordered or authorised by the Architect/Project Manager and accompany a valid and signed site instruction.

The Electrical Sub-Contractor shall submit to the Main Contractor and Engineer an application for all day works due at the end of each month together with dayworks record sheets which must be signed by the Architect/Project Manager to verify the dayworks has been completed.

Valuation Certificates shall support application for payment for the month, which have been certified by the Engineer, or a representative. Such endorsement shall be deemed to certify that the labour, materials and plant used are correct.

Day work Valuation Certificates shall give the following: -

- Description of works done
- Operatives' names and trades
- Rates of wages and hours
- Insurances
- Quantities of materials used
- Details of plant used

Daywork Rates shall only apply to NEW Scope of Works NOT contained within this Contract. Tender Rates shall apply to all variations which are related to additional scope of works which is of a similar nature to that already defined in this specification and under similar site conditions.

### **2.13.7 General Obligations**

#### **2.12.71 Tax Clearance Procedures**

The Electrical Sub-Contractor shall be registered with the Revenue Commissioners for Income Tax purposes and shall submit with his Tender a current Sub-Contractor's C2 Certificate or a Tax Clearance Certificate.

Failure to do so will nullify the tender.

#### **2.13.72 Insurances**

The Electrical Sub-Contractor shall provide for Insurance under any National or Local Statutory Acts affecting labour in force at the Tender Date (unless previously allowed for in rates), and as set out in the Main Contractor's Conditions of Contract.

The Electrical Sub-Contractor shall comply with the provisions of the Building (Safety, Health, Welfare) Regulations under Factories Act.

The Electrical Sub-Contractor shall provide for all payments in connection with obligations arising under Working Rule Agreements, Employment Regulation Orders, Registered Employment Agreements and the like.

The Electrical Sub-Contractor shall provide for all payments in connection with Pensions Scheme, Guaranteed Week, Redundancy Scheme, Sick Pay Scheme and Pay Related Social Insurance (unless previously allowed for in rates).

The Electrical Sub-Contractor shall provide for all payments in connection with conditions of employment during the Contract.

#### **2.13.73 Fixed Price Contract Sum**

Refer to the cover letter accompanying the tender documentation and refer to the Main Contractors preliminaries.

## **2.14 Safety, Health and Welfare at Work**

### **2.14.1 General**

The Electrical Sub-Contractor shall comply fully with Safety and Health requirements as stated in the Main Contract Conditions.

In particular the Electrical Sub-Contractor shall comply with the conditions of the Safety, Health and Welfare at Work (Construction) Regulations

The Electrical Sub-Contractor shall contribute as necessary to the Health and Safety Plan and File for the building and co-operate with the Project Supervisor. (

### **2.14.2 Safety Statement**

The Electrical Sub-Contractor shall submit a Contract specific Safety Statement to the Project Supervisor for Construction for review within ten (10) working days of Contract Award. The Safety Statement must be signed by the Project Supervisor (Construction).

This Statement shall set out arrangements whereby the Contractor intends to ensure the safety, health and welfare of his employees and shall include a list of foreseeable hazards, assessment of risks and proposed control measures.

### **2.14.3 Safety Rules**

The Electrical Sub-Contractor shall observe and ensure full implementation by his employees of the Safety Rules as specified on site by the Main Contractor.

### **2.14.4 Security and Protection**

On the grounds of Client Security, maps, plans, drawings and sketches, etc of the works should be treated as highly confidential and only be released to other persons on a need to know basis.

Refer to the Main Contract Documents for any specific requirements for this site.  
No photography is allowed on site without prior written consent from the Client.  
Any special security clearance to be approved by the Client.

**2.15 Site/Progress Meetings**

The Electrical Sub-Contractor will be obliged to attend all site/ progress meetings, as required and determined by the Main Contractor/Engineer.

**2.16 Execution of Works**

The whole of the Works shall be executed in the manner specified and to the dimensions and in accordance with the particulars shown on the drawings or given in the Specification's.

The Electrical Sub-Contractor shall be paid only for the work executed to the satisfaction of the Architects/Engineer.

The Works shall be executed and maintained in an Approved and workmanlike manner, by workmen skilled in the various trades required for carrying out and maintaining the Works.

All materials, which are used in connection with the Works, shall be of the best quality of their respective kinds.

**2.17 Protection of Property, Trespass and Nuisance**

The Electrical Sub-Contractor shall take every precaution to preserve from damage any property; trees and shrubs etc, situated on or near the Site of the Works and shall indemnify the Client against all claims in connection thereto.

The Electrical Sub-Contractor and Suppliers shall keep within the Site Boundaries  
And shall not Trespass or cause Nuisance to adjoining Operations / Property or the Public generally.

**2.17.1 Protection of Existing Services**

The Electrical Sub-Contractor shall make good, at his own expense any damage caused whatsoever to existing services to the complete satisfaction of and in accordance with the instructions of the Engineer/Statutory Authority concerned, and shall keep the Client indemnified at all times from claims in connection with the damage.

**2.17.2 Protection of Works**

The Electrical Sub-Contractor shall carefully cover up or otherwise protect all work liable to injury from the weather, stormwater, or any other cause during construction.

The Electrical Sub-Contractor shall allow for any contingencies or extra temporary works which may be necessitated by adverse site conditions or which may be required by the Engineer or Architect for the protection of the Works.

**2.18 Suppression of Noise**

The Electrical Sub-Contractor shall have due regard at all times for the need to reduce the noise level of plant to a minimum.

This is particularly necessary where work is carried out in close proximity to hospitals, buildings, and housing and office developments.

Compressors and all other plant, which is likely to constitute a nuisance or cause distress, must be fitted with efficient silencing devices.

**2.19 Order of Works**

The Electrical Sub-Contractor shall, within two weeks of the date of the official order to commence the Works, submit to the Main Contractor, for his Approval, a detailed programme setting out the stages and

order in which he proposes to carry out and complete the Works within the prescribed time for completion.

**2.20 Priced Bill of Quantities:**

**The successful Contractor will be required to submit to the Engineer a comprehensive priced Bill of Quantities on which the electrical element of his tender is based.**

**Failure to submit a priced Bill of Quantities will nullify his/her appointment.**

The following is a sample section indicating the level of breakdown required for each element of the works

**SECTIONAL SUMMARY**

Estimate            **File Ref**  
 Customer Name    **CLIENT**  
 Site                 **PROJECT TITLE]**

Section	Quantity	Name	Unit Cost	Total Cost
	<b>1</b>	<b>008 FIRE ALARM</b>	<b>26250.84</b>	<b>26250.84</b>
<b>Quantity</b>	<b>Products / Description</b>		<b>Unit Cost</b>	<b>Total Cost</b>
1	2 LOOP PANEL		841.11	841.11
166	SMOKE		34.40	5710.40
41	COMBINE ADDRESS SOUNDER		32.66	1339.06
21	ADD BGU		38.65	811.65
20	MAGNETIC DOOR HOLDER		125.21	2504.25
1	POWER / BATT		226.60	226.60
1	COMMISSION INCLUDED		0.00	0.00
50	SMOKE CEILING VOID FF		34.40	1720.00
21	SMOKE CEILING VOID GF		34.40	722.40
30	SMOKE IN ENSUITES		34.40	1032.00
10	COMBINE ADDRESS SOUNDER...ADD GF		32.66	326.60
8	INTERFACE		128.28	1026.20
2536	2X1.5 PH120 CABLE		3.64	9219.63
2536	LSF INSULATED CLIP		0.15	385.47
2536	HILTI NAIL FIXING		0.15	385.47

**2.20.1 Ascertainment of Prices for Variations:**

Any oral instructions, directions or explanations given by the Architect or Engineer upon the Works to Electrical Sub-Contractor shall if involving a variation be confirmed in writing by the Electrical Sub-Contractor to the Architect or Engineer within five working days.

The rates in the Priced Bill of Quantities referred to in the clause above applied to the Works shall determine the value of work carried out as a variation when such work is of a character similar to that to which the aforesaid rates apply and is carried out under similar conditions.

The aforesaid rates shall also determine the value of any work omitted.

### 3. SCOPE OF WORKS

#### 3.1 General

In all sections of this Specification, the word "Electrical Sub-Contractor" shall mean the tenderer whose tender has been accepted for the Electrical Building Services Installation.

#### 3.2 Electrical Sub-Contractors Responsibilities

**The tenderer must at the time of tender, state the manufacturers names and catalogue numbers of the equipment on which his tender is based.**

It is not sufficient for the tenderer to state "materials as specified ", the information given must be adequate to identify the actual unit concerned without ambiguity.

The Electrical Sub-Contractor shall study carefully the furniture layouts before commencing the marking out of installations in any room.

Any obstructions to the proper positioning of the outlets shall be brought to the notice of the Engineer.

The Electrical Sub-Contractor shall keep a competent supervisor constantly on the works at all times when the Contract Works are being carried out. The supervisor must be authorised to receive instructions on behalf of the Electrical Sub-Contractor.

The Electrical Sub-Contractor shall be entirely responsible for the Contract works, whether under construction or during testing and commissioning, until the Works have been accepted as completed by the Engineer. The Engineer reserves the right to reject any workmanship and materials not conforming to the specification and instruct the Electrical Sub-Contractor to carry out such alterations or replacements of materials at the Electrical Sub-Contractor's expense.

When the installation has been completed in accordance with the Contract, a Completion Certificate will be issued certifying the date on which the installation was taken over and the commencement of the maintenance/ defects liability period.

**3.3 Design Criteria**

**Normal Lighting Specification**

**Lighting Levels**

The following lighting levels are maintained illuminance levels, which are recommended for tasks carried out in various spaces.

Area	Maintained Illuminance, Lux
Classrooms	300
Corridors, Entrance/Lobbies	100/200
Stores	100
Cloakrooms	200
Luminaire Type:	Various. See Lighting Data Sheets for details

Specification Literature: CIBSE Guide A – Environmental Design

**Emergency Lighting Specification**

All Escape Route Areas: 1.0 lux minimum

Luminaire Type: Non Maintained

Internal Emergency Fittings: Non Maintained

External Emergency Fittings: Non Maintained

Emergency Exits: Maintained

Specification Literature: IS3217 – 2023 – Code of Practise for Emergency Lighting

**Fire Detection and Alarm Specification**

System Design: L2/L3, Addressable Fire Detection and Alarm System

Detector Type: Heat and Smoke Detectors

Detector Coverage: 50m<sup>2</sup>/ 100m<sup>2</sup> respectively

Manual Call Point: Break Glass Units

Alarms: Sounders

Specification Literature: IS3218 – 2024 – Code of Practice for Fire Detection and Alarm Systems for Buildings (System Design, Installation and Servicing)

**Low Voltage Distribution Specification**

System Design:	LV incoming supply to feed three phase and single-phase circuits
Circuit Protection:	MCB fuses and combined RCD for protection of socket outlets Local Isolation for Mechanical Equipment
Specification Literature:	IS 10101:2020 (Current Edition)

The Electrical scope of works as detailed below is to be executed in conjunction with all sections of this Electrical Contract specification, the general Electrical specification, the relevant standards and the Electrical drawings.

### **3.4 LV Distribution**

The existing main distribution board in the existing building shall feed a new sub main distribution boards as indicated on the drawings. A new sub mains cable shall be installed from the existing Distribution Board to the new Sub Main Distribution Boards.

The electrical Sub Contractor shall allow for the installation of new MCCB's in the existing panel to feed the sub distribution board and Heat pump. The electrical Sub contractor shall allow for re-labelling the existing distribution board as necessary. The Electrical Sub Contractor shall allow for liaising with the building to agree any interruptions to the existing supply. These works shall be carried out outside of normal building working hours.

The Electrical Sub Contractor shall supply and install a new sub distribution boards as indicated on the drawings, the Sub-Contractor shall, test, certify and commission the distribution boards upon completion of the works. The Sub Distribution Boards shall be Form 3 installed in accordance with current wiring regulations.

All outgoing circuits shall be pre-wired to rail terminals.

All items of switchgear shall be labelled externally with plastic triple ply, engraved labels, secured with self-tapping screws. Internal labelling of all MCB boards shall comprise a heat sealed circuit chart, printed identifying the current controller, MCB rates, the circuit reference number and the cable size. All MCB's shall be named or numbered. Earth leakage (30mA) Protection shall be provided on all general services circuits.

The Electrical Sub-Contractor shall include for the supply, installation, testing and connection of all cabling from relevant distribution boards to the final circuits. The sub-main cables shall be of type XLPE/SWA/LSF/LSZH and the final power circuits cabling shall be of type 4.0mm<sup>2</sup> LSF singles cable.

No cable shall be permitted to be clipped directly to the structure. All power and lighting cabling shall be contained within steel trunking with surface mounted steel conduit drops to all accessories in the general classrooms and concealed steel conduit drops to all outlets in the Special Needs area of the extension.

Where cables pass through fire compartments the holes shall be smoke sealed using intumescent compound.

### **3.5 General Services**

The Electrical Sub-Contractor shall supply and install the general services as detailed on the drawings and data sheets.

The Electrical Sub-Contractor shall allow for the disconnection of all electrical connections to the existing temporary accommodation being removed to accommodate the new refurbishment & extension. The electrical contractor shall allow for the stripout and disposal of all redundant electrical services.

The Electrical Sub-Contractor shall install socket outlets at an elevation of 450mm above floor level or 150mm above bench level. All equipment must be installed in accordance with the heights outlined in Part M of the Building Regulations.

Within the distribution boards, as described in section 3.4 all MCB's feeding sockets shall be fitted with integral RCD's.

All outlets, face plates, isolators, panels etc., shall be suitably labelled and engraved to indicate purpose, serving distribution board, way reference and phase.

The Electrical Sub-Contractor shall install spur outlets at locations as indicated on the drawings and in the

data sheets of this specification.

The Electrical Sub-Contractor shall gland, terminate, label and test all cables prior to energisation and include the test sheets in the Operation & Maintenance documentation.

The exact location of all new services shall be agreed on site with the architect/client prior to commencing the first fix.

The maximum number of twin socket outlets on any circuit shall not exceed 6 and the maximum number of spur outlets or isolators shall not exceed 1.

The Electrical Installation in the general building area shall be wired in surface mounted steel conduit and trunking in the ceiling space with surface steel drops to all outlets.

All wall mounted twin socket outlets shall be surface mounted metal clad type in the general building extension, all accessories in the SEN area of the extension shall be recessed PVC. All faceplates shall be Part M compliant Grey/Black PVC where mounted on white dado trunking. All backboxes are to be steel, knockouts are not permitted in backboxes. Ensure all rocker switches on twin sockets are outward.

The Electrical Installation in the special need area shall be flush with recessed steel conduit drops to all outlets and trunking in the ceiling.

The Electrical Sub Contractor shall be responsible for ensuring the installation complies with the current edition of the wiring regulations IS10101:2020 NATIONAL RULES FOR ELECTRICAL INSTALLATIONS.

The Electrical Sub Contractor shall allow for the supply and installation of dado trunking as indicated, drops to the dado shall be in dado as indicated on the drawings.

All teaching spaces shall be fitted with a CO2 monitor that shall include a LED display. The single wall mounted self – contained unit shall consist of a CO2 sensor enclosure and a large LED display and all associated electronics.

The unit shall be screwed to the teaching wall facing the body of the classroom. The display colour will be capable of changing from Green to Amber and Red to indicate CO2 levels, thus providing easy visual indication as well as specific readings.

The LED colour indicator should be capable of being easily identifiable from the rear of the classroom with a minimum illuminated area of 25cm<sup>2</sup>. It should be connected to the mains distribution system and have a dedicated spur outlet installed adjacent to the unit. It does not need to be connected to the BMS system.

The system will enable the teaching space users to be aware when the desired levels are breached so that the necessary intervention via opening windows for ventilation can take place to maintain the comfort levels and air quality.

A laminated A4 size label (screwed at the four corners to the wall ) incorporating clear and simple advice and instructions on how The teaching space can be operated efficiently with regard to heating, lighting and ventilation during building hours shall be located in a suitable location near the door of each teaching space.

It is paramount that all building staff are provided with full user training and demonstration of these systems as part of the handover requirements

The parameters and sensor settings should be as follows;

Carbon Dioxide (CO <sub>2</sub> ) Traffic Light Display Indicator Ranges		
Optimum Range <1500ppm		
Green	Amber	Red
<1500ppm	1500 to 2000ppm	>2000ppm

The Electrical Sub Contractor shall supply and install disabled alarm systems where indicated on the drawings, these shall be installed in accordance with Part M of the Building Regulations.

**3.6 Photovoltaic Installation N/A**

The Contractor shall supply and install, test and commissioning the complete photovoltaic installation as identified on the drawings.

The PV system shall be a building integrated and grid-connected system and operate in parallel with the grid network. If the PV supply is less than the demand, the grid supplies the balance to ensure security of supply; if the PV supply is greater than the building demand, and where the ESB Networks connection agreement has a zero or limited export capacity, an export limitation system controller will signal the inverters to limit their production by ramping the output to match the building demand and export capacity.

PV modules,

- Module Peak Power (Wp), 500
- Peak Power Tolerance (%)
- Efficiency (%)
- Maximum Current (A)
- Short Circuit Current (A)
- Open Circuit Voltage (V)

Inverter details:

- Peak Power (kW)
- Efficiency (%)
- Power Factor
- Maximum Power Point Tracking
- DC and AC protection

**PV System & Warranties**

The system shall comprise a traditional PV system configuration, i.e. a DC string design which connects PV modules (panels) in series on DC circuits back to DC/AC inverters.

The PV Panels shall be required to have a 25 year performance warranty and a 10 year product warranty as a minimum. The maximum annual power loss under the warranty after the first year must be less than 1%. Linear warranties based on a uniform decline in performance each year are preferred to those with step changes in warranty conditions after the first year of installation.

**Performance, Testing and commissioning**

The contractor shall allow for full testing and commissioning including string testing, to show that the DC circuits have been connected correctly, and acceptance tests which show that the system is producing the expected power output (given the solar irradiance) over a short period (minimum 10 days).

A 'reference cell' or irradiance sensor will need to be installed to achieve this. All testing shall be performed in accordance with IEC 62446 "Grid connected photovoltaic systems – Minimum requirements for system documentation, commissioning tests and inspection".

The acceptance test shall show that the actual output of the PV system (measured at the AC output of the inverters), over the test period is aligned with the theoretical output of the system over the same period

(measured from the reference cell), considering the Performance Ratio.

### **The PV monitoring system**

The PV monitoring system must allow for the accurate recording of energy generated. This can be through the inverter meter, or a separately connected PV meter. The PV monitoring system must be capable of connection and access via the BMS recording the PV system operation and performance. The PV monitoring system must measure kW, kWh and status alarms from inverters and embedded generation interface protection (EGIP) relays. A visible alarm light in the Principal's office should also be provided to ensure that in the event of a fault the PV system will not sit producing no electricity until faults are detected. The PV system will also include a LED indoor digital display, located in a public area of the building (to be agreed at design stage with the Building Management). This display will indicate to students, staff and visitors the yields, power and the amount of avoided greenhouse gas emission, from the PV system. The monitor shall have a minimum size of 500mm x 400mm with large illuminated symbols capable of being viewed from at least 8 meters away.

### **PV System modules, fixings and cabling**

Solar PV modules must be certified to the appropriate European and Irish Standards and shall be CE marked. Modules must be provided with datasheets that state all relevant test parameters under the standard test conditions defined by the relevant standard.

The Solar Photovoltaic (PV) system shall include the following main components, PV Modules, Module Mounting System, provision for safe access, Cabling DC and AC, Connectors, String Combiners, Inverters (power optimisers), Switch-disconnectors (isolators) DC and AC, Electrical Protection and Monitoring System.

As required, for the protection of individual modules or strings, string fuses or electronic protection must take account of the manufacturer's maximum module safety fuse as defined in the standard: IS EN 61370:2007 Photovoltaic (PV) Module Safety Qualification. String Fuses will be required if any fault current could exceed the manufacturer's safety rating.

The module mounting system including all fittings selected shall:

- be suitable for the particular environment and local conditions to which it will be exposed, including the degree of exposure to wind or to a corrosive environment (e.g. salt and windblown sand in coastal sites)
- provide for appropriate physical connection of the PV solar panels to the roof structure
- maintain the integrity of the existing roof with panels securely connected to the roof structure to ensure that the panels are orientated correctly, both initially and in the future
- be fixed without drilling of roof surfaces / tiles for mounting systems
- be fabricated to be corrosion proof, using either stainless steel, anodised aluminium or hot dipped galvanised steel, all compatible to avoid galvanic corrosion
- be recyclable at end-of-life through normal recycling channels
- chosen to match the particular location and mounting surface and must be compatible with the module frame dimensions and structural loading points
- be chosen to best suit the mounting surface and minimize potential leakage from installation requirements
- have materials that must be resistant to local weather and atmospheric conditions, including corrosion from chemical exposure and marine environments
- have adequate fire-resistance in accordance with building regulations
- have structural strength and integrity to withstand the effect of wind and snow loading, be rigid and resistant to wind gusts up to 150 km/h (IS EN 1991) and to corrosion environments equal to or higher than C4 (ISO 9223);
- have supporting structure and fixing materials that are aluminium or hot dipped galvanized steel; the installation procedures must ensure anti-corrosion protection, including any access doors, trays, bolts, nuts, washers and fixing elements in general
- ensure that all the parts of the supporting structure must be correctly assembled, must fit with each other and must be compatible to avoid galvanic corrosion and allow every single module to be accessible for periodic inspections

- be such that PV modules are rigidly fixed to the supporting structure with appropriate clamps and/or bolts and nuts according to the PV modules manufacturer specifications
- not impede quick rainwater run-off

Cabling on the array side of the PV system must be adequately protected from abrasion and cuts, maximum temperatures of 800°C and provide UV and water resistance over the system lifespan. Drilling of the roof surfaces / tiles for cable access is not acceptable.

Double insulated solar cable to the HO7NF standard may be used, as well as single insulated cable enclosed in a stainless steel conduit or multi-core SWA steel-wire-armoured for longer distances and mechanical protection. Cables shall satisfy IS EN 50618:2014 Electric Cables for Photovoltaic Systems. DC cable cross-sectional areas must be sized to limit the voltage drop along the cable to less than 2.5% of the open-circuit string voltage.

In the absence of string fuses or electronic protection, string cables must also be sized to withstand any fault currents on a continuous basis. AC cables shall be sized according to standard practice to maintain a voltage drop of less than 1%. All cables shall be delivered to the site for installation in complete coils or reels with the manufacturer's name attached, indicating cable and type of insulation.

DC connectors must be fully electrically compatible (as verified by a test certificate) as well as mechanically compatible. Ideally only identical connectors from the same manufacturer shall be used. Connectors must be designed for Solar PV use and be protected against water ingress and UV exposure and touch-safe to IP21. Connectors shall satisfy IS EN 62852: 2015 Connectors for DC-application in Photovoltaic Systems – Safety requirements and tests. Connectors must not be removed from modules and AC connectors for inverter connection must be touch safe.

All connections in the DC circuit other than approved plug and socket connections must be inside non-conductive weatherproof enclosures that segregate positive and negative connections to prevent short circuits. Junction Boxes shall satisfy IS EN 50548:2011 Junction Boxes for Photovoltaic Systems and IS EN 62790: 2015 Junction Boxes for Photovoltaic Modules – Safety requirements and tests. Larger arrays shall use purpose constructed string combiner boxes. These may be integrated into monitoring systems and may also enclose string fuses.

### **Inverters and Protection Relays**

All inverters and protection relays are to be designed for grid-connected operation and shall comply with ESB Networks Embedded Generation Interface Protection (EGIP) standards including any modification to the main electrical connection to the building (including Neutral Voltage Displacement and Reverse Power Protection where specified by ESB Networks).

Installed inverters must not compromise the safety of the electrical infrastructure in any way and should be housed taking into account overheating, access, etc. Inverters shall be installed indoors and be easily and safely accessible.

An export limitation system must be installed to maintain the export at zero or the specified limit, while continuing to maximise useful energy production and use of the solar PV system. The selected inverters must be compatible with the export limitation system controller and respond to signals sent to it which will trigger the inverter to change the mode of operation, potentially turning it off, on, or ramping the output up or down.

The inverters, or protection relays where required by ESB Networks, shall have a mechanism to verify that the grid parameters are within their defined tolerances and must disconnect from the grid within a specified time if any of the tolerances are exceeded.

The inverter specifications must be provided in detail in the manufacturer's datasheet and be supported with comprehensive installation and user manuals. Inverter data sheets and nameplates must satisfy the IS EN 50524:2009 Data Sheet and Name Plate for Photovoltaic Inverters. A type-test approval certificate must be submitted for each inverter to verify this behaviour as required to the CER or EN50438 standard or additionally in larger systems incorporated within a grid-protection relay operating to the same standard.

Inverters must connect to the Grid via a dedicated medium-voltage interface unit, whose specification must be agreed with the network provider. Inverters must be sized to match the array characteristics in respect of maximum voltage and current limits, acceptable power sizing ratio, maximum power tracking voltage range and compatibility with module type. The inverters shall operate properly at their nominal power, with an ambient temperature  $T_A=500C$ .

In order to preserve the quality of the general electricity service, the inverters shall comply with IEC 61000-6-2 and IEC 61000-6-4 (EMI), with EN 50178 (Grid quality requirements) and also with particular national codes.

The inverters shall include anti-islanding protection with automatic shutdown of the inverter once a grid power outage is detected in accordance with standard IEC 62116. Inverter-on after grid voltage and frequency restoring shall be delayed between 1 to 3 minutes.

The inverters shall include protection against inverse polarisation in its DC input, short-circuits in its AC output, over-voltages (operative surge arrestors) in both input DC and output AC, insulation failure with output to relay. The inverters shall include detection and protection in case of lack of insulation in accordance with the requirements of standard IEC 60364-7-712.

The inverter shall include an emergency stop device, it shall be easily accessible, but not to students or members of the public. As a minimum the inverters must satisfy the requirements of: IS EN 50530:2010 Overall Efficiency of Grid Connected Photovoltaic Inverters. Both the maximum conversion efficiency and the Euro-weighted efficiency shall be provided from the manufacturer's test results.

Safety requirements of: IS EN 62109:2010 Safety of Power Converters for use in photovoltaic power systems and the Anti-Islanding requirements of: IS EN 62116:2014 Utility-interconnected Photovoltaic Inverter Inverters shall have the following minimum specifications:

Efficiency (%)	98%
Harmonic Distortion (% THD)	<2.5
Standby Losses (W)	<20
Power Factor	>0.99
Output Voltage	400/230V +1%
Output Frequency	50Hz + 1%

### 3.7 Lighting Installation

A light level of 300 lux shall be provided in the Classrooms and teaching spaces at 700 mm above the finished floor level. In toilets, circulation and entrance areas a light level of 120 lux at 700 mm above the finished floor level shall be provided.

Light switches shall be metalclad finish with grid type switches surface mounted and be engineered to fit flush with the backbox.

The Sub-Contractor shall supply and install the normal and emergency lighting, as detailed on the drawings and data sheets. All linear LED fittings shall have screw-in end fittings to ensure diffusers do not detach over time due to thermal deflection.

All light fittings shall be properly adequately supported and the fixing methodology shall be compatible with suspended ceilings.

The Sub-Contractor shall supply and install cabling as detailed on the drawings and data sheets. All cables/conduits shall be labelled at the device with the circuit number. Final cable runs shall be installed in suitably sized steel trunking and conduit. The Sub-Contractor shall gland, terminate, label and test all cables prior to energisation and include the test sheets in the Operation & Maintenance documentation.

The Sub-Contractor shall test all circuits and record the lux levels in each room. This should be included in test sheets in the Operation & Maintenance documentation.

The emergency lighting shall be in compliance with IS3217 2023. The Sub-Contractor shall install emergency luminaires, as specified on the drawings and in data sheets.

Each exit and emergency luminaire shall be connected to the phase-neutral and switch wire of the local lighting circuit.

The Central Test Unit for the emergency lighting shall be an integral part of the relevant Sub-Main Distribution Board.

The Electrical Sub-Contractor shall test the emergency lighting installation for operation, coverage and three-hour duration. The test sheets and lux levels obtained shall be included in the Operation & Maintenance documentation. The electrical contractor shall label all emergency light fittings and issue a drawing highlighting the location of each emergency light fitting.

In teaching spaces automatic lighting controls shall be based on Manual on/off switching absence detection and daylight sensing so that the lights will need to be switched on manually but will automatically dim or turn off depending on the signals from the lighting controls. Push type light switches shall be provided in all areas where lighting controls as outlined above are being provided. Standard rocker type switches shall be provided in all other areas except stores etc where switches incorporating auto time delayed release are required.

Lighting control in teaching spaces should be such that all lights in the space are linked to just one detector such that all lights respond in the same manner to the automatic control signals.

The PIR detectors shall be ceiling mounted and incorporate 3 control elements:

- Photo Cell Control
- Day Light Control
- Absence Control

Lighting controls in teaching spaces are to be based on photo cell control to turn off lights where daylight levels are adequate, daylight sensing to dim lights as required to "Off" in response to changing daylight levels and absence detection to turn off lights when rooms are not occupied.

Lighting installations in the classrooms shall be programmed to switch off after 3 minutes of inactivity and in the corridor areas after 5 minutes.

The Electrical Contractor shall complete a commissioning certificate detailing the settings to be provided on the various detectors. It shall be completed and handed over to the Building Services Consulting Engineer prior to commissioning of the lighting controls.

Lighting Controls in en suite toilets shall be based on manual "On/Off" switching with automatic absence detection only.

Clear instructions on the operation of the lighting controls should be provided in each teaching space

The lighting Installation shall be wired in surface steel conduit, unless stated otherwise.

All lighting circuits shall be wired using 2.5mm<sup>2</sup> LSF insulated copper cable contained in steel trunking and conduit.

The maximum permitted length of final flexible connections shall not exceed 1.5m.

Lighting Controls in the Special Educational Needs area of the extension shall be based on manual on/off controls. A manual dimmer switch shall be installed in the multi sensory room.

Lighting controls shall not be commissioned until all spaces have been decorated and furniture returned to their normal locations. A commissioning certificate as outlined below shall be completed and signed by all parties prior to handover. Part: A of the commissioning certificate should be completed by the Contractor, Commissioning Firm, Building Services Consulting Engineer and building Principal. Part: B deals with the settings on detectors throughout the building. Commissioning of individual detectors is to be witnessed by

both the Commissioning Firm and Building Services Consulting Engineer and completed and signed off by them. A signed copy shall be included in the Operation and Maintenance Manual handed over to the building on completion of the project.

The Electrical Sub Contractor shall allow for the stripout and disposal of all existing (100 No.) light fittings and associated cabling, switches etc.

All new light switches shall be installed at heights in accordance with Part M of the Building Regulations i.e. 1100mm AFFL.

<b>LIGHTING CONTROLS COMMISSIONING CERTIFICATE (MAY 2014)</b>		
<b>PART A</b>		
<b>SCHOOL NAME:</b>		<b>ROLL NO:</b>
<b>ADDRESS:</b>		
<b>PROJECT:</b>		
<b>INTRODUCTION:</b>		
This document is to be completed by the Contractor, Building services Consulting Engineer, Contractor, Commissioning Firm and school Principal and will be used by the school authority in the future to assist in ensuring that lighting controls are operating correctly and efficiently.		
The lighting controls installed are in full compliance with the Department's Technical Guidance documents for lighting controls in teaching spaces and have been supplied and installed as outlined in the tender documents		
Part B Recorded Data Relating to the Lighting Controls is an accurate account of the settings applied to the lighting detector in each teaching space.		
A signed copy of the Lighting Controls Commissioning Certificate (May 2014) Parts A & B is included in the Operation & Maintenance Manual handed over to the school on completion of the project		
All lighting controls in teaching spaces have been properly commissioned by the agent for the lighting controls installed.		
<b>CONFIRMATION OF THE ABOVE ELEMENTS:</b>		
We the undersigned confirm that all of the above elements have been concluded.		
<b>BUILDING SERVICES CONSULTING ENGINEERS (COMPANY NAME):</b>		
<b>NAMES: (PRINTED)</b>	<b>SIGNED:</b>	<b>DATE:</b>
<b>MAIN CONTRACTOR (NAME):</b>		
<b>NAMES: (PRINTED)</b>	<b>SIGNED:</b>	<b>DATE:</b>
<b>COMMISSIONING FIRM (NAME):</b>		



Light Source	LED
Colour Rendering Index	>80
Colour Temperature	4000k
Minimum Luminaire Efficacy	125 lm/W
Median Useful Life (IEC 62717) Ta 25°C (50,000 hrs)	L80 B50
Minimum Driver Lifetime (Max ambient temp 35°C)	50,000hrs
MacAdam Step	3
UGR	<19

**3.8 External Lighting**

The Electrical Sub-Contractor shall supply and install the external lighting, as detailed on the drawings and data sheets.

The Sub-Contractor shall supply and install cabling as detailed on the drawings and data sheets. All cables/conduits shall be labelled at the device with the circuit number. External cable runs shall be installed in surface mounted galvanised steel conduit or run in a trench. The Main Contractor shall make good all necessary finishes to the cable routes, including the painting of all surface mounted conduit.

The Sub-Contractor shall gland, terminate, label and test all cables prior to energisation and include the test sheets in the Operation & Maintenance documentation.

The Sub-Contractor shall test all circuits and record the lux levels. This should be included in test sheets in the Operation & Maintenance documentation.

All external light fittings shall be controlled via a Photocell and a timeclock, all wall mounted external fittings to contain integral emergency packs.

**3.9 Fire Alarm System**

The existing fire alarm system shall be retained for the duration of the works, the contractor shall allow for the installation of dust covers on any detectors that may be affected by the works during the project and for the removal of the cover prior to leaving site in the evening. A new fire alarm panel shall be installed in the location indicated on the drawings, the Specialist Sub Contractor shall allow for all works associated with linking the existing fire alarm loops into the new panel. The new panel shall be open protocol either Advance of Morley.

The electrical contractor shall employ a specialist Sub Contractor to supply and commission the fire alarm system. The Specialist Sub Contractor shall allow for the supply and installation of all fire alarm devices as indicated.

The Specialist Sub-Contractor shall programme, test and commission the entire fire alarm system and complete the certification in accordance with IS3218 2024 prior to handover. They shall also provide the client with training to ensure safe operation of the system.

The electrical contractor shall allow for labelling all fire alarm devices and for supplying a laminated colour zone chart drawing to be mounted adjacent to the fire alarm panel.

All fire alarm cabling shall be installed within dedicated suitably sized dedicated galvanised steel trunking and conduit.

All manual call point units are to be of the fully resettable type via key operation. Integral covers shall be provided on all key operated re-settable type manual call points.

The detector heads shall include a condition indicating light.

The Fire Alarm System shall be installed to an L1 standard.

All cabling must be PH120 enhanced as a minimum standard. 1.5mm<sup>2</sup> cable for all detectors, break lasses and i/o's, all sounder circuits to be wired in 2.5mm<sup>2</sup> enhanced cabling, contractor to ensure a maximum of 8 sounders per circuit. All glands used as part of the installation shall be fire rated.

The Contractor shall allow for the supply and installation of all devices outlined on the drawings, fire alarm system to be interfaced with all door access controls.

All certificates associated with the fire alarm installation must be available prior to Practical Completion being achieved.

The Specialist Contractor shall include for the supply and installation of all fire alarm hold open device and fire alarm interfaces. Interfaces shall be included for the door access control systems.

The Contractor shall allow for the supply and installation of a disabled refuge alarm system as indicated on the drawings, the system shall consist of stainless steel call stations in each stairwell linked to the DRAP located adjacent to the fire alarm panel. All cabling shall be PH120 enhanced.

### 3.10 Data Installation

The existing comms cabinet shall be retained and a new comms cabinet installed for the proposed extension where indicated on the drawings. The new cabinet shall be a wall mounted 24u cabinet complete with patch panels as required to complete the installation.

The Electrical Sub Contractor shall supply and install fibre optic cable installed from the existing cabinet to the new cabinet. The contractor shall supply and install all fibre switches etc. required to complete the installation and for the termination of all fibre cabling. The new fibre shall be 8 core, 62.5/125 M graded index cable. Step index fibre is not to be used. Cables shall be LSHF and water-resistant. Cables shall be metal free

The Electrical Contractor shall install additional data outlets as identified on the drawings. All elv cabling shall be contained within steel trunking. The Sub-Contractor shall supply and install new patch panels to accommodate the outlets identified on the drawings. All new outlets shall be terminated onto a new patch panel. The Electrical Sub Contractor shall allow for the supply and installation of a new 24 port 500GB Ethernet switch and for the supply and installation of all patch leads from the new patch panel to the switch.

The Sub-Contractor shall supply and install CAT6a structured cabling, wired to standard T568b pin designation, to the data/phone outlets as detailed on the drawings and data sheets. Cabling shall be 24 AWG, 4 pair UTP and shall comply with EN50288

All outlets shall be labelled at both the patch panel and the outlet. All labels shall be machine generated using indelible ink ribbons or cartridges. The labelling convention shall be agreed with the project engineer/project manager/relevant IT personnel prior to works taking place.

All cables shall be tested to prove compliance with all relevant standards. Permanent link tests shall be carried out using a 'Fluke DSP-4000' meter and all results shall be incorporated in the O&M Manuals. Any cables that do not pass tests shall be replaced. Each fibre strand shall be tested for attenuation with an optical power meter and light source. Cable length and splice attenuation shall be verified using an Optical Time Domain Reflectometer. All tests shall be performed in accordance with the manufacturers recommendations and best industry practice.

All Cat 6a structured cabling shall be supplied by one of the following manufacturers, Krone, Brand Rex or Molex.

All test results shall be issued in digital format prior to handover of the building.

The Electrical Sub Contractor shall allow for the installation of a data outlet at high level in each classroom to facilitate the future installation of wireless routers.

### 3.11 Induction Loop Installation

The electrical contractor shall supply and install an audio frequency induction loop to comply with Part M: 2010. This shall be fitted at the reception counter or the main office.

The induction loops shall be a C-Tech 1.2m2 PL1 portable induction loop system. The system shall be supplied with one built-in mic and one 3.5mm2 remote mic sockets for AMT or AMD microphones.

The system shall be supplied with 2 "AFLIS available" stickers.

### 3.12 Security Installation

The electrical contractor shall employ a specialist Sub Contractor to extend the existing intruder alarm system, CCTV System and install Door Access Controls.

The Specialist Sub Contractor shall allow for the installation of all new intruder alarm devices as indicated on the drawings.

All cabling associated with the intruder alarm system shall be installed by the electrical Sub Contractor, a 2 pair alarm cable shall be installed from each PIR to the alarm panel, a 2 pair alarm cable shall be installed to all door contacts in a zone (in a closed loop system starting and finishing at the alarm panel) and a 2 pair to each door contact located on doors that shall be used as a means of fire escape only.

The Electrical Contractor shall be responsible for all works carried out by the Specialist Contractor. The Specialist Sub-Contractor shall programme, test and commission the complete intruder alarm prior to handover and provide the client with training on the installed system.

The Specialist Sub Contractor shall supply and install an electronic key fob type access system complete with rebated mortice electromagnetic type locks on the entry/exit doors.

The door access system shall be interfaced with the fire alarm system to ensure that the system fails open in an emergency situation and meet the following requirements.

- Door access controls on fire escape routes must comply with either EN 179, EN 1135 or EN 13637 and Part B of the Building Regulations. Electronically controlled doors should also have a mechanical means of escape in an emergency and cannot be reliant on a fire alarm to trigger egress. Abloy electrical locks provide a compliant solution.
- This building is used by general public and thus EN1125 applies. Final exits to be fitted with PBE-11-EL560 panic bar with EL560 solenoid lock, CY325 single cylinder and EA280 concealed door loop. For multi point locking doors the lock shall be EL566.
- Each door with access control shall be fitted with a FOB reader on the protected side of the door. The pushbar will facilitate exit from the other direction.
- Devices shall be fit for their environment e.g. IP rated where installed externally.
- Power supplies for access controls shall be fitted with 3hr batteries and shall be interfaced with the building fire alarm system. The battery capacity shall meet the largest load likely to be placed upon it under normal operational conditions.
- Door access controls shall 'fail unlocked' in the event of a system failure.
- Spurs to power supplies shall be by unswitched spur.

The Specialist Sub Contractor shall supply and install an intercom system at the door entering the SEN accommodation as indicated on the drawings, this shall link to an audio visual handset located in the SEN office.

The Specialist Sub Contractor shall supply and install new CCTV cameras as indicated on the drawings. All internal cameras are dome type cameras, all external cameras are fixed cameras complete with all brackets, etc. All external cameras shall be white with auto iris. Each camera shall be contained in a housing suitable for its intended environment with a heater and thermostat. The lens shall have a minimum range of manual focal length adjustment. All external cameras are to be fitted with wire guard protection.

The Specialist Sub Contractor shall supply and install a new NVR and 17" LCD monitor such that all cameras can be viewed on a monitor in the comms cabinet and the NVR shall be networked to allow Web access on the internal network.

The Specialist Sub Contractor shall supply and install a wireless panic alarm system in the SEN accommodation, the system shall be complete with Infra Red Receivers, indicator lights and 20 no. pendants.

#### **Internal/External CCTV Wiring**

The electrical contractor shall wire a CAT 6a cable from each CCTV camera position back to the Comms Cabinet.

#### **Intruder Alarm Cabling**

Allow for Intruder Alarm wiring (6 core alarm cable to each detection device) and the Access Control Wiring (1 x Belden 9504 and 2 x 6 Core Alarm Cable to each Door)

#### **Mains Power Point**

Each of the wiring termination locations will require a mains power point for the Power Supply Units for the Zone Expansion Units for the Intruder Alarm System and for the Power Supply Units for the Access Control Door Stations for the ACT Access Control System.

#### **Network Wiring for the Access Control System**

A network cable (Belden 9501) will need to be installed by the Electrical Contractor to link each of the ACT Access Control Door Stations on the ACT Access Control System and then wired back to the Access Control Network Position in main offices comms room.

### **3.13 Earthing and Bonding**

The Electrical Sub-Contractor shall supply and install an earth bar in the electrical switch room and beside each Sub-Main Distribution Board as indicated on the drawings.

All metalwork, other than current carrying parts, including distribution boards, pipework, ductwork, cable trays and conduit, shall be properly and effectively bonded together and earthed in accordance with the appropriate recommendations outlined in IS10101:2020 National Rules for Electrical Installations. The resistance of the metalwork shall not exceed one ohm.

### **3.14 Mechanical Wiring**

The Electrical Sub-Contractor shall include for the supply and installation of all power and control cabling associated with the mechanical installation as identified on the drawings and in the data sheets of this specification. All items of Mechanical Plant shall be powered from the local distribution board. The Sub-Contractor shall cable from this panel to all the outlet locations as shown on the drawings including but not limited to fans, stats, etc. Sizes for these cables shall be as identified in the data sheets of this specification.

The power cables shall be of type XLPE/SWA/LSF/LS0H, to the sizes shown on the data sheets and installed in galvanised steel conduit and trunking to the outlet locations. Final connections shall be in heat resistant flexible cable.

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The Electrical Sub-Contractor shall include for the installation of local isolators at all items of mechanical equipment, and to make final connections from the isolators to the motors.

The Electrical Sub-Contractor shall include for the installation of thermostats and sensors at outlet locations as shown on the drawings, which will also be supplied by the Mechanical Sub-Contractor.

The Electrical Sub-Contractor shall co-ordinate with the Mechanical Sub-Contractor as necessary to assist in the mechanical and electrical installation. Cost incurred due to failure to co-ordinate will not be entertained.

The heating circuits shall be controlled by a Multi Zone 7-day 24-hour time clock. The time scheduling shall allow the user to input various daily on and off times on an annual calendar. Three two port valves for each circuit shall be supplied and installed by the mechanical contractor. The actuator(s) shall be supplied and installed by the controls specialist. Three and two port valves to have manual control handles.

Two-port control valves to be added to class room heating controlled by local wall mount thermostats as per drawings.

### 3.15 Testing and Handing Over

The Electrical Sub-Contractor shall carry out insulation and continuity tests with an approved tester supplying DC voltage at 500 volts. Tests shall be carried out as outlined in the IEE and SAFE ELECTRIC requirements.

The polarity of all switches and sockets shall be checked

### 3.16 Test Reports

On completion of all tests, the Electrical Sub-Contractor shall sign complete and hand over to the Engineer, a Completion Certificate in the form approved by the SAFE ELECTRIC, a copy of which is included in Appendix 2.

### 3.17 Builders Work and Protection

The Electrical Sub-Contractor shall be responsible for the protection of all equipment specified in this specification and on the drawings and data sheets, from adverse weather conditions or any other damages that may occur during the construction period.

In the event of such damage occurring to such equipment, then the Mechanical Subcontractor shall be responsible for making good the repairs to it.

The Sub-Contractor shall allow for co-ordination with the Main contractor. This shall include provision of "Builders Works" details/schedules and supervision of all said works.

The Electrical Sub-Contractor shall allow for internal sealing of all conduits/trunking passing through firewalls and floor slabs.

### 3.18 Handover/ Operation and Maintenance Documentation

The Electrical Sub-Contractor shall handover all other vendor supplied documentation relating to the mechanical installation of this project.

This shall include, but not limited to the following: -

- A full set of "as built" electrical services drawings.
- Operating and Maintenance manuals.
- Installation Manuals.
- Spare Parts List.
- Calibration/Test Sheets.
- Calculations.
- Commissioning Certificates.
- Completion Certificates.

The Electrical Sub-Contractor shall include in the contract sum for the issue of three number copies of all the above drawings/documentation.

### 3.19 Milestone Dates

Refer to Main Contract preliminaries

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#### 4. TECHNICAL DATA SHEETS

##### Data Sheets

Data Sheets have been provided to control the quality of the installation.

The Electrical Sub-Contractor must price the equipment listed in the Datasheets and identify in the Tender Return. For Alternative refer to the section on Alternatives.

Technical Datasheet No	Description
1	Power
2	Lighting
3	Security
4	Comms

##### Note

The contractor shall submit full details of all proposed equipment prior to placing an order

<b>Client</b>	ACDAL	<b>Document</b>	Power & Data
<b>Project No</b>	26K27	<b>Date</b>	24/06/26
<b>Project Description</b>	Extension	<b>Sheet</b>	1 of 4

Item	Description	Quantity	Vendor (equal or approved)	Catalogue No.	Comments on Specification
1	Distribution Boards	From Drawings	Contractors Vendor Source		
2	Twin 13A Sockets	From Drawings	MK		Part M compliant Metal Clad or PVC depending on area of building
3	Single 13A Sockets	From Drawings	MK		Part M compliant Metal Clad or PVC depending on area of building
4	Dual RJ45 Outlet	From Drawings	MK		Part M compliant Metal Clad or PVC depending on area of building
5	Single RJ45 Outlet	From Drawings	MK		Part M compliant Metal Clad or PVC depending on area of building
6	Switched Spur Outlet C/W Neon	From Drawings	MK		Part M compliant Metal Clad or PVC depending on area of building
7	Isolators	From Drawings	MK		Part M compliant Metal Clad or PVC depending on area of building
8	Induction Loops	1	C-Tech	ML1/K	1.2m2 double gang fixed counter induction loop system
9	Dado Trunking	From Drawings	Marshall Tufflex		3 Compartment white
10	Disabled Toilet Alarm	From Drawings	C-Tec		
11	Miscellaneous Spur Outlets	From Drawings	Contractors vendor source		Part M compliant, Metal Clad
12	Disabled Refuge Alarm	From Drawings	Comsec	ECU-4	Type B Stainless Steel Refuge outstation to be installed in refuge location

<b>Client</b>	ACDAL	<b>Document</b>	Lighting Data Sheet
<b>Project No</b>	26K27	<b>Date</b>	24/06/26
<b>Project Description</b>	Extension	<b>Sheet</b>	2 of 4

Item	Description	Quantity	Vendor (equal or approved)	Catalogue No.	Comments on Specification
A	600x600 LED panel	From Drawings	Fagerhult	23509-402	29w, 4000K, 4300lm, 600x600mm, DALI
B	Surface mounted Downlight	From Drawings	Fagerhult	57759	Discovery EVO 18W, 2652LM
C	600x600 LED panel	From Drawings	Fagerhult	M3WH34K8WW1	Mirage 3 c/w MA3-DIFF, white reflector
D	600x600 LED panel	From Drawings	Fagerhult	23509	29w, 4000K, 4300lm, 600x600mm
F	Linear LED	From Drawings	Fagerhult	33494-402	Allfive, Contractor to allow for 12 No. Type F fittings to be installed within the attic, controlled via 2 No. PIR's at the entrance to each attic
E	Emergency Exit Light	From Drawings	Ventilux Lighting	ATEB2M3/LED	Atlantic EB
EM1	Emergency Bulkhead	From Drawings	Ventilux Lighting	HANM3/LED/3W	Halo
EM2	Emergency Bulkhead	From Drawings	Ventilux Lighting	HANM3/LED/3W	
EX1	External Emergency Bulkhead	From Drawings	Ventilux Lighting	VIM3/LED1W	c/w eyelid attachment
X	Surface Mounted Wall Light	From Drawings	Thorn Lighting	96666262	A robust Wall mounted luminaire. Electronic, fixed output control gear with 3 hour, manual test, emergency lighting circuit. Back plate: die-cast aluminium, painted anthracite. Body: anthracite polycarbonate. Ø20mm cable entry via rear or side conduit entries, BESA compatible. IP65, IK10. Complete with 4000K LED.  Dimensions: 381 x 196 x 305 mm Luminaire input power: 25 W Luminaire luminous flux: 2910 lm Luminaire efficacy: 116 lm/W Weight: 3.1 kg
M1	Light Switches	From Drawings	MK		Part M compliant, Metal Clad, Surface mounted metal clad in classroom, Recessed PVC in Special Needs Rooms

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O	Conduit and fixings	From Drawings	Contractors vendor source		
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<b>Client</b>	ACDAL	<b>Document</b>	Security Data Sheet
<b>Project No</b>	ACDAL	<b>Date</b>	24/06/26
<b>Project Description</b>	ACDAL	<b>Sheet</b>	3 of 4

Item	Description	Quantity	Nominated Vendor	Catalogue No.	Comments on Specification
1	CCTV Recording Equipment	From Drawings	Contractors vendor source	HikVision	
2	CCTV Cameras	From Drawings	Contractors vendor source	HikVision	Smartwatch Vandal Resistant IR Dome Camera, B9020AH and Smartwatch External Fixed IR cameras
3	Disabled Refuge Alarm	From Drawings	Comsec	ECU-4	Type B Stainless Steel Refuge outstation to be installed in refuge location
4	Disabled Toilet Alarm	From Drawings	Contractors vendor source		Standard pull chord alarm system
5	Security Control Panel	From Drawings	Contractors Source		HKC 10270 hybrid
	Motion Detectors Door Contacts Window Contacts Communicator	From Drawings	Contractors Source		HKC Quad detectors, 15M detection White reed contact White inertia sensor GSM-WiFi World Sim & WIFI communicator
7	Door Access System	From Drawings	Contractors Source	ACT	ACTentry A5 System c/w Act5 prox readers, Abloy Locks, push to release buttons and green break glass units.
5	Cabling	From Drawings	Contractors vendor source		
6	Conduit and Fixings	From Drawings	Contractors vendor source		

<b>Client</b>	ACDAL	<b>Document</b>	Telecommunications Data Sheet
<b>Project No</b>	26K27	<b>Date</b>	24/06/26
<b>Project Description</b>	Extension	<b>Sheet</b>	4 of 4

Item	Description	Quantity	Nominated Vendor	Catalogue No.	Comments on Specification
1	CAT6a Cable	From Drawings	Contractors vendor source		For data and telephone outlets.
2	Telephone Outlets	From Drawings	MK		Part M Compliant
3	Data Outlets	From Drawings	MK		Part M Compliant
4	Outlet Cover Plate	From Drawings	MK		Part M Compliant
5	Patch Panels	From Drawings	As specified		
6	Wire raceways and fixings	From Drawings	Contractors vendor source		
7	Comms Cabinets	From Drawings	Contractors Vendor Source		REFER TO SPECIFICATION
8	Patch Leads	From Drawings	Contractors Vendor Source		Contractor to allow for all patch leads as required.

**ISSUE REGISTRATION:**

**Project Title: Acdal**

**Project No: 26K27**

Rev	Date	Purpose of Issue/Nature of Revision	Prepared by	Issue Authorised by
T1	June 2026	Issue for Tender	CM	CM

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