



Galileo Energy Services

Unit A6, Celbridge M4 Business Park,
Maynooth Road, Celbridge, Co. Kildare.

Tel: 01-6274103
www.galileoenergy.ie

**NUNS CROSS NATIONAL SCHOOL,
ASHFORD,
CO. WICKLOW.**

ROLL NUMBER: 11649S

ELECTRICAL SERVICES SPECIFICATION

VOLUME A.2.4

PARTICULAR SPECIFICATION FOR THE ELECTRICAL INSTALLATION

TENDER ISSUE (T1)

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GENERAL ITEMS

Introduction

The intention of this specification and the drawings issued is to describe and provide for a complete installation. The Electrical Contractor is advised that the work to be executed as described in these documents shall be complete in every detail, notwithstanding that every item involved may not be specifically mentioned or described. The Electrical Contractor shall be held to allow for all materials and labour necessary for an entire and complete installation and shall not avail of any unmentioned error or omission should such exist.

The works entails a new extension & refurbishment of works for Nuns Cross NS, Ashford. The works includes for the supply and installation of new Electrical services in the new extension and existing building. Refer to the drawings for further information, layout of the building and services/works required. All works shall be in compliance with all relevant Building Regulations, Irish Standards, British Standards, CIBSE Guidelines and Good Engineering Practices.

The Electrical Contractor shall be deemed to have carried out a site visit of the unit prior to the completion of his tender and ensure that all factors, site conditions, and items are taken account and what items are necessary in order to complete the installation and to leave same in a complete working condition to the satisfaction of the Employer's Representative. No extras or variations shall be allowed for additional work that could have been ascertained by visiting the site. The Electrical Contractor shall contact the Main Contractor to arrange an appropriate appointment to visit the site during the tender period.

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

The Electrical Contractor shall take all reasonable care to ensure all site workers and visitors are not endangered by any element of their works. The Electrical Contractor must ensure that the works are completed as soon as possible and/or within the agreed program time frame.

The Electrical Contractor shall also review all Architects and Structural Engineers drawings to familiarise themselves with the proposed development and scope of works involved. It is the Electrical Contractor's responsibility to raise any concerns over the proposed works with the Engineer prior to commencement of works. Failure to inform the Engineer of any such concerns will be deemed that the contractor has accepted the design and scope of works to be fault free.



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This specification will set out in general terms the design drawings and data to be used by the Electrical Contractor in order to submit a tender bid for the electrical services and works associated with the installation. The procurement, delivery, supply, handling, erection, installation and commissioning of the services as there under described as may be seen or inferred from the enclosed drawings and documents from the Consulting Engineer.

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

- i) The Safety, Health and Welfare Act, 1989.
- ii) Requirements of the Health and Safety Authority / SI 138.
- iii) Requirements of the Fire Officer.
- iv) All Irish Building Regulations including Building Control (Amendment) Regulations (BC(A)R), S.I. 9 of 2014.
- v) Factories Act / Statutory Instruments.
- vi) Client Safety Protocol.
- vii) Client Specifications.
- viii) Chartered Institute of Building Services Engineers.
- ix) The Tender Drawings.
- x) The Contract Preliminaries.
- xi) All relevant Irish, British and European Standards and Codes of Practice.
- xii) The ETCI National Rules for Electrical Installations.
- xiii) IS3218:2013 – Fire Alarm Systems
- xiv) IS3217:2013 - Emergency Lighting
- xv) EN12464 - The Lighting of Workplaces

Please note that 'The Contractor' in this specification refers to the Electrical Contractor.

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

For any queries relating to this specification or related drawings, the Contractor shall contact the following:

*Mr. Robert Whyte,
Galileo Energy Services,
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Standard and code of practice

Unless specifically stated otherwise, or approved by the Engineer, installation, materials and equipment shall be in accordance with the relevant Irish, European International and British Standards and Codes of Practice and CIBSE Guidelines, whether indicated in this Specification or not.

Where stated in this document the British Standard Reference numbers shall be compatible with the I.E.C. reference numbers or vice versa.

Acts and regulations

The installation(s) shall comply with all Acts, relevant Statutory Instruments and Regulations including any special Regulations issued by the electricity, gas and/or water authorities. The tender shall be based on the Acts and Regulations current on the date for return of tenders. If these Acts and/or Regulations are amended or new Acts and/or Regulations are enacted after that date the Mechanical Contractor shall inform the Engineer immediately.

Specified equipment

The Electrical Contractor shall refer to the rear of this document for a schedule of the specified equipment on which The Company's price is based. The Tenderer may offer an alternative manufacturer, providing the equipment offered is equal in all aspects, i.e. aesthetic appearance, classification and performance.

Alternative equipment proposed to that specified shall only be accepted/installed with the expressed approval of the Engineers in writing prior to the completion of the tender documents.

Plant warranties

Where a manufacturer's warranty applies, the warranties on plant and equipment shall commence from the date of commissioning and acceptance of plant by the Engineers.

Form of tender

The Electrical Contractor will pay particular attention to the proper completion of the Form of Tender. Completion of the Form of Tender must be as per the item numbers listed and should note that any section heading may apply to one or more of the items listed in the Summary of Prices.

The Electrical Contractor shall include in his tender under additional headings if necessary, and irrespective of the items indicated for all work specified or implied by the drawings or specification.



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The tenderer shall be deemed to have full knowledge of the Specification and Drawings supplied to him and to have made himself fully acquainted with all requirements and to have obtained clarification on any matter or detail, which may be obscure to him.

Should any matter arise which in the opinion of the tenderer is obscure, he shall submit the details for clarification in writing to the Employer's Representative Engineer within 7 days of expiration of the tender period. The Employer's Representative shall circulate a reply to all Tenderers before the tender period expires.

The tender price is to be based on the works being carried out at rates of pay during working hours and under conditions of labour not less favourable than those established for the trade or industry in the district where the works are to be carried out. Any non-productive time associated with the recruitment of additional staff by the Contractor during the execution of the contract shall be deemed to be included in the tender price.

Installation and setting out of works

The Contractor shall set out the whole of the works and be responsible for the correctness of the positions, levels and dimensions of the several works. All openings, plinths, bases and holes to be cut in the structure shall be positioned and marked by the Contractor.

The tender drawings are diagrammatic only and the Contractor shall allow for a practical installation allowing for the setting around obstructions and other minor modifications which may or may not be apparent from the Architectural, Engineering, Structural, or services drawings.

The exact courses and positions of all pipes, ducts, flues, cabling, conduit, trunking etc. and other items of equipment shall be duly laid out and marked on the job by the Contractor and approved before execution as the best possible course and position, having regard to all considerations including temperature and the proximity to other services plant.

The Contractor shall make good any incorrectly set out works and shall be liable for costs of making good any work incorrectly carried out. The Contractor shall furnish all materials, labour and instruments necessary to enable the setting out to be checked.

Conflict between drawings and specifications

In the event of there being a conflict between drawings and specification, the tenderer shall obtain clarification before submitting his tender.



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

Materials and workmanship

All materials used in the works shall be fit for the use for which they are intended and for the conditions in which they are to be used in and includes materials which:

- a) Bear a CE mark in accordance with the provisions of the Construction Products Directive (89/106/EEC)
- b) Comply with an appropriate harmonized standard, European technical approval or national technical specification as defined in article 4(2) of the Construction Products Directive (89/106/EEC)
- c) Comply with an appropriate Irish Standard or Irish Agreement Board Certificate or with an alternative national technical specification of any member state of the European community, which provides in use an equivalent level of safety and suitability.

The installation shall be carried out and maintained in the best and most substantial and workmanlike manner. Workmanship shall comply with British or Irish Standards and the relevant codes of practice.

Only fully qualified and competent tradesman and helpers shall be employed on the works. Work shall not be sub-let or done by any other Contractors without the Employer's Representative permission.

No work shall be covered up prior to inspection by the Employer's Representative.

Wherever a proprietary name is used to specify a material or process it shall be deemed to have the term '**or equivalent**' appended to it.

Where a material or process is described by reference to its propriety name the name is used to indicate the standard of construction, appearance, ease of maintenance and durability acceptable to the Employer's Representative. The Employer's Representative will approve the use of alternatives where such alternatives are shown to equal or surpass the qualities of the product or process specified. Accordingly proprietary names wherever mentioned in the Specification, schedule of Rates or on the drawings shall be deemed to mean the provision of the named product or process or an approved alternative.

Notwithstanding the above no items shall be used for the works except those as specified in the contract documents except with the permission of the Employer's Representative. Any points, which differ in the contract documents to the Contractors normal practice, may receive consideration at tender stage if referred to the Employer's Representative.



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If no reference is made at tender stage it will be assumed that the Contractor will proceed exactly according to this specification.

Improper materials

The Employer's Representative shall have the power to order during the progress of the works the removal from site of any material, which in his opinion is not in accordance with this contract, the substitution of proper materials, and the removal and proper re-execution of any work, which in respect of materials and workmanship is not in accordance with the contract. This condition is not withstanding any previous tests or interim payments.

Liability for defects

Works showing defects or damage, whether caused by or as a consequence of negligence on behalf of the Contractor or not and regardless of whether the defects are discovered during the progress of the works or upon completion of the works, and regardless of whether the works have been approved or fully certified, the Contractor shall make good, at his own expense, such damage or defects discovered. On refusal to do so the Employer shall be entitled to carry out the work necessary and recover the expenses associated with such work.

Allow for maintaining the works in perfect condition for 12 months after the issue of the Employer's Representative's Certificate of Substantial Completion in accordance with the Conditions of Contract.

Conditions of building and site

The Contractor shall be responsible for making good any damage caused to the fabric or decor of the building or site by, or as a result of, his negligence or the negligence of his employees or contractors or others unnamed or otherwise. All rubble and waste shall be removed as it arises. Upon completion of the works, the site and building shall be thoroughly cleaned to the satisfaction of the Employer.

The Contractor shall pad ladders or similar equipment so that the building structure or finishes are not damaged in anyway. He shall also ensure that oil, grease or similar goods do not cause damage to the structure during the execution of the works.

Local authorities

The Contractor shall observe and comply with the requirements of all Statutes and Byelaws and serve notice on the Authorities or Owners of water, gas, electricity or any other items, which may be affected in any way by the execution of the works.



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Plant

The Contractor shall supply all necessary slings, tackles, scaffolding, haulage, instruments, materials, apparatus, tools and labour for delivery and erection of the works, and for the completion and testing of the works to the entire satisfaction of the Employer's Representative.

Loss, theft, damage and injury

The Employer or Employer's Representative shall not bear any responsibility for the loss, theft or damage of equipment or materials associated with the works either during delivery or at any time during the execution of the works. All plant, equipment, tools, workmanship and materials shall comply with the relevant safety standards. The Contractor shall bear responsibility for the safety of his employees and agents throughout the execution of the works.

Copyright

Copyright is reserved on the Consulting Engineers' documents, which include all drawings, specifications, sketches and the like. These documents may only be used in relation to the works as outlined in this contract. Photocopying of documents is not permitted without prior permission of the Consultant Engineer. Any copies of documents made during the execution of the works shall be returned to the Consulting Engineer prior to final payment.

Contractors drawings

The Contractor shall prepare if requested by the Employer's Representative any working drawings necessary for proper completion of the Contract. Two copies of each drawing shall initially be submitted to the Employer's Representative and upon approval the Contractor shall provide 6 no. copies of said drawings for distribution.

Working drawings shall show the final arrangement of all items of plant and their associated connections, all control assemblies and panels, as well as the routing of all pipework and ductwork. The Contractor shall consult with all relevant parties and in the preparation of his working drawings so as to ensure there is no conflict between the Mechanical, Electrical and other services, Architectural or structural elements.

Variations, extras and omissions

No variation shall vitiate this Contract or save as hereinafter provided or give rise to any claim for compensation.



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Where an extra, variation, omission is required the Contractor shall submit a price for such variation, omission or extra to the Employer's Representative in writing within seven days of the request for such a price.

He shall not proceed with such alteration, variation or extra until such a time as he has received a Variation Order in writing from the Employer's Representative.

No payment shall be made whatsoever to the Contractor for any variation, alteration, addition or extra unless a Variation Order is produced. Variations shall be priced at the rates submitted by the Contractor with his tender where such are applicable.

Pricing

Un-priced items

Any item left un-priced shall be deemed to be included for in the tender and the cost of the item shall be deemed to be spread across and included in the rates generally.

Currency

All prices and rates shall be deemed to be denominated in Euros (€).

Electricity supply, electric wiring and equipment

All electrical equipment is to be suitable for the standard ESB supply of 400/230V @ 50hz AC.

Where starters or controls are provided with any equipment included under the mechanical services contract, they shall be handed over to the Electrical Contractor together with their wiring diagrams, for erection and commissioning by him.

Electrical sub-systems certification

All electrical subsystems shall be certified as having been carried out in compliance with the requirements of the ETCI Wiring Regulations.

Copies of the ETCI Subsystems certificates, accompanied by the relevant test results, shall be included with the ETCI Completion Certificate in the Health and Safety File for the project.

In the event of the Contractor failing to secure subsystem certificates for all items of equipment then the Contractor shall be liable for the cost of having the system tested, remedied as necessary and certified.



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The tender figure shall be deemed to include for all costs incurred by the Contractor in providing the appropriate documentation.

Proprietary names

Wherever a proprietary name is used to specify a material or process it shall be deemed to have the term '**or equivalent**' appended to it. If applicable, if the Contractor proposes an alternative material or equipment, this material or equipment shall be approved by the Employer's Representative prior the end of the tendering period.

Where a material or process is described by reference to its proprietary name, the name is used to indicate the standard of construction, appearance, ease of maintenance and durability acceptable to the Client / Employer's Representative. The Client / Employer's Representative will approve the use of alternatives where such alternatives are shown to equal or surpass the qualities of the product or process specified. Accordingly proprietary names wherever mentioned in the Specification, Schedule of Rates or on the drawings shall be deemed to mean the provision of the named product or process or an approved alternative.

'Safepass' accreditation

The Contractor shall comply with the requirements of the construction industry's safety accreditation scheme, known as the 'Safepass' scheme.

Decision of the Employers Representative

The decision of the Employer's Representative on all questions relating to the execution of the works, the meaning of the Drawings and Specification, the manner of the execution of the works or the quality of the materials, the nature, quality of the works executed or what amount was included in the Contract shall be final, conclusive and binding.

Works outside the contract

The contractor should note that claims for additional works will not be entertained unless specifically requested in writing by the Employer's Representative.

Waste management

The site shall at all times be kept as clean and tidy as possible and the contractor shall be responsible for removing debris and rubbish on a regular basis. Removal of waste from site shall comply with the statutory waste management requirements.



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Damage

External:

The Contractor shall note that any damage to the existing yards, main entrance, grassed areas, access roads or paved areas that may arise during construction stage of the project and caused by the construction works or by the Contractor's vehicles or staff, is to be made good by him at no extra cost to the Client.

The Contractor should provide all necessary protection to existing paved, grassed and landscaped areas around the site and shall make good any damage caused by lack of such protection at no extra cost to the Client.

The work is not to interfere in any way with the public roads. In particular, the Contractor is to ensure that these areas are to be left free of all dirt and debris and builder's materials and parking of construction vehicles, etc and the roadways are to be thoroughly cleaned as and when required. Any damage caused to the surrounding public roadways shall be made good to the satisfaction of the Local Authority at the Contractor's expense. Any damage caused to the surrounding barracks roadways shall be made good to the satisfaction of the Client at the Contractor's expense.

Internal:

The Contractor shall note that any damage to the existing walls, windows, floor coverings, ceilings, doors, etc. that may arise during construction stage of the project and caused by the construction works or by the Contractor's plant or staff, is to be made good by him at no extra cost to the Client. Any damage caused to the internal building as listed above shall be made good to the satisfaction of the Client at the Contractor's expense.

Interpretation of this specification and drawings

This specification has been written using simple, direct language wherever possible. Imperative terms such as 'provide' and 'submit' mean that the Mechanical Contractor shall 'provide' or 'submit' the relevant samples, documentation or information. If any discrepancies exist or there is any doubt about the interpretation of the Documents, obtain clarification from the Project Manager.

Declaration of Performance/CE markings

General:

All materials, equipment and plant used in the works shall be fit for the use for which they are intended and for the conditions in which they are to be used in.



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All materials, equipment and plant shall adhere to the following:

- Shall bear a CE mark in accordance with the provisions of the Construction Products Directive (89/106/EEC)
- Shall comply with an appropriate harmonized standard, European technical approval or national technical specification as defined in article 4(2) of the Construction Products Directive (89/106/EEC)
- Shall comply with an appropriate Irish Standard or Irish Agreement Board Certificate or with an alternative national technical specification of any member state of the European community, which provides in use an equivalent level of safety and suitability.

The Contractor shall provide a Declaration of Performances (DOP's) cert for all materials, equipment and plant used in the works.

Evidence:

The Contractor shall provide evidence of Declaration of Performances(DOP's) and CE markings for all equipment, plant and material used in this project upon request by the Employers Representative.

Trade union rates and agreements

The Contractor must be in compliance with all Trade Agreements and the Contractor shall pay all employee's connected with the project to current trade union rates. If the Contractor appoints Sub-Contractor's to complete work then they too shall be compliant with current trade union agreements.

This will be monitored on site to ensure that all the Contractors employees and subsequent Sub-Contractors are in compliance with all Trade Agreements and that all are paid current union rates.

All employee's and Sub-Contractors employed by the Contractor for the duration of the works shall have their union cards on them at all times.

Timescale, working hours, payment, etc.

Refer to the Main Contractor for specific details on these requirements.

NZEB/BER Compliance

The contractor shall ensure that all items specified within this specification is installed as a preliminary NZEB/BER calculation has been carried out based on this specification. If the contractor is to deviate from the specified items within this specification and propose alternatives, the contractor must ensure that these items match the specified criteria within this specification.



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If in any case the contractor takes the onus to install any item that isn't equal or equivalent to the specified items, then the contractor shall be asked to carry out an individual NZEB/BER assessment to ensure it meets the desired NZEB/BER criteria.



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BUILDING CONTROL REGULATIONS

General:

All works shall be carried out to the new Building Control (Amendment) Regulations (BC(A)R), S.I. 9 of 2014.

Therefore, the Contractor shall allow for the following over the following stages of the contract:

Commencement Stage:

- Familiarise themselves with the drawings, specifications and documents lodged with the Commencement Notice.
- Ensure a competent person is assigned to oversee the Construction works.

During Construction:

- Install the services and construct the building in accordance with the plans and specifications.
- Ensure that the workmanship complies with the requirements of the Building Regulations.
- Ensure that materials which they select and for which they are responsible comply with the requirements of the Building Regulations.
- Co-operate with the design team, the Assigned Certifier and other certifiers.
- Co-operate with the Assigned Certifier for the implementation of the site inspection plan.

Upon Completion:

- Sign the Certificate of Compliance (completion).
- Provide to the Assigned Certifier, such documents for which they are responsible, as may assist the Assigned Certifier to collate particulars for the purposes of handover and certification, and/or for further submissions to the Building Control Authority.
- We will require Certificate of Compliance with the Building Regulations and relevant standards and manufacturers requirements at this stage.
- Ensure the coordination and provision of all test certificates and confirmations to the satisfaction of the Assigned Certifier or other designated inspectors or certifiers providing Ancillary Certificates;
- Maintain records.



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Inspections during the Construction Process:

The Contractor shall allow the following for inspections during the Construction Phase:

- Contractor to give the Engineer at least 5 days notice to carry out a necessary inspection.
- All services that are to be hidden or concealed shall be left exposed until inspected.
- Prior to closing up services in walls, ground, attics, etc., all tests shall be completed and sign off sheets shall be signed and witness signed. Test sheet to contain the name of the tested, name of the witness, type of test, duration of test and results recorded.
- No cost variations will be accepted for time delays or opening up for inspections if these procedures are not followed.

BUILDERS WORK

General:

All Builders work associated with the execution of this Contract shall be carried out under the main contract by the Main Contractor. The Electrical Contractor shall liaise with the Main Contractor on all builders work requirements relating to their installations and shall prepare detailed builders work drawings for the Main Contractor.

The Electrical Contractor shall prepare any working drawings if necessary, agree all details with the Employer's Representative, mark out and be responsible for correctness, and the cost of any unnecessary work due to the Electrical Contractor failing to comply with this condition shall be the Electrical Contractors responsibility. The Electrical Contractor shall ensure that cutting away and general attendance is reduced to a minimum and must not impede or delay the carrying out or completion of this work. The permission of the Employer's Representative shall be secured before cutting or chasing is commenced.

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

- Builders work drawings, including all necessary opes for installation
- Technical submittals, for all items of plant and equipment that vary from the specified equipment herein.
- Ensuring that all services/installation details are completely integrated with all aspects of the building elements, to the satisfaction of the Client.



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Opes through Fire Barrier Membrane:

All services through fire barriers, fire walls or floor slabs shall be sleeved either side of the fire barrier/wall/slab. All opes shall be filled in and fire proofed by the Main Contractor after services is installed and commissioned. Allow for all necessary works. Liaise with Main Contractor in ensure that all opes for services are fire-proofed.

CO-ORDINATION

The Electrical Contractor shall allow for liaising with all other trades in relation to coordination. Before any works are started on site, the Electrical Contractor shall hold a meeting with the Mechanical Contractor to co-ordinate the M&E installations in the unit. The co-ordination of the mechanical installations shall be the responsibility of the Mechanical Contractor but the Electrical Contractor shall allow for co-ordinating the electrical installation with the Mechanical Contractor.

The Electrical Contractor shall provide all information necessary and on time to the Main Contractor for the proper discharge of this responsibility. The Electrical Contractor shall agree all methods, sequences timing and all relevant details of the works within his contract with the Main Contractor in advance and shall not deviate from this agreement unless otherwise agreed in writing with the Contractor. No adjustments will be made to the electrical contract sum where additional work is required due to poor co-ordination or where the Employer's Representative has not been informed in good time of a co-ordination difficulty that could have been resolved by a design decision had the issue and its full implications been advised to the Employer's Representative in good time. The Electrical Contractor shall liaise with all other trades when co-ordinating their works.

The Electrical Contractor shall mark out opes and holes on all floor and wall surfaces as required to the satisfaction of Services Engineer, Structural Engineer and Main Contractor in sufficient time to allow the Main Contractor complete his works to programme.



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(6-) ELECTRICAL WORKS

General

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

60.0 ELECTRICAL SITE SERVICES

60.01 Attendance to the Sliding Gate, Soft Play Entrance Gate, and Pedestrian Gates

An automated gate shall be installed for access to the unit as indicated on the drawings. This gate shall require electrical attendances and the Electrical Contractor shall allow for all the necessary data cabling and power cabling to the gate as indicated on the drawings.

The Electrical Contractor shall allow for the following electrical attendances to the gate:

Sliding Gate:

- 1no 13amp fused spur to gate location. The power supply shall be wired using 2 x 2.5mm² LSF cable run in a suitable underground duct to the location.
- 1no CAT6 cable from the comms cabinet in the unit of the gate. This is for the main access to the building.

Soft Play Entrance Gate:

- 1no 13amp fused spur to gate location. The power supply shall be wired using 2 x 2.5mm² LSF cable run in a suitable underground duct to the location.
- 1no CAT6 cable from the comms cabinet in the unit of the gate. This is for the access to the soft play area.



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Pedestrian Gate:

- 1no 13amp fused spur to gate location. The power supply shall be wired using 2 x 2.5mm² LSF cable run in a suitable underground duct to the location.
- 1no CAT6 cable from the comms cabinet in the unit of the gate. This is for the access to the site.

For the power supplies, the gate shall be wired and cabled from the new sub distribution electrical board (NSDB-02) which shall be located in the location as indicated on the drawings. Underground ducting shall be installed from the electrical board to the dedicated gate for the power cabling. Cabling shall run in pipe-ducts over the entire length of the cable run. The Electrical Contractor shall provide all cable supports and cable glands necessary for correct installation and termination of the cables.

For the CAT6 cables, the gate shall be wired and cabled from the intermediate comms cabinet in the building which shall be located as indicated on the drawings. Underground ducting shall be installed from the Comms cabinet to the gate for the CAT6 cabling. Cabling shall run in pipe-ducts over the entire length of the cable run. The Electrical Contractor shall provide all necessary items for correct installation and termination of the cables.

All ducting and external trenching shall be carried out by the Main Contractor. Include for draw wires in the ducting so that cables can be pulled through the ducts at a later stage. See detail on drawing ME(S001) for information on the trenching and ducting requirements for sub-mains cabling and data cabling.

Routes and information on trenching required is highlighted on the site services drawing. Liaise with the Main Contractor on the required trenching and ducting required for all the required sub-mains cabling and IT cabling for the gate.

60.02 Submains cables underground (Temporary Prefab Structure).

The Contractor shall supply, install, connect, test and commission all sub-main distribution cables. Cables shall be of type and size indicated on the drawings and run in pipe-ducts over the entire length of the cable run. The Contractor shall provide all cable supports and cable glands necessary for correct installation and termination of the cables. Cables shall be installed to all sub distribution boards and other boards as indicated. See schematic and site services. Builders work shall be carried out as part of this contract by the Electrical Contractor.



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60.03 Cabling and power to the EV Charger

The Contractor shall supply, install, connect, test and commission all external cabling to new EV Chargers. Cables shall be of type and size indicated on the site services drawings and run in pipe-ducts over the entire length of the cable run. The Electrical Contractor shall provide all cable supports and cable glands necessary for correct installation and termination of the cables.

61.0 ELECTRICITY CENTRE

Refer to section 62.01 for further information.



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62.0 POWER DISTRIBUTION SERVICES

62.01 Sub-distribution board for building

General:

The Electrical Contractor shall supply, install, connect, test and commission the new sub distribution board for the new extension as indicated on the drawings. The existing main electrical board in the electrical room shall supply the new sub-distribution electrical board in the staff room of the new extension so all for the necessary sub-mains cabling from the existing main electrical board to the new sub-distribution electrical board. The new sub-distribution electrical board shall be supplied and installed as indicated on the drawings.

See drawings for the layout and location of the new sub-distribution electrical board.

The assembly of the board shall adhere to the following specifications and shall have the following specifications:

- Wall mounted.
- Sheet steel cubicle with MCCB type cubical construction. The enclosure protection shall be IP31.
- Shall be supplied with a moulded case circuit breaker incomer.
- Type tested assembly.
- Incoming cables shall be bottom entry and outgoing cables shall be top exit.
- The board shall be extensible at both ends and shall be of MCCB type wall mounted cubical construction.
- All panel sections providing direct access to live assemblies shall be openable only with a special tool.
- All panel sections accessing shrouded MCB's shall be provided with a handle for opening.
- The sub-distribution electrical board shall be manufactured to 'Form 3A (Type 1)' separation in accordance with IS EN 60439.
- Shall be suitable for a voltage of 630/230V (3 phase).
- Electronic surge shall be protection provided on the incoming mains as detailed in item '62.02'.

The Contractor shall provide with his tender the manufacturer's name and the overall dimensions of the distribution boards he proposes to supply and install. Detailed schematics shall be approved by Employer's Representative prior to ordering of board.



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Supply Cables:

The Contractor shall supply, install, connect, test and commission the supply cable to and from the electrical board.

Cables shall be XLPE/EPR and of the size indicated on the drawings. The Contractor shall provide all cable supports and cable glands necessary for correct installation and termination of the cables.

A separate CPC shall be installed with every sub-mains feed and should be of the size detailed in the distribution drawings. The armour of the cable should also be bonded at both ends to the distribution equipment by means of a nut and bolt through a tab linked to the earth bar.

See electrical schematics for information on size and length of new sub-mains cable required for each board in the main building and attached extension.

Labelling:

All MCCB's, circuits and devices shall be provided with engraved plastic circuit labels. A main label to be provided in accordance with IEC 439, which gives details of voltage rating, current rating, class of equipment, fault rating and serial number.

Construction:

Busbars - To be manufactured from HDHC Copper and housed in separate compartments. Secondary busbars are considered a part of the main busbar system. All busbars shall have bolted joints. Phase and neutral busbars shall be fully rated throughout the length of the assembly.

Connections - To be HDHC Copper.

The structure is to be manufactured from sheet steel formed or folded to give an inherently rigid design.

Fuse Switches, MCCBs, Motor Starters and similar devices shall be designed on a common modular dimension and shall be dimensionally interchangeable.

Segregation shall be provided between devices.

Finish - All main steelwork to be epoxy powder finish. Nuts, bolts and fasteners to have zinc plated finish. Main steelwork to be finished Light Grey (or otherwise approved).



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Cabling:

Glands and Sockets - To be provided by the installation Contractor and not by the switchgear manufacturer. Gland plates which shall be provided by the switchgear supplier, to be steel for multi-core cables and brass for single-core cables.

Load cables to ESB whole current meters or Cts must be of stranded copper conductor and not multi-stranded flexible cable. If multi-stranded flexible cables must be used they must be fitted with suitable copper ferrules.

Earthing:

Earth Continuity - The main structure together with devices shall be provided with earth continuity in the form of copper bonding tape or cable connected to the earth busbar. Earth Busbar - A copper HDHC Earth Busbar shall run the length of the FBA. The size of the busbars shall be in accordance with the Switchgear COP and ETCI Wiring Regulations.

62.02 Electronic surge protection

General:

Electronic surge protection shall be installed to provide surge protection on all incoming lines and devices into the building.

Specification:

Surge protection shall be installed in line with I.S. EN 62305:2012 (Parts 1-4:2012). The services in the electrical boards will require surge protection devices (SPD's) and the type required are highlighted below:

- TP & N incomer on the new Main Electrical Distribution Board - (Type 1 & Type 2 combined lightning & SPD).
- TP & N incomer on all the new Sub-Distribution Board (Type 2 combined lightning & SPD).
- TP & N incomer on all the circuit for all car-park lighting poles (Type 2 combined lightning & SPD).
- SP & N incomer on the existing Fire Alarm Panel – (Type 2 combined lightning & SPD).

Surge Protection Devices (SPD's) shall be installed at distribution panels as shown on drawings. Where equipment/panels are more than 30' from service entrance SPD, additional local protection shall be provided in the form of distribution panel protection.



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Distribution branch circuits that feed equipment that generates electrical disturbances shall have additional SPD protection to prevent this noise feeding back onto other circuits. Additionally, SPDs may be used where sensitive electronic equipment is located more than 30' from the closest upstream SPD.

Surge protection devices shall adhere to the following specifications:

- Shall be capable of handling both direct lightning current of 25kA 10/350µs per pole and maximum discharge currents of 40kA 8/20µs per pole
- Type 2 arresters shall have a maximum discharge current of 40kA 8/20µs waveform per pole 160kA 8/20µs, TP+N system.
- The arrester shall be fully co-ordinated between lightning and surge currents. The arrester shall be fully energy co-ordinated to work correctly in conjunction with other surge protection devices from the same manufactures range.
- The arresters shall be of the pluggable type to facilitate easy removal and replacement of defective modules. Locking modules with quick easy release button. The unit shall have easy hot-swop replacement cartridges.
- Must have remote interrogation IR.
- The arresters shall have international test approvals either UL or KEMA.
- The arrester shall comply with the Surge Protection Device standard EN 61643-11 and shall be tested for vibration and shock proof characteristics in accordance with EN 60068 – 2.
- The arrester shall have a maximum let through voltage of less than 1.5kV even in the case of direct lightning.
- The arrester shall be able to withstand multiple direct strikes without damage.
- The arresters shall have visual indication of status. Green - ok. Red – defect.
- The arrester shall have thermo dynamic control which disconnects the device from the supply in case of defect.
- Arresters to be equipped with a optional fault alarm changeover contact to remotely signal device failure.



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- To easily distinguish the arrester from circuit breakers and RCD's they shall be coloured red.
- Disconnect fusing shall be installed where required in accordance with the SPD instructions.
- Shall have a UP value of <1500.
- Shall have a 10 year warranty.
- The values for the SPD must follow the definition 3.1.30 of the standard IEC 61643-12 (and also the definition 3.7 of IEC 61643-1), the SPDs protective components may be connected line to line or line to earth or line to neutral or neutral to earth and combination therefore. These paths are referred to as modes of protection. IEC 61643-1.
- Accepted manufacturer's of surge protection are Furse, Dehn & Sohn, or equivalent.

62.03 Cable carrier LV and ELV

General:

The Electrical Contractor shall allow for supplying and installing a new cable carrier system for the new electrical services in the building as indicated on the drawings.

Trunking and Tray:

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

All power, lightings, circuit wiring, etc. in the building shall be installed in metal conduit, trunking, tray, etc. as described below. All sub-mains cabling shall be installed on suitably sized tray as described below.

The new containment routes on the drawings are indicative only. The Electrical Contractor shall allow for all necessary bends, offsets, crossovers, additional labour, etc. in installing the new cable containment in conjunction with the Mechanical Services. The Electrical Contractor shall allow for visiting the site during the tendering period to review all necessary works that are involved in supplying and installing the necessary cable containment for the new electrical services.

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



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

A space factor of minimum 40% must be allowed in all carrier systems. Overloading and under sizing of the cable carrier system will not be permitted. Where trunking or cable tray systems pass through fire compartment boundaries, the Contractor is responsible for the internal fire stopping with a suitable approved material, and also the provision of a lid to cover cable tray at such points.

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

A system of galvanised steel cable tray and trunking shall be installed to distribute sub mains, general and emergency lighting, power, fire alarm, public address and mechanical services control wiring throughout the building. Separate trunking shall be provided for data. Separate systems shall be segregated in accordance with the ETCI National Rules for Electrical Installations. Cable containment shall be Uni-trunk or equivalent.

Information and communication technology cables shall be run on a separate cable tray system generally following the same service routes and they shall be separated from power distribution cables. Where crossovers are required, they shall be at 90° to the power cable route.

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

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

Conduits:

Refer to section 62.03 for information on the conduit to be installed in the building.

The majority of the electrical services in the walls shall be recessed and as a result, the majority of conduits shall be flush mounted and recessed into the walls in the building. Where conduits are to be chased into concrete walls



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throughout the ASD unit, all these conduits shall be steel. Where conduits are to be installed in internal partitions, these conduits can be installed in plastic.

For chasing, the Electrical Contractor shall mark size and location of chasing required for the hidden conduits to the Main Contractor.

In some areas, conduits to electrical items shall be surface mounted. All surface mounted conduit to be installed in the building shall be steel conduit.

Location of recessed and surface mounted conduits to be discussed on site.

Hanging of cable containment from the ceiling:

The Electrical Contractor shall allow for hanging the new cable containment for the Ground Floor ceiling using suitable supports in order for the tray/trunking to be installed.

The cable containment shall be installed at approximately 3200mm above finished floor level. Main runs of cable containment shall be installed in the ceiling void. Refer to drawings for the size, quantity, layout and routes of the cable containment.

In order to install the cable containment at high level in the ceiling void, the Contractor shall allow for the following:

- Dropping 10mm threaded rod from the ceiling at 500mm distances over the length of the containment run. Allow for a drop of approximately 200mm.
- The threaded rod shall be hung from the existing steels/purlins via 10mm G-Clamps or supports shall be drilled into the ceiling for supports.
- The base supports for the cable containment shall be 41mm double channel unistrut. Supports shall be placed at 500mm distances over the length of the containment run. Allow for a drop of approximately 200mm.
- Allow for connecting the threaded rods to the double-channel unistrut.

62.04 Sub-mains cables – internal

The Electrical Contractor shall supply, install, connect, test and commission all new sub-mains distribution cables for the building.

Refer to drawing 61(E001) for the information on all sub-mains cabling to be provided from the existing main distribution board to the new sub-distribution board.



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Cables shall be of type and size indicated on the drawings and shall be laid on cable trays or run in pipe ducts over the entire length of the cable run. The Contractor shall provide all cable supports and cable glands necessary for correct installation and termination of the cables.

Sub-mains cables and sub-distribution cables shall be 4 Core Cu-PVC XLPE SWA with separate CPC's for cables over 16.0 sq.mm, and 5 Core Cu-PVC SWA for cables of 16.0sq.mm or less. Cables shall be sized as scheduled on the electrical drawings.

Sub-mains cables and sub-distribution cables shall be fixed to cable tray. Cable tray shall be perforated type, galvanised medium gauge sheet steel. Sub-mains cables and sub-distribution cables shall be installed on cable trays at a spacing of twice the diameter of the larger adjoining cable with nylon cable ties.

Sub-mains cable distribution within the building shall be via XLPE insulated, steel wire armoured, LSF sheathed cable galvanised steel cable tray mounted directly to the soffit. A separate CPC shall be installed with every sub-mains feed and should be of the size detailed in the distribution drawings. The amour of the cable should also be bonded at both ends to the distribution equipment by means of a nut and bolt through a tab linked to the earth bar.

The objective of the system is to provide an efficient and effective system for the distribution and support of small power requirements.

The design parameters are defined within the ETCI National Rules for Electrical Installations.

All cables shall have stranded or flexible copper conductors and LSF or heat resisting insulation to suit the particular application.

Cable carriers for incoming mains cables must be complete with lid. Under no circumstances will exposed cables be acceptable in any location throughout the building.

Information and communication technology cables shall be run on a separate cable tray system generally following the same service routes and they shall be separated from power distribution cables. Where crossovers are required, they shall be at 90° to the power cable route.

Steel wired armoured cables, if required, shall be laid underground in trenches free from sharp stones to a depth of 600mm. The cable shall be laid on a bed 300mm in depth of clean sharp sand within the trench and backfilled with a further 300mm of sand before trenches are finally closed in. Where cables are run on the surface of walls they shall be supported with galvanised saddles to a minimum spacing of 300mm complete with brass screws. Anthygron cables



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which pass through, up or in walls are to be enclosed in conduit. No underground joints are allowed on the cables.

Segregation, Concealment and Re-Wiring:

The Electrical Services Specialist shall comply with ET101 when wiring installations. Circuits shall be segregated as indicated. Draw wires shall be left within empty conduits for use of specialist installers. Draw wires comprising nylon tapes with fitted eyelets shall be used by the Electrical Contractor.

For concealed conduit the Electrical Contractor shall ensure that the system is installed to enable re-wiring to be carried out from boxes for fittings or accessories only. Draw-in boxes will only be permitted with prior permission in writing. The Electrical Contractor shall not use tallow or any other substances to facilitate drawing-in of cables.

62.05 Electrical check meter

An electricity check meter shall be installed in the new electrical boards as indicated on the drawings. This meter shall be digital and shall be supplied and installed by the Contractor.

The check meter shall be interfaced to the Buildings Management System for the purpose of gathering information on the buildings performance and energy monitoring. The Contractor shall include for all provisions in respect of the above, whether explicitly stated or not, regarding connection of meter and no claims for extras, resulting from a lack of sufficient information at tender stage, will be entertained at a later date. Meters shall be as PowerLogic PM700 series from Schneider Electric, or equivalent.

62.06 Sockets and spurs

Internal sockets:

The Electrical Contractor shall allow for the supply and installation of all new sockets as indicated on the drawings. See drawings for quantities and the locations of the new power and general services that are to be installed for the building. Sockets that are to be installed on dado trunking are highlighted in 62.07 below.

The Electrical Contractor shall supply, install, connect, test and commission the general service socket outlets installation as indicated on the drawings for the areas. General services wall/floor mounted outlets shall be single or twin switched 13A 3 pin type mounted on suitable conduit boxes. Sockets are to be located 450mm generally above finished floor level and 200mm above worktops.



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The main earth terminal on all sockets shall be connected to the earth terminal in the conduit box.

ASD Unit:

In the ASD part of the building, all conduits shall be recessed and hidden in the building fabric. The new electrical distribution system shall be installed in a steel conduit/trunking system throughout.

Flush mounted unswitched socket outlets to be MK Albany Plus K732 BSS (1 gang) or MK Albany Plus K773 BSS (2 gang), or equivalent. Mounting boxes to be 866 ZIC (1 gang) or 886 ZIC (2 gang), or equivalent. All double sockets shall have outboard rocker switches as highlighted in image below.

All sockets shall be of brushed stainless steel finish.



General areas:

In the General area of the building, all conduits shall be exposed and surface mounted. The new electrical distribution system shall be installed in a steel conduit/trunking system throughout.

Surface mounted switched socket outlets shall be from the MK Albany Plus (Brushed Stainless Steel) range as K2958 BSS (1 gang) or MK Albany Plus K2947 BSS (2 gang), or equivalent. Mounting boxes to be 829 ALM (1 gang) or 830 ALM (2 gang), or equivalent. All double sockets shall have outboard rocker switches as highlighted in image below.

All sockets shall be of brushed stainless steel finish.

Please note that all sockets shall adhere to Building Regulations Part M. Therefore, all sockets shall adhere to the following specification:

- All double sockets shall have outboard rocker switches as highlighted in image below.
- All rocker switches shall have neon indicators in the switch rockers to indicate that they are on.
- The rockers on the socket shall contrast with the colour on the socket.



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Putty Pads on sockets and spur outlets in fire walls:

Where sockets are to be recessed into fire walls, the Electrical Contractor shall allow for supplying and fitting fire rated switch/sockets inserts into the knock out boxes to protect the fire protection. The inserts shall be rated for a fire protection of 120 minutes and shall be tested to BS476 part 20/22:1987 for both the integrity and insulations. Inserts as 'Safire Fire Rated Switch Socket Inserts', or equivalent. Allow for the supply and installation of 10no fire rated switch/sockets inserts.

Sockets below counters:

Where sockets are to be located below counters and in presses, the Contractor shall include for the supply and installation of a fused isolation switch for each socket above the counter and connection of that switch to the socket for isolation. Isolation switches shall be a three pole 5 Amp or 13 Amp fuse and fuse holder, bushed flex outlet and neon indicator. All isolators shall be as manufactured by MK Albany Plus and finished in brushed stainless steel, or equivalent.

Unswitched fused spur outlets:

The Contractor shall include for the supply, erection and wiring of all new unswitched fused spur outlets for connection to electrical control/equipment panels throughout the building. Unswitched fused spur outlets shall comprise single pole 5amp or 13amp fuse and fuse holder, bushed flex outlet and neon indicator.

Surface mounted unswitched fused spur outlets shall be from the MK Albany Plus (Brushed Stainless Steel) range as K978BSS BSS (1 gang), or equivalent. Mounting boxes to be 829 ALM (1 gang), or equivalent.

Connection to all equipment shall be by fixed spur outlet, mounted in line with the equipment on the drawings. Wiring to the units shall be 2 core 2.5mm² LSZH cable in trunking and conduit. Surface box shall be acceptable in ceiling void provided all cables are in conduit from trunking to outlet.



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Switched fused spur outlets:

The Electrical Contractor shall include for the supply, erection and wiring of all new switched fused spur outlets for connection to electrical control/equipment panels throughout the building.

Switched used spur outlets shall comprise switch, single pole 5amp or 13amp fuse and fuse holder, bushed flex outlet and neon indicator.

Surface mounted unswitched fused spur outlets shall be from the MK Albany Plus (Brushed Stainless Steel) range as K971BSS BSS (1 gang), or equivalent. Mounting boxes to be 829 ALM (1 gang), or equivalent.

Connection to all equipment shall be by fixed spur outlet, mounted in line with the equipment on the drawings. Wiring to the units shall be 2 core 2.5mm² LSZH cable in trunking and conduit.

Surface box shall be acceptable in ceiling void provided all cables are in conduit from trunking to outlet.



IP65 rated sockets

A number of IP65 rated sockets shall be installed externally as indicated on the drawings. See drawings for locations of where the new IP65 rated sockets are to be installed in the building.

The Electrical Contractor shall supply, install, connect, test and commission the IP65 rated service socket outlets installation as indicated on the drawings for the



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areas. IP65 rated sockets shall be a twin switched 13A 3 pin type mounted on suitable conduit boxes.

IP65 rated double sockets shall be from the MK Masterseal Plus range as K56488GRY (2 gang), or equivalent. Sockets are to be located 450mm generally above finished external floor level.

Isolators

All three phase and single phase isolators shall have a red lockable switch on a yellow enclosure. The housing shall be IP65 polystyrol enclosure. Isolators shall be as Santon, or equivalent.

Wiring:

Wiring shall be carried out in 4mm sq. cables for radial circuits, and 2.5mm sq. cables for ring circuits. Refer to section 62.13 for details on the cabling and wiring required. All final sub-circuit cables for power shall be single core low smoke and zero halogen (LSZH) insulated type cable.

Circuiting shall be as indicated on the drawings and each circuit shall be protected by a 20A RCBO. The maximum no. of sockets shall be 5no. twin sockets per final circuit. All wiring shall be carried out to current standards and regulations.

Power outlets to fans, air-conditioning units, water boilers and cookers shall be switched with neon indicator.

The Electrical Contractor shall co-ordinate fully to ensure no sockets are located behind radiators or cupboards.

All general power circuits shall be provided with combined MCB/RCDs giving distinction between MCB and RCD tripping. All circuits supplying socket outlets shall be individually protected by a 30 mA RCD.

62.07 Power installation on dado trunking

General:

The Electrical Contractor shall supply, install and fit the dado trunking installation as indicated on the drawings. All dado trunking shall be 3-compartment dado trunking arrangement. Refer to the drawings for quantity, locations, drops, etc. for the dado trunking arrangement in the building.

Dado trunking shall generally be wall mounted which shall be mounted and fixed directly to the wall. Allow for dado trunking drop from ceiling void to low level dado trunking.



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Wall mounted dado trunking shall be MK 'Prestige 3D Compact' (or equivalent) complete with all necessary corner pieces, stop ends, couplers etc. Allow for all additional lengths of vertical trunking required to route cabling to ceiling level to distribution board.

Where dado trunking is to be installed above desks, the bottom of the dado trunking shall be 150mm above desk height.

Sockets on dado trunking:

The Contractor shall supply, install, connect, test and commission the general service socket outlets on the dado trunking as indicated on the drawings and schedules. Refer to the drawings for quantities, locations and types of sockets required on the dado trunking.

All socket outlets on the dado trunking shall be recessed into the dado trunking. Sockets on the dado trunking shall be of the switched type as MK Logic Plus K2746 WHI (2 gang), or equivalent.

Mounting frames/boxes to be VCT-121 WHI (1 gang) or VCT-121 WHI (2 gang), or equivalent. All double sockets shall have outboard rocker switches as highlighted in image below.



Please note that all sockets shall adhere to Building Regulations Part M. Therefore, all sockets shall adhere to the following specification:

- All double sockets shall have outboard rocker switches as highlighted in image below.
- All rocker switches shall have neon indicators in the switch rockers to indicate that they are on.
- The rockers on the socket shall contrast with the colour on the socket.
- The sockets installed shall not match the same colour as the dado trunking compartment i.e black sockets on the white compartment trunking.



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IT points on dado trunking:

A number of IT and telephone points shall be installed and recessed in the dado trunking as indicated on the drawings. The Contractor shall allow for installing all required back boxes, face plates, RJ45 outlets, etc. Refer to the drawings for quantities, locations and types of sockets required on the dado trunking.

Refer to section 64.01 for information on the cabling and faceplates for the IT installation.

62.08 Attendances to mechanical ventilation

The Electrical Contractor shall allow for the wiring of extract fans for the toilets as indicated on the drawings, which shall be supplied and fitted by the Mechanical Contractor.

Electrical power supplies to each fan shall be 230VAC 50 Hz c/w 13amp spur and shall be supplied as part of this contract.

Each fan shall be controlled via a remote PIR sensor which shall be wired and connected to the fan. Wiring to the extract fan and remote PIR sensor shall be carried out using 2.5mm sq. in LSOH. Wiring shall be exactly to supplier's instructions.

For each fan above the ceiling, the Contractor shall include for the supply an installation of a fused isolation switch for the fan below the ceiling near where each fan is located and connection of that switch to the fan. Isolation switches shall be a three pole 5 Amp or 13 Amp fuse and fuse holder, bushed flex outlet and neon indicator. All isolators shall be as manufactured by MK Albany Plus and finished in brushed stainless steel, or equivalent.

62.09 Hand-dryers

General:

The Electrical Contractor shall allow for the installation of hand-dryers c/w a switched fused spur in the toilet areas as indicated on the drawings. The hand-dryers are located as indicated on the drawings but final locations shall be finalised with the Client on site. See drawings for locations and quantities.

Hand-dryers shall adhere to the following specification:

<u>Brand:</u>	ATC Panther High Speed
<u>Cover:</u>	Steel
<u>Finish:</u>	Matt Stainless Steel
<u>Warranty:</u>	5 Years



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<u>Dust Filters:</u>	Dust filters supplied with dryer
<u>Activation:</u>	Automatic
<u>Voltage:</u>	230V
<u>Frequency (Hz):</u>	50Hz
<u>Power W Motor (Factory Setting):</u>	700 Watts
<u>Power W Heating Element (Factory Setting):</u>	900 Watts
<u>Power Total (Factory Setting):</u>	1600Watts
<u>Drying Time (adjustable):</u>	10 - 15 Seconds
<u>Air Flow (m3/h):</u>	87-116 m3/h
<u>Noise Level (at 1m) db(A):</u>	78 dB(A)

Hand-dryers shall be as ATC Panther High Speed Hand-dryer finished in stainless steel, or equivalent.

Wiring:

Hand-dryers shall be wired using 2.5mm sq. in LSZH (in conduit) c/w double pole switched fused spur with a rating of 13 amps and be exactly to suppliers instructions. Refer to section 62.16 for details on the cabling and wiring required.

A switched fused spur outlet shall be installed for all hand-dryers. Refer to section 62.06 for further information on the switched fused spur outlets.

Allow for a fused spur at high level for the isolation of the hand dryer. The switched fused spur outlet shall be located at high level at approximately 2500mm above finished floor level.

Final connection to the hand dryers shall be in heat resistant cable and shall be via a cable outlet box immediately to the rear of the hand dryer.

62.10 Earthing and bonding

The electrical installation shall be effectively earthed and non-current carrying metalwork shall be bonded, all in accordance with ETCI rules and as described below. This shall include all conduit, metal clad equipment; fuse board, trunking, service sockets, cable sheath, steel oil tanks etc. or any metal work whatsoever adjacent to the electrical equipment. All items shall be bonded together and earthed to a main earthing terminal on the main distribution board.

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

- Faults between line conductors and non-current carrying metal work
- Atmospheric discharges
- Accumulation of static charges



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- The design parameters are defined within the ETCI National Rules for Electrical Installations.
- The system requirements are as defined on the system drawing

Bonding cables shall be run in conduit throughout the installation, terminating at the bonding point in surface or flush conduit box. Final connection shall be from a bushed outlet or outlet plate to the bonding point. Main bonding clamps shall be fitted with approved labels. The use of perforated strip is not permitted, use only proprietary bonding clamps.

Main bonding conductors shall be 1 x 50mm² G/Y PVC cable routed from the main earth terminal to mains water and electrical intake points, control panels, main plant and equipment items. Bonding of piped services shall be in 10mm² G/Y cables.

At least 1 no. copper or galvanised iron earth electrode shall be driven vertically at least 1800mm underground, outside the building, adjacent to the main board. See detail on site services drawing for further information.

The earth lead shall be connected to the electrode by means of a substantial non-ferrous clamp to B.S. 951, which shall be protected against corrosion by denso tape. The resistance between any metals to the earth and the main earthing terminal shall not exceed 0.5 ohms. Sufficient electrodes spaced 3600 mm apart shall be used to obtain a satisfactory earth.

The main earth points shall be housed in a concrete surround and fitted with approved inspection covers giving access for disconnection of the earth lead for test purposes.

The earth connections shall be fitted with a permanent indelible label engraved; **'SAFETY ELECTRICAL EARTH, DO NOT REMOVE'**. Bell couplings shall be installed where conduit is attached to trunking to ensure proper earth continuity.

62.11 Multi-Sensory room

In the Multi-Sensory room, a number of spur outlets shall be wired back to a 12-gang socket control panel for the switching of equipment in this room. The layout and list of equipment for this room is to be finalised with the Client. These spurs shall be wired back to the wall mounted control panel to facilitate independent control of each piece of equipment and each spur shall be individually switched from this panel. The spurs shall be located at different heights above floor level and these heights shall be confirmed on site. Allow for installing and wiring the number of spurs for this room as indicated back to a wall mounted 12-gang switch grid/panel. The grid shall be from the MK Albany Plus range and shall be



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finished in stainless steel. Wiring shall be carried out in 2.5mm sq. from each socket back to the 12-gang grid.

There are electrical double sockets to be installed in this room also but these sockets shall be wired back and connected to the main electrical board for that area.

62.12 PV installation

General:

The Electrical Contractor shall allow for the supply and installation of photovoltaic panels (PV panels) on the roof of the building for supplementary electrical supply to the building.

The School shall have 24no. PV Panels located on the roof as shown on the drawings

The Electrical Contractor shall employ a specialist PV installer to install the PV panel array as indicated on the drawings. The PV installer must include for the coordination works associated with the installation of this PV system and liaising with ESB Networks Ireland.

The PV installer shall be a SEAI registered installer for the supply and installation of the PV Panels.

Our recommended PV specialist would be as follows:

PV Green Energy Savings Ltd.
Donacarney,
Mornington,
Co. Meath
Tel: 041 9888960
Contact: Mr. Gerhard Heyl
E-mail: Gerhard@pvgreen.ie

PV Arrangement:

The Electrical Contractor shall allow for the supply and installation of 24no photovoltaic panels (PV panels) on the roof of the building for supplementary electrical supply to the building.

The PV panels shall be located on the roof as indicated on the drawing 19-052 66(E001).

The PV panels shall be installed on the roof in a south east facing orientation.



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The Electrical Contractor shall allow for the supply and installation of the 24no PV Panels as per the drawings.

Survey:

The PV panel specialist shall allow for carrying out a site survey and investigation of the building before any PV panels or equipment are ordered.

PV panels:

Performance & Design:

The PV panels shall be a high-performance solar module. The PV panels shall have a performance output of up to 370Wp and shall have a static front load of up to 6,000Pa. The contractor shall also require that the panels shall have a warrantee of 25 years.

The contractor shall ensure that the busbars on the panels are located on the rear of the cells and this will ensure that the front of the cells are fully exposed to light. This shall also allow for additional busbars to be installed on each module instead of the busbar being installed on the front of the PV panels.

Mechanical Properties:

Cells:	40 x 10
Cell Vendor:	LG
Cell type:	Monocrystalline/N-type
Cell dimensions:	161.7 x 161.7mm
No. of busbars:	30 (Multi Ribbon Busbar)
Dimensions:	1,700 x 1,016 x 40mm
Front Load:	6,000Pa
Rear Load:	5,400Pa
Weight:	18.5kg
Connector Type:	MC4, 05-8
Junction Box:	IP68 with 3 Bypass Diodes
Cables:	1,000mm x 2ea
Glass:	High transmission tempered glass
Frame:	Anodized Aluminium



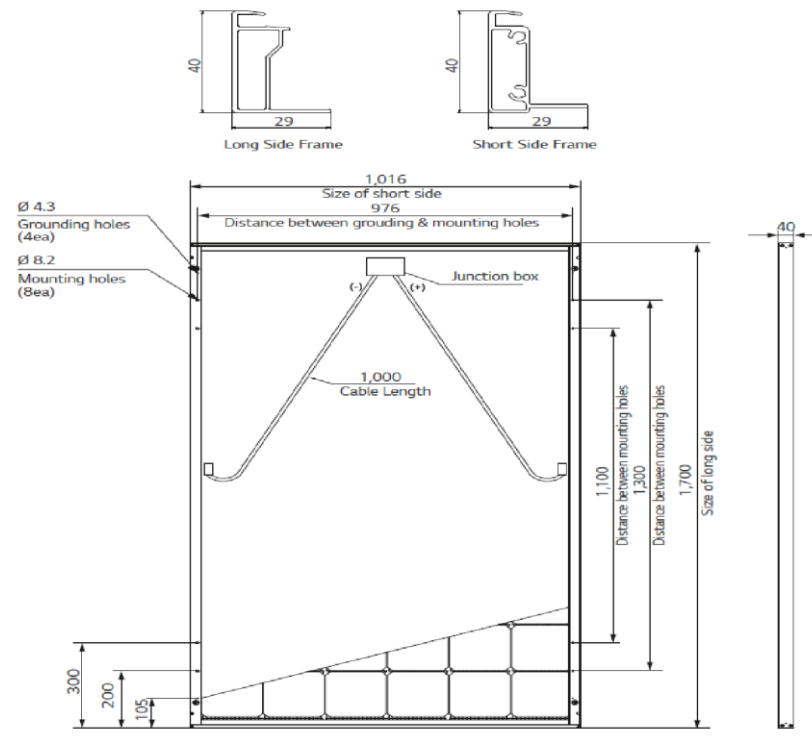
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Electrical Properties:

Model:	LG370Q1C-A5
Maximum Power (PMax):	370W
MPP Voltage (Vmpp):	37.0V
MPP Current (Impp):	10.01A
Open circuit current (Voc):	42.8V
Short circuit current (Isc):	10.82A
Module Efficiency:	21.4%
Operating temperature:	-40 ~ +90
Maximum system voltage:	1,000V
Maximum series fuse rating:	20A
Power tolerance:	0 ~ +3

Dimensions



Inverter:

The contractor shall allow for the installation of the inverter alongside the main electrical board in the electrical board in the location as indicated on the drawings. The inverter shall be a three phase inverter and shall be supplied as part of the PV package. The inverter shall meet the following criteria which is as follows:



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Output:

Rated AC power output:	40000 VA
Maximum AC power output:	40000 VA
AC output Voltage – Line to Line:	380/220 ; 400/230 Vac
AC output power – Line to Neutral:	184 – 264.5 Vac
AC Frequency:	50/60 $\pm$ 5 Hz
Maximum continuous output current:	10A
Grids supported – Three phase:	3/N/PE (WYE with Neutral)
Utility Monitoring Islanding protection:	Yes

Input:

Maximum DC power (Module STC):	14800W
Transformer-less Ungrounded:	Yes
Maximum Input Voltage:	900 Vdc
Nominal DC Input Voltage:	750 Vdc
Maximum input current:	10 Adc
Reverse-Polarity protection:	Yes
Ground-Fault isolation detection:	700k Ω Sensitivity
Maximum Inverter Efficiency:	98%
European Weighted Efficiency:	97.3%
Nighttime power consumption:	< 2.5 W

Additional Features:

Supported communication Interfaces:	RS485, Ethernet, Wi-Fi (requires antenna), ZigBee (Optional), Cellular (optional).
Smart Energy Management:	Export Limitation, Home Energy Management (Device Control).
Inverter Commissioning:	With the setup mobile application using built-in Wi-Fi access point for local connection.

Standard compliance:

Safety:	IEC-62103 (EN50178), IEC-62109
Grid Connection Standards:	VDE 0126-1-1, VDE-AR-N-4105, AS-4777, G83/G59
Emissions:	IEC61000-6-2, IEC61000-3-11, IEC61000-3-12, FCC part15 class B



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RoHS: Yes

Installation Specification:

AC Output:	Cable Gland -diameter 15-21 mm
DC Input:	2 MC4 pairs
Dimensions:	540 x 315 x 191 mm
Weight:	16.4mm
Operating Temperature Range:	-40 to +60 °C
Cooling:	Internal Fan
Noise:	< 40 dBA
Protection Rating:	IP65 – Outdoor and Indoor
Mounting:	Brackets Provided

The inverter shall be on the type **Solaredge SE6K** as specified above.

Bracketing system:

The contractor shall allow for installing the PV system on the flat roof of the extension. Allow for using a fixed frame south facing at a 30 degree pitch to allow for the installation of the 6no. new PV panels.

62.13 Attendances to the two-port valves and local room stats

The Contractor shall allow for the wiring of all two-port valves and associated wall stats in the rooms as indicated on the drawings. Allow power supplies to all valves/thermostats and control wiring between all valves/thermostat. See drawings for the quantities and locations of all two-port valves and thermostats.

ASD Unit:

The Contractor shall include for the following electrical attendances to each 2-port valve located at the heating manifold and thermostat arrangement in the rooms as indicated (see drawings for quantities):

- 230V power supply via a 13 amp unswitched spur for each 2-port valve which shall be installed above the heating manifold installation. Final location of spur to be confirmed with the system installer.
- 2-core 1.5mm² cable from the wall mounted thermostat to the 2-port valve located beside the heating manifold arrangement. The thermostat shall be located at 1100mm above finished floor level.
- Wiring installed in steel conduit from the 2-port valve to the thermostat. Include for all necessary cable containment. Ensure that the steel conduit is recessed and flush mounted into the wall.



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- Wiring shall be taken from the new sub-electrical board in the building which are indicated on the drawings.

Wiring shall be by the Contractor and shall be exactly to supplier's instructions. The Contractor shall liaise with the supplier regarding installation of equipment.

General areas:

The Contractor shall include for the following electrical attendances to each 2-port valve and thermostat arrangement in the rooms as indicated (see drawings for quantities):

- 230V power supply via a 13 amp unswitched spur for the 2-port valve which shall be installed at high level in the ceiling void/exposed. Final location of spur to be confirmed with the system installer.
- 2-core 1.5mm² cable from the wall mounted thermostat to the 2-port valve in the ceiling void/exposed. The thermostat shall be located at 1100mm above finished floor level.
- Wiring installed in steel conduit from the 2-port valve to the thermostat. Include for all necessary cable containment.
- Wiring shall be taken from the new electrical boards in the building which are indicated on the drawings.

Wiring shall be by the Contractor and shall be exactly to supplier's instructions. The Contractor shall liaise with the supplier regarding installation of equipment.

62.14 Cabling, wiring and cable sizes

General installation:

All final sub-circuit cables for lighting, power, etc., shall adhere to the following specifications:

1. All cabling shall be run in metal cable containment and shall be run in conduit, trunking, tray etc. See section 62.03 for further information.
2. All final sub-circuit cables for lighting, power, etc., shall be single core low smoke and zero halogen (LSZH) insulated type, flame retardant to BS 4066, with stranded copper conductors, thermosetting insulation type E1.5 to BS 7655 all complying with BS 7211. All cabling shall be LSZH sheathed cable.
3. Multicore unscreened cables for control and signalling requirements shall be of the unarmoured type with copper conductors, PVC insulation and PVC sheath to BS 7655 all in accordance with BS 6004/BS 6346 (as appropriate).



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4. All cables shall be 450/750 volt rated and no cable less than 1.5 sq. mm in cross section shall be used without the permission in writing of the Engineer.
5. Only insulated cables shall be installed in conduit and/or trunking and cabling for different services shall not be installed in the same conduit without the permission in writing of the Engineer.
6. Joints on cables in trunking shall not be permitted. The cables of different circuits run in trunking shall be taped together at not greater than 3 metre centres.
7. Cables in excess of 10 sq. mm cross sectional area shall not be installed in trunking with smaller cables. In addition MICS LSF or armoured cables shall not be installed in trunking with other cables.

LSZH Cabling:

All final sub-circuit cables for lighting, power, etc., shall be single core low smoke and zero halogen (LSZH) insulated type, flame retardant to BS 4066, with stranded copper conductors, thermosetting insulation type E1.5 to BS 7655 all complying with BS 7211. All cabling shall be LSZH sheathed cable. All LSZH or LSOH cabling shall adhere to the following specifications:

Product features:

- Flame-retardant according to IEC 60332-1-2 (flame spread on a single cable)
- No flame-propagation according to IEC 60332-3-22 and IEC 60332-3-24 respectively IEC 60332-3-25 (Flame spread on vertical cable or wire bundle)
- Halogen-free according to IEC 60754-1 (amount of halogen acid gas)
Corrosiveness of combustion gases according to IEC 60754-2 (degree of acidity)
- Low smoke density according to IEC 61034-2
- UL Cable Flame Test

References/Approvals:

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

Product Make-up:

- Fine-wire strand made of bare copper wires



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- Core insulation: Halogen-free
- Cores twisted in layers
- Outer sheath: Special halogen-free compound, grey (similar to RAL 7001).

Cable Sizes

All conductors carried in conduits shall be single core LSZH cabling as specified in 'point 2' above. All cable sizes are to be a minimum of 1.5 sq. mm. Conduit capacities as set down in Appendix 12 of the I.E.E. regulations latest edition are not to be exceeded.

Joints in conductors between terminating points will not be permitted.

Cable sizes shall be as follows:

a) Lighting final circuits	1.5 sq. mm
b) Emergency light fittings	1.5 sq. mm
c) Socket outlets ring circuits	2.5 sq. mm
d) Socket outlets ring circuits	4.0 sq. mm
e) Undersink electric water heaters	2.5 sq. mm
f) Hand-dryers	2.5 sq. mm

See also electrical schematics for specific cable sizes.

Sub-mains cabling:

Refer to section 62.04 above.

Conduits

All conduits shall be galvanised welded steel to BSS 31 Class E for heavy gauge tubing as manufactured by ASCM or approved equal. 16mm outside diameter is the minimum size to be used. All inlet boxes, conduits shall be plugged or capped whilst waiting for further items to be attached. The ends of every fitting, tube length or nipple are to be reamed and all threads to be coated with aluminium paint after assembly.

All fittings shall be installed so as to facilitate easy re-wiring. Inspection fittings shall be fitted at all bends, tees and elbows. Back entry elbows or tees shall be used, if necessary, to enable easy of accessibility without disturbing any plasterwork. Inspection fittings shall be flush with the plasterwork and floorboards over conduit fittings shall be screwed in position. The complete conduit installation shall be finished before any wiring is pulled through.

The minimum spacing of conduit supports shall be as follows:



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

Conduit Fixing and Fittings

Surface conduit, where used, shall be run parallel to building elements and shall be fixed to the structure by means of galvanised spacing saddles affording a clearance of 3mm min. and spaced at 100mm min. Saddles shall be fixed with wooden plugs or rawl plugs as the surface permits. Where conduit is to be concealed in plasterwork, it shall be fitted using galvanised pipe hooks. Conduit boxes shall be fitted using brass round head screws. Where conduits are fixed under flooring, which is supported on joists, cutting away shall be kept to an absolute minimum. The approval of the Employer's Representative must be sought prior to any notching.

Trunking & Tray:

Refer to Section 62.03 above.

62.15 Attendances to the AOV

Automatic opening vents (AOV) shall be installed in the new extension as indicated on the drawings. This AOV's shall be electrically operated via a switch & when the fire alarm goes into activation.

The Contractor shall allow for the electrical attendances to the electrically operated rooflight which shall be as follows:

- 230V power supply via a 13 amp unswitched spur for the AOV which shall be installed at high level as indicated on the drawings. Final location of fused spur outlet to be confirmed with the AOV installer on site.
- Wiring installed in steel conduit from the control switch to the AOV. Ensure that the steel conduit is recessed and flush mounted into the wall.
- Include for all necessary cable containment.

Wiring shall be by the Contractor and shall be exactly to supplier's instructions. The Contractor shall liaise with the supplier regarding installation of equipment.

62.16 Testing and commissioning

The Contractor shall test all items of equipment individually and shall commission the full installation as a unified system. All testing and commissioning shall be carried out in the presence of and to the satisfaction of



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the Employer's Representative. The Contractor shall give to the Employer's Representative seven days notice in writing before testing or commissioning is carried out.



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63.0 LIGHTING SERVICES

63.01 Internal task lighting

General:

The Contractor shall, install, connect, test and commission the whole of the new lighting installation in the building as shown on the drawings and as described in the Specification. See drawings for the locations in the unit where new lighting services are to be installed. This includes all light fittings, cabling, containment, etc.

The type of luminaire required for each location is specified in the appropriate schedules. The Contractor shall supply and install these new luminaires at the locations shown on the drawings. The lighting system shall be fed from the new sub-electrical board as indicated on the drawings. The exact location of each luminaire shall be determined on site in consultation with the Employer's Representative.

The Contractor shall allow for the supply and installation of all light fittings for the building. See the lighting schedule below for further information on all light fittings to be supplied and installed.

The design parameters are those defined in the Chartered Institution of Building Services Engineers lighting code.

Final connections to each light fitting shall be made in heat resistant cable.

All luminaires shall comply with BS4533. Incandescent lamps shall comply with BS1101. All luminaires shall be supplied complete with lamps. All surface mounted luminaires shall be fixed to surface mounted conduit boxes at their rear, unless stated otherwise or recommended by the manufacturer. Ceiling roses where required shall be of the semi-recessed white pattern mounted on suitable back outlet boxes, the lower end of the box being flush with the ceiling.

The circuit shall be arranged for a loop-in system of wiring. Circuit arrangement shall be based on a maximum of 1kW per circuit. Circuit protection shall be by means of 10A MCB only. Switching arrangements shall be as indicated on the drawing.

Average working plane illumination levels shall generally be as follows:

- | | |
|-------------------|----------------------|
| • Offices: | 400lux at 700mm AFFL |
| • General spaces: | 300lux at 700mm AFFL |
| • Meeting Rooms: | 300lux at 700mm AFFL |
| • Circulation: | 120lux at 700mm AFFL |



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-
- Toilets: 120lux at 700mm AFFL
 - Disabled toilets: 200lux at 700mm AFFL

63.02 Lighting switches for the ASD unit of the building

General:

All new lighting switches for the ASD of the building shall be 'push-to-make' switches and shall be recessed throughout. All lighting switches, unless stated otherwise, shall be located 1100mm generally above finished floor level.

All new light switches (unless indicated otherwise) in the ASD unit of the building shall be momentary action ('push-to-make' type) light switches. These light switches shall be installed for all areas in ASD unit of the building where manual dimming is installed. Absence detection is not required in the ASD areas.

All lighting switches shall be from the MK Grid Albany Plus Range as described above with the switch module being white and of the rocker/push type. These shall be installed in all occupied rooms and corridor in the ASD unit as indicated on the drawings.

Refer to section 63.04 for further information on lighting controls for the extension building.

See drawings for quantities of light switches required.

New lighting switches shall be provided and ganged as indicated on the drawings and shall be either 1-way, 2-way or intermediate as indicated. Switches for internal use shall be of the 15/20 Amp inductive rating grid switch type. Switches for external use shall be weatherproof to IP 54.

The contractor shall allow for installing a manual dimmer switch in the multi-sensory room as indicated on the drawings.

New light switches in the ASD unit of the building shall be from the MK Grid Albany Plus Rang and shall be finished in Brushed Stainless Steel (BSS). Include for all switch modules for light switches. Modules shall be white.

Include for suitable cover plate, grid and back box for recessing the light switch. All switches to be of brushed stainless steel finish

Where light switches are to be recessed into fire walls, the Contractor shall allow for supplying and fitting fire rated inserts into the knock out boxes to protect the fire protection. The inserts shall be rated a fire protections of 120 minutes and shall be tested to BS476 part 20/22:1987 for both the integrity and insulations. Inserts as 'Safire Fire Rated Switch Socket Inserts', or equivalent.



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63.03 Lighting switches for the General areas of the building

General:

All new lighting switches for the general areas of the building shall be 'push-to-make' switches and shall be surface mounted. All lighting switches, unless stated otherwise, shall be located 1100mm generally above finished floor level.

All lighting switches shall be from the MK Grid Albany Plus Range as described above with the switch module being white and of the rocker/push type.

New lighting switches shall be provided and ganged as indicated on the drawings and shall be either 1-way, 2-way or intermediate as indicated. Switches for internal use shall be of the 15/20 Amp inductive rating grid switch type. Switches for external use shall be weatherproof to IP 54.

New light switches shall be from the MK Grid Albany Plus Range and shall be finished in Brushed Stainless Steel (BSS). Include for all switch modules for light switches. Modules shall be white.

Include for suitable cover plate, grid and back box. All switches to be of brushed stainless steel finish. Mounting boxes to be supplied without knock outs.

63.04 Lighting controls

Class base rooms\SET Rooms:

Automatic lighting controls shall be installed for all these rooms in the building as indicated on the drawings. The Controls shall incorporate 2no control elements:

- Manual dimming control
- Absence detection control (non ASD areas only).

The lighting controls in all these rooms shall be based on manual on/off switching, absence detection to turn off lights when no movement is detected and manual dimming of the lighting fittings through the momentary 'push-to-make' light switch. A momentary action (bell push) rocker type switch shall be installed for the lighting circuits in all areas (see drawings for quantities).

Lighting switches shall be provided and ganged as indicated on the drawings and shall be either 1-way, 2-way or intermediate as indicated. Switches for internal use shall be of the 15/20 Amp inductive rating grid switch type. See section



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63.02 & 63.03 for further information on the light switches required. See drawings for quantities and locations.

Absence detection shall be set up so that the sensor in each room will require the lighting 'push-to-make' light switch to turn the lights on and will time out when the area is left unoccupied and will need re-activation again by the light switch.

A remote sensor or sensor incorporated into the light fitting shall be supplied for all the light fittings in each of these rooms and this sensor shall be linked to the light fittings in the room for lighting control. Allow for the necessary control wiring between the light fittings and the relevant sensor in each area/room. Refer to the drawings for further information.

See schedule of light fittings and drawing to see what light fittings have the sensor incorporated into the fitting and what light fittings have the sensor remote from the fitting.

Operation of lighting system in these areas:

- The user will enter the room/area and to press the 'push-to-make' bell push switch to bring the lights on. The lights shall then turn on to the required light level only if the detectors sense that the room/area is occupied.
- The lights will remain on while the room/area is occupied. There is no time limit to this.
- Once the room/area is vacated, the system will time out and switch the lights off. This timeout period shall be set to 10 minutes.
- If the room/area is entered before the lights have timed out, the system will reset and stay on until once again the room/area is vacated.
- If the room/area is entered after the lights have timed out, the user will have to press the 'push-to-make' rocker switch to bring the lights back on.
- The user of each room shall also have the facility to increase or decrease the lighting level of the lights through the 'push-to-make' rocker switch so that the user has manual dimming control over the light fittings.

Class base rooms\SET Rooms:

The Contractor shall allow for the supply and installation of a remote motion/PIR sensor to control the light fittings in these areas as indicated on the drawings.

All motion/presence detectors shall be as a Smartscan Stand-alone sensor from Thorlux, or equivalent.

All sensors shall adhere to the following specifications:

- Colour: White



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-
- Mounting: Ceiling mounted (Recessed)
 - Detection range: 360° and adjustable from 1 to 6 metres.
 - Voltage: 230V AC
 - IP Rating: IP43

See drawings for quantities and locations.

Toilet areas\Corridors & Stores:

Automatic lighting controls shall be installed for all the light fittings in the toilet areas, corridors & stores as indicated on the drawings. The light fittings in these areas shall be controlled via motion detection.

The lighting controls in these areas are to be based on motion detection to turn on the lights when motion is sensed and to turn off lights when no presence is detected after 15 minutes. Settings shall be set up as identified above.

A remote sensor or sensor incorporated into the light fitting shall be supplied for all the light fittings in each of these rooms and this sensor shall be linked to the light fittings in the room for lighting control. Allow for the necessary control wiring between the light fittings and the relevant sensor in each area/room. Refer to the drawings for further information.

Operation of lighting system in these areas:

- The user will enter the room and the lights shall then turn on.
- The lights will remain on while the room is occupied. There is no time limit to this.
- Once the room is vacated, the system will time out and switch the lights off. This timeout period shall be set to 10 minutes.
- If the room is entered before the lights have timed out, the system will reset and stay on until once again the room is vacated.

See section 63.02 & 63.03 for further information on the light switches required. See drawings for quantities and locations.

Remote motion/presence detector for toilet areas, corridors & stores:

The Contractor shall allow for the supply and installation of a remote sensor to control the light fittings in the toilet areas and stores as indicated on the drawings. Please note that the majority of light fittings for the toilet areas and the stores shall have the sensor incorporated into the light fitting and shall be supplied with the light fitting. However, some light fittings in these areas will require a remote sensor as indicated on the drawings. Refer to drawings for quantities and locations.

Allow for the necessary control wiring between the light fittings and the relevant sensor in each area/room. Refer to the drawings for further information.



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All motion/presence detectors for use with the light fittings in the toilet areas as indicated shall be as a Eco-Sensor PIR from Thorlux, or equivalent.

All motion/presence detectors shall adhere to the following specifications:

- Colour: White
- Mounting: Ceiling mounted (Recessed)
- Detection range: 360° and adjustable from 1 to 6 metres.
- Voltage: 230V AC
- IP Rating: IP43

See drawings for quantities and locations.

Wiring & Control Wiring:

See detail on drawings for control wiring and mains wiring for lighting controls.

All the new light fittings as indicated in the building shall be wired in new cable. Allow for wiring all the new light fittings back to the new electrical boards as indicated on the drawings.

Mains wiring for the internal lighting circuits shall be run in 2.5sq.mm, with 2.5sq.mm earth throughout the installation. All lighting circuits shall be protected by MCB's of a minimum size of 10A. The circuits shall be arranged to minimise voltage drop and provide the correct operating voltage for each luminaire.

In order to achieve absence detection as required by the system must be connected to at least one normally open momentary action switch wired in parallel. See detail on drawing for further information.

Include for all 1-10V, 2 core 1.5sq.mm LSZH control cabling associated with the above.

The Contractor shall ensure that the lighting control system selected is compatible with the luminaires selected. This shall include liaising with the lighting control specialist prior to 1st fix, to ensure the light sensor is located in the optimum location within each room.



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Commissioning:

The Contractor shall allow for the testing and commissioning of the lighting systems for the building by the lighting supplier. Allow for 1no full day of commissioning on site from the supplier to set all light levels and times for the lighting controls in each building. All lighting levels shall be set-up and commissioned by the lighting supplier.

The lighting system in each building shall be commissioned, tested, and demonstrated to the Design team and the client.

A testing and commissioning cert for the lighting controls, stating that each and every area has been commissioned to the above parameters shall be provided to the Consultant Engineer prior to handing over the building.

63.05 Cable carrier systems

See section 62.03 for further information.

63.06 Schedule of light fittings to be provided by the Contractor

General:

All the light fittings for the project shall be supplied and installed by the Contractor.

The Electrical Contractor shall allow for the supply, installation, cabling and commissioning of all the light fittings listed below. The type of luminaire required for each location is specified in the appropriate schedules. The Electrical Contractor shall install these luminaires at the locations shown on the drawings. The lighting system shall be fed from the new sub-electrical board for the building as indicated on the drawings. The exact location of each luminaire shall be determined on site in consultation with the Employer's Representative. The proposed schedule of light fittings for the project is as highlighted below.

All light fittings shall be CE Marked.

All emergency light fittings shall be EMC compliant, CE Marked and manufactured to IS EN60598-2-22.

Samples:

The Contractor shall ensure that all the luminaires required for the project are placed on order in due time to ensure delivery to suit the project construction programme. However, approval of the Employer's Representative shall be obtained for final selection of the luminaires before the orders are placed. A



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sample of each luminaire shall be erected on site in a suitable location for inspection by the Employer's Representative for this purpose.

The Contractor shall allow for providing a sample of each proposed light fitting on site so that the Design Team can approve all light fittings prior to ordering. The Contractor shall allow for factoring the cost of providing samples of the light fittings into his tender costs.

Light fittings to be supplied and installed by the Contractor:

See drawings for quantities and locations of all light fittings.

All light fittings shall be supplied by Thorlux, Thorn, ACEC, or equivalent.

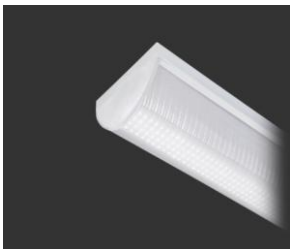
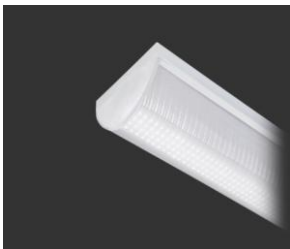
<u>Internal and wall mounted external light fittings</u>	
Type	Description
A 	Surface mounted 37watt 1520mm x 217mm x 90mm LED light fitting. Light fitting shall adhere to the following: • Surface mounted fitting. • 37watt LED • IP44 rated below ceiling. • Body: white painted steel. End caps: white polycarbonate with a curved, precision extruded clear prismatic polycarbonate diffuser. • Ø21.5mm cable entry hole in the centre of the back spine with optional cable entry through each end cap. • 4000K LEDs • Dimmable • 5-year warranty for all components. • CE Marked. The proposed lighting fitting is <u>Thorn College Prismatic LED (96628920 COLLEGE LED4650-840 HFIX L1500)</u> (or equivalent).



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Type	Description
B 	Surface 30watt 1545mm LED light fitting. Light fitting shall adhere to the following: • Surface mounted 30watt fitting. • 30watt LED • IP40 rated fitting. • Steel body finished full polyester, non-yellowing white • Shallow profile with co-extruded 'Satin -Glo' polycarbonate controller • Screw in end caps • 4000K LEDs • 5-year warranty for all components. • CE Marked. The proposed lighting fitting is <u>Thorlux Jubilee LED</u> (or equivalent).
C 	Surface 43watt 1545mm LED light fitting. Light fitting shall adhere to the following: • Surface mounted 43watt fitting. • 43watt LED • IP40 rated fitting. • Steel body finished full polyester, non-yellowing white • Shallow profile with co-extruded 'Satin -Glo' polycarbonate controller • Screw in end caps • 4000K LEDs • 5-year warranty for all components. • CE Marked. The proposed lighting fitting is <u>Thorlux Jubilee LED</u> (or equivalent).



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Type	Description
D	Twin 1500mm LED ultraviolet light fitting, surface mounted c/w all fittings as necessary.
Type	Description
X1 	External IP66 rated wall mounted light fitting. Light fitting shall adhere to the following: • External wall mounted LED light fitting. • 15watt LED • IP66 • Silver or white finish options. • Strong die-cast LM2 aluminium body • High efficiency fire retardant satin polycarbonate diffuser • Photocell option • Microwave presence detector option with stand-by light level feature • Silver colour. • 4000K LEDs • 5-year warranty for all components. • CE Marked. The proposed lighting fitting is <u>Thorlux Cobalt LED</u> (or equivalent).



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<u>Emergency Light Fittings</u>	
Type	Description
E1  Surface Mounted for Wall or Ceiling mounting for straight through escape	IP30 rated ultra slim (blade type) wall/ceiling mounted 4W LED emergency luminaire with 3hr <u>maintained</u> emergency operation c/w status indicator. Light fitting shall adhere to the following: • Suitable for wall mounting or ceiling mounting, dependent on location. • Polycarbonate body finished in matt silver with 10mm screen printed acrylic signage panel indicating straight through escape. • Screen printed legend panel in appropriate European signs directive format pictogram. • 4 watt LED in total. • Self-contained battery • Three-hour maintained. • 3-year warranty • The light fitting shall conform to the current BS ISO 3864-1 & ISO 7010 S standards. • CE marked Refer to drawing for directional arrows required. The proposed lighting fitting is <u>Thorlux Lex</u> (or equivalent).



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Type	Description
E2 Recessed fitting with 'Open Area' lens 	IP65 rated self-contained standalone recessed 3W LED emergency light downlighter (<u>Open Area Version</u>). Fitting shall be a high performance LED light fitting. Light fitting shall be a <u>non-maintained</u> emergency operation c/w status indicator. Allow for remote control unit for standalone light fitting. Light fitting shall adhere to the following: • Recessed for open area version. Supplied with the open plan lens (symmetrical light pattern). • Self-contained. • 3 watt LED. • Lamp colour - 4500K. • Lamp power - 3.0 watt. • 270 lumens in emergency. • IP65 rated below the ceiling. • IP40 rated above the ceiling. • Thermally conductive nylon body. • Polycarbonate bezel finished in White RAL 9016 • Self-contained battery • Three-hour Non-Maintained • Class I. • Status indicator to indicate operational condition. • 5-year warranty. • CE marked. • Fully compliant to EN 60598.2.22 The proposed lighting fitting is <u>Thorlux Firefly (Area Version)</u> (or equivalent).



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Type	Description
E3 Recessed fitting with 'Escape Route' lens 	IP65 rated self-contained standalone recessed 3W LED emergency light downlighter (<u>Escape Route Version</u>). Fitting shall be a high performance LED light fitting. Light fitting shall be a <u>non-maintained</u> emergency operation c/w status indicator. Allow for remote control unit for standalone light fitting. Light fitting shall adhere to the following: • Recessed for escape route version. Supplied with the escape route lens (asymmetrical light pattern). • Self-contained. • 3 watt LED. • Lamp colour - 4500K. • Lamp power - 3.0 watt. • 235 lumens in emergency. • IP65 rated below the ceiling. • IP40 rated above the ceiling. • Thermally conductive nylon body. • Polycarbonate bezel finished in White RAL 9016 • Self-contained battery • Three-hour Non-Maintained • Class I. • Status indicator to indicate operational condition. • 5-year warranty. • CE marked. • Fully compliant to EN 60598.2.22 The proposed lighting fitting is <u>Thorlux Firefly (Escape Route Version)</u> (or equivalent).



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Type	Description
E4  Surface Mounted for Wall or Ceiling	IP65 rated wall/ceiling mounted 4W LED emergency bulkhead with 3hr <u>non-maintained</u> emergency operation c/w status indicator. Ceiling or wall mounted version dependent on location. Light fitting shall adhere to the following: • Surface mounted IP65 rated bulkhead. • Self-contained. • Off-white polycarbonate body with clear linear prismatic cover. • 4 watt LED. • Lamp colour - 4000K. • Three-hour Non-Maintained. • 5-year warranty. • CE marked. • Fully compliant to EN 60598.2.22 The proposed lighting fitting is <u>Thorlux Mini-8</u> (or equivalent).

All luminaires shall be complete with all necessary control units that shall be used in conjunction with the LED light fittings. Ensure lighting supplier has included for all remote control units.

All luminaires to be complete with lamps, spare lamps and necessary items as per specification.

All luminaires shall comply with BS4533. All luminaires' photometric data shall comply with BS 5225. All luminaires shall be in accordance with IS EN 60598.

The Electrical Contractor shall ensure that luminaires of similar type have same photometric performance as published data within the tolerances defined by BS 5225. All hazardous area luminaires shall comply with IS EN 60079, and IS EN 50014; IS EN 50018 or IS EN 50020 as appropriate.

Final connection to luminaires shall be via a "KLIK" type connector junction box with 3 core 1.5sq.mm heat resistant flex (maximum length 0.75m) as final connection. Luminaires erected prior to the completion of wall, floor and ceiling finishes must be sealed from dust/dirt and protected from damage. Such luminaires may not be used for temporary lighting of the works unless approved.



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Luminaires erected prior to the completion of wall, floor and ceiling finishes must be sealed from dust/dirt and protected from damage. Such luminaires may not be used for temporary lighting of the works unless approved.

63.07 Emergency Lighting

General:

The Contractor shall supply, install, connect, test and commission a fully comprehensive operational emergency/escape lighting systems for the building as indicated on the drawings. The emergency lighting installation shall be installed in conjunction with the fire alarm system. All emergency light fittings for the building shall be supplied, tested and commissioned by the Contractor.

The objective of the system is to provide an efficient and effective emergency lighting system meeting the requirements of IS 3217:2023.

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

The Contractor shall supply and install the emergency lighting system and emergency light fittings in compliance with IS 3217:2023, BS EN 50172 and IEC 62034.

All emergency light fittings for this building shall be EMC compliant, CE Marked and manufactured to IS EN60598-2-22.

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

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

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

Types of luminaires required for the various locations are shown on the drawings and described in the below. The Contractor shall ensure that the luminaires are placed on order to suit the installation programme. However, approval of the Engineer shall be obtained before placing orders.



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Containment

See section 62.03 above and drawing for further information on containment required.

New Electrical Board:

All the new emergency light fittings shall be wired on the same circuits as the new general lighting on each floor in the building as indicated on the drawings. All the new general lighting in on each floor shall be wired from the new electrical board in the staffroom of the building.

This ensures that the emergency lights will protect not just against a general power cut, but also against the failure of a lighting circuit. If it desired to switch the normal lighting by a contactor; then this is done by the use of suitable multi pole contactors controlled as desired.

The emergency lighting should be connected before the contactors, such that opening of the contactor won't discharge the batteries.

Emergency Lighting Test Units

An emergency lighting test unit shall be provided in each electrical board as indicated on the drawings.

All test units shall be complete with interface units on the lighting MCB board as necessary. Power to each central test unit shall be in 2 x 1.5 sq. mm. cables in conduit from a separate circuit on the lighting MCB board. See item 62.03 for cable carrier details and section 62.13 for information on type of cabling required.

The emergency lighting test unit shall have the following functions:

- Shall have a timer
- Shall have pre-set test durations for selection.
- Shall have indicators for 'Test', 'Complete' and 'Elapsed Time'.
- Shall have automatic restoration of mains power.

Facility shall be provided for periodic testing of the emergency lighting luminaires without having to switch off the relevant circuit. Emergency luminaires shall generally be suitable for 3-hour duration. The recharge period for the batteries after full discharge shall not exceed 24 hours.

A full discharge/recharge test must be performed for every luminaire during commissioning procedures. Each emergency luminaire shall have a switching unit which shall automatically switch the luminaire to the emergency circuit in



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

Supplies to emergency sections of signs shall be taken from the interface unit on the lighting MCB board fed from the MCB controlling the adjacent lighting circuit.

Also, where sustained, a switched supply, taken from the same circuit, shall be run to the sustained section of the fitting together with a permanent supply. The switch for the sustained fittings shall be mounted with the nearby light switch.

Emergency Luminaires

The Contractor shall supply, test and commission all the emergency light fittings throughout the building. Refer to section 63.06 for further information on all emergency light fittings to be supplied and installed. The Contractor shall ensure that all emergency luminaires (maintained and non-maintained as appropriate) shall be compatible with the emergency lighting test system.

All emergency light fittings shall be designed and manufactured to meet the requirements of EN60598-2-22 and all applicable EU standards. All emergency light fittings shall also be EMC compliant and CE Marked.

The Contractor shall ensure that all emergency signs shall be compatible with the emergency lighting test system, to allow these devices to be incorporated into the building-wide testing regime.

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

LED Downlighter & Control Module

The surface mounted and recessed LED Downlighters shall operate in 3 hour non-maintained mode using a 4W high output LED.

It shall have a status indicator LED to display test results.

It shall be supplied with a 300mm flying lead terminated in a RJ11 plug for connection to a LED Control Module.

The light output of the LED shall be at least 200 lumens for the full duration of 3 hours.

The LED Control Module shall monitor the local mains and will operate the lamp in the event of mains failure.



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It shall use Nickel Metal Hydride batteries contained within its enclosure for operation of the LED in emergency mode.

All connections shall be by a proprietary plug and socket arrangement with latching catches to prevent accidental disconnection.

LED emergency exit signs & control modules

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

Cabling

Refer to section 62.13 for details on the cabling and wiring required.

Wherever possible, cables pre-wired with connectors shall be used to connect devices together. All cable carrying mains voltage shall be LSZH, coloured red to differentiate from standard wiring.

Wiring to new exit signs shall be in 2 x 1.5 sq. mm. LSZH in conduit to a surface/flush outlet box over which the fitting shall be mounted.

All new cables shall be supplied from the new electrical distribution boards in each building. Quantity and locations as indicated on the drawings.

Commissioning

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

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

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

- Carry out a full test on the emergency lighting system in the building. A full discharge/recharge test must be performed for every luminaire during commissioning procedures.
- The test shall be carried out at night time when it is fully dark to see the effectiveness of the emergency lighting system in the building. Results shall be recorded and any discrepancies highlighted.
- The Contractor shall allow for the witnessing of the emergency lighting system by the Engineer in the building.
- Check all emergency light fittings in the building to ensure all lamps and LED indicators are operational.



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- Verify sub-circuit monitoring in the building.
- Simulate power failure to each area in the building.
- Verify maximum 24-hour recharge. The recharge period for the batteries after full discharge shall not exceed 24 hours.
- Carry out a second full duration test in the building after the 24-hour recharge has elapsed.

Labelling:

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

Record Drawing:

The Contractor shall allow for preparing a record drawing of the installed emergency lighting system in the building which shall include all locations of emergency light fittings throughout the building.

The Contractor shall also highlight on this drawing the location, type and ID of light fitting for each building. This record drawing shall be included in the O&M manual. It is the responsibility of the Contractor who installs the system to produce a relevant record drawing to the satisfaction of the Engineer.

Certificates:

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

- Certificate of Installation as highlighted in I.S. 3217:2023.
- Final Certificate of Commissioning as highlighted in I.S. 3217:2023.
- Certificate of Handover as highlighted in I.S. 3217:2023.

63.08 External bulkhead lighting attached to the building

External bulkhead lighting attached to the building shall be installed as per the drawings. The Contractor shall allow for the cabling and power to these new light fittings.



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Supply and fit external lighting as per the drawings and specifications. Lighting circuits shall be as indicated on the drawings. All external lighting mounted on the building shall be carried out in 2.5mm² LSF cable run in conduit or trunking. All external wall mounted light fittings shall be controlled by a photocell & analogue timeclock arrangement c/w hand-off-auto switch located inside the main electrical board as indicated on the drawings.

Include for cabling and wiring all new external wall mounted light fittings back to the new sub electrical board (SDB.02) for the building. Location as indicated on the drawings. Cabling requirements as highlighted above.

Demonstration to be given to the Employer's Representative for setting of time clocks at future date. All times to be agreed with Client. Demonstration to be given to Client for setting of time clocks at future date.

See section 'Schedule of Light Fittings' in Section 63.06 below for information on the external wall mounted light fittings.

63.09 Cabling, wiring and cable sizes

Refer to section 62.13 for information on cabling and cable carrier.

63.10 Testing & Commissioning

The Contractor shall test all items of equipment individually and shall commission the full installation as a unified system. All testing and commissioning shall be carried out in the presence of and to the satisfaction of the Employer's Representative. The Contractor shall give to the Employer's Representative seven days notice in writing before testing or commissioning is carried out.

All tests shall be carried out in accordance with IEE Recommendations, relevant British and Irish Standards or IEC Publication.



64.0 COMMUNICATION SERVICES

64.01 ICT system

General:

The building shall be provided with a new independent CAT 6A UTP structured computer wiring system as per the drawings. The system as described below shall be installed in accordance with ISO 11801 and EN 50173. All equipment provided shall be from the same manufacturer to ensure optimum performance. The installed system shall be certified by the specialist Contractor with a twenty-year performance and components warranty.

All new structural wiring shall be terminated in the data cabinet which shall be located in the Building as identified on the electrical drawings. All wiring terminations shall be RJ45 presentation. In total, the Contractor shall allow for the supply and installation of 1no wall mounted comms cabinet for the IT points in the building. The comms cabinet shall also house the data points for the CCTV system, the telephone system, door access system, etc. All IT and telephone points indicated for the building shall be wired back to this comms cabinet in the building.

Power supply to the cabinet shall be via a separate MCB from the DCC to an industrial type plug and socket to IS/EN 60309, so as to eliminate the risk of nuisance tripping. A trailing lead from the plug shall be terminated in a switched spur in the cabinet which in turn connects to socket outlets.

In some instances, the IT points shall be installed in 3-compartment trunking, provide for 35mm deep back boxes (Single: VTS/60.35 WHI, twin: VTS/70.35 WHI from Mk Prestige Plus Range) and RJ 45 outlets (Single: K3827 WHI, twin K3828 from Mk Prestige Plus Range) at all IT points as indicated on the drawings. For surface mounted IT points, provide for surface steel conduit drop, draw wire, MK Metal clad Plus back boxes K8891 and RJ45 outlets.

The entire installation shall be carried out by a data specialist Contractor. The specialist Contractor shall be fully trained and certified to install the specified product and fully authorised to issue a warranty certificate.

The Contractor shall allow for the following:

- The supply, installation, testing, commissioning and handover of a complete fully compliant Cat 6A structured cabling network as outlined in this specification and drawings.
- Supply, installation and commissioning of all IT cabling.



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- Supply and installation of necessary face plates, comms cabinets, IT points, patch panels, etc. for the successful installation of the IT system.
- The punch down at each end of each of the Cat 6A cable for voice/data.
- Supply and installation of an intermediate comms cabinet in the staffroom as indicated on the drawings.
- All associated labour
- All associated testing, labelling and Certification
- All associated client training
- All associated client handover documentation
- All other items of equipment deemed necessary to complete the installation as specified

Wiring and Patch Panels:

The Contractor shall allow for the following wiring, cabling and patch panels for the IT installation:

- All cabling for the data points as indicated shall be CAT 6A UTP (unshielded twisted pair) horizontal cabling 1071. Allow for cabling to all IT points as highlighted from the associated comms cabinet and punching down at both ends.
- Adequate number of UTP RJ45 Cat6A 24-port patch panels to suit number of IT points required in the building. See drawings for quantities of data/IT points required in the building. Allow for adequate number of 24-port patch panels to suit the number if IT points required. It is estimated that there will be approximately 3no 24-port patch panels required for the building.
- Adequate number of UTP RJ45 Cat6A outlets to suit number of IT points. See drawings for quantities of data/IT points required in the building.
- Adequate number of UTP RJ45 Cat6A patch cords to suit number of IT points as highlighted on the drawings. See drawings for quantities of data/IT points required in the building.
- Every second patch panel shall have a 2U horizontal cable management bracket mounted underneath.

Wall mounted cabinet in the extension:

As indicated on the drawings, a new intermediate wall mounted comms cabinet shall be supplied and installed in the Store for the localised wiring of all IT points in the throughout the new extension of the building.



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The cabinet shall be as follows:

- IP 21 rated, wall mounted 800mm wide x 800mm deep 120-way, Cat 6A, RJ45 presentation in a 16U lockable enclosure. Cabinet shall be installed such that all equipment, including patch panels may be installed and serviced from the front. The contractor shall provide MOF's as indicated on the electrical drawings (size to be confirmed by Specialised IT Contractor).
- The cabinet shall be located at high level in the Store as indicated on the drawings. Final locations shall be decided on site.
- Provide a 6-way 230V 3-pin power block within the cabinet.
- 19" rack mounting type, frame shall be of minimum 2 mm steel, doors and panels of minimum 1.5mm sheet steel, seam-welded.
- Maximum static load shall be up to 70kg.
- Glass door with cylindrical lock.
- Allow for adequate number of 24-port patch panels to suit the number of IT points required. It is estimated that there will be approximately 4no 24-port patch panels required for the building.
- Supplied fully assembled
- The comms cabinets shall adhere to the following standards IEC 297-2, DIN 41494-7, DIN 41491-1, BS 5850/3192



IT points for CCTV system, door access systems:

All the cabling for the IT points that are to be installed for the CCTV system, door access systems shall be wired back and connected to one of the comms cabinet in the building.

Allow for punching down the cabling to all IT points for the CCTV system, door access systems at both ends.



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Telephone cabling to comms cabinets:

The Contractor shall allow for the supply and installation of a 20 pair Cat 3 copper multipair cable link between the incoming existing Eircom incomer in the electrical room to the comms cabinet in the staffroom of the building. Allow for connections at both ends terminating at each end in the Krone connection 500 box. See drawings for locations.

The Eircom incomer is located in the existing electrical room which is located approximately 100 meters apart.

Further Notes:

- Only the specified product shall be priced
- All products shall meet the requirements to support 10GBASE-T to 100m and comply with IEEE 802.3an, TIA 568-B.2-10 (Category 6A) ISO/IEC 11801 Amendment 1 (Class E_A) and EN 50173.
- The RJ45 Patch Panel shall be able to accommodate 24 AWG (0.51 mm) stranded and solid cable conductors. The panels shall meet or exceed the ANSI/EIA/TIA 568-B, ISO IS 11801 and EN 50173 Category
- All products shall be of one manufacturer, as specified.
- Class Ea channel performance of 500 MHz is required
- The solution required shall be Systimax (or equivalent)
- The tenderer shall comply fully to this specification and in particular to the warranties section
- No sub-let labour shall be allowed and all staff shall be permanent employees of the tenderer
- All I.T. hardware, i.e. switches, hard drives etc. are excluded from this contract and are considered to be a Client fit out item.

Horizontal backbone system:

The data horizontal cabling shall consist of CAT 6A UTP (unshielded twisted pair) cable complying with EIA-TIA 568 up to and including 155 Mps. All cable runs on a system of cable trays/conduit to be supplied by the Electrical Contractor.

Each data outlet shall be connected to the RJ45 patch panel. Connect equipment via the above cable in a star topology format.

The length of each run shall not exceed 90m and total length from network device to network device including any leads must not exceed 100mts. If necessary, additional cross connects must be provided. UTP cable shall comply with EIA/TIA 568 (SPZ 840A) ISO 11801 and EN 50173 standards. UTP cables



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from each user locations shall be terminated at the comms cabinet in each location as indicated.

Work location system:

The data equipment shall be connected to RJ45 socket outlets via Category 6A device cables to EIA/TIA 568A, (SP 2840A), ISO IS 11801 and EN 50178 standards. Cables shall be terminated in RJ45 plugs and shall be 3m long.

The data outlets shall be supplied and fitted under this contract and shall be modular universals applications RJ45 type to EIA/TIA 568A, ISO IS 11801 and EN 50173 Category 6A.

Faceplates on dado/skirting trunking shall be selected to match exactly MK dado compartment trunking system as specified earlier in this document. They shall be flush mounted and be of an exact matching colour. Stand-alone RJ45 points shall be fitted with faceplates to match the finish of the electrical sockets as detailed earlier in this specification.

Quad faceplates in PVC WHI to match trunking as described above.

Punch-down and testing:

The specialist IT structured wiring contractor shall be responsible for punch down at each end of each Voice/Data Cable, together with testing and commissioning to current requirements and for warranty purposes. All cables shall be 100% continuity tested with results recorded on disc in Excel format.

All circuits shall be tested with an approval proprietary tester and all results shall be recorded in tabular form for the client.

The specialist IT structured wiring contractor shall provide the engineer with three copies of Operating and maintenance manuals consisting generally of As-Installed Drawings, Hardware Manuals, Test Sheets, Port Plans, Certification and Warranty.

The installation shall be fully tested (i.e. 100% of all cables) to comply with the requirements to support 1000BASE-T to 100m and comply with IEEE 802, TIA 568-B Category 6A ISO/IEC 11801 Class E and EN 50173. Fibre Optic cables shall be 100% tested @ 850nm and 1300nm.

Level III test instruments shall be used and all test results recorded on disc and included in the hand-over documents.

Cables that fail the test must be replaced. The engineer reserves the right witness all of the testing.



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Cable identification and labelling:

All labeling shall conform to good labeling and identification standards. The specialist contractor shall be responsible for labeling at both the user and communications cabinets locations to an agreed labeling system in all UTP / Multicore / Fibre installation. Hand written labels will not be acceptable.

Training and Demonstration:

The Contractor shall include for demonstration and client training. Adequate notice shall be given to the client and, at an agreed time and in the presence of the engineer a training and demonstration event shall be provided.

64.02 PA System

New Public Address System:

The Contractor shall allow for the supply and installation of a completed Public Address (PA) System) in areas as indicated on the drawings including all speakers, cabling, console system, etc.

A specialist sub-contractor shall be employed by the Contractor in order carry out all the final connections, testing and commissioning of the system.

The Contractor shall allow for the supply, installation, testing and commissioning of a complete public address/music system for the new extension of the building as indicated on the drawings. All areas as indicated on the drawing shall be linked back to a new independent public address control panel which shall be located in the Principals Office.

The supply of equipment, final connection of devices and commissioning shall be by the specialist supplier below with all other works performed by the Contractor. The Contractor shall allow for a complete installation within the tender price. All equipment as supplied by SKS Communications, or equivalent.

Zoning/Switching:

Classroom Switching:

The PA system shall be wired so that the Principal can independently speak to each classroom and office area throughout the building and subsequently, that each classroom and office area can talk back to the Principal. The PA system shall be a 2-way communication system.

Therefore, there shall be a dedicated switch for each classroom and office on the main PA console in the Principals Office so that the Principal and



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flick this switch and talk independently to a specific classroom throughout the building without other classrooms or areas hearing the conservation.

Subsequently, there shall be a switch on each PA speaker in all Classrooms, Offices, etc. that shall allow the teacher in each room to speak independently to the Principal if required.

General Area Switching:

Apart from the switching highlighted above, the PA system shall be zoned so that certain areas are grouped together.

A separate switch for each zone (zones highlighted below) shall be installed on the main PA console so that the Principal can speak to all the zones separately.

Announcements for all Areas:

A single switch shall be installed on the PA system console that the Principal can activate so that when activated, the Principal can make an announcement to all the PA speakers throughout the Junior School Building.

Zoning:

Apart from each classroom and office being independently switched, the PA system shall be zoned as follows:

1. External Areas (Zone 1)
2. Corridors (Zone 2)

Equipment:

The system shall consist of the following elements:

- a) Wall mounted PA Speakers in Safebase, SET rooms, Offices, etc.

Wall mounted speakers shall be installed in all Safebase, SET rooms, Offices, Staffroom, etc. as shown on the drawings, allowing **2-way communication** from the main console in the Principals Office to these rooms throughout the building.

Speakers shall be vandal resistant loudspeakers and shall be mounted 1600mm above finished floor level. Final location of speakers to be agreed with the Employers Representative. These speakers will be 6watt with power tape of 3/1.5/.75/.3 Watts as a minimum.



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The speakers will be constructed of metal and shall be white colour. Wall mounted speakers to be mounted 1600mm above finished floor level to be CES WAS-6061, or equivalent. Speakers shall be located at the teachers wall and shall have a volume control in addition to the toggle switch.

b) Wall mounted PA Speakers for Corridors

Wall mounted speakers shall be installed in all corridors allowing only **1-way communication** from the main console in the Principals Office to all corridors throughout the building.

Speakers shall be vandal resistant loudspeakers and shall be mounted 2100mm above finished floor level. Final location of speakers to be agreed with the Employers Representative. These speakers will be 6watt with power tape of 3/1.5/.75/.3 Watts as a minimum. The speakers will be constructed of metal and shall be white colour.

Wall mounted speakers within corridors shall be as CES WAS-6061. Speakers to be mounted 2100mm above finished floor level.

c) External PA Speakers:

External horn type weatherproof loudspeakers shall be installed for the external areas as indicated on the drawings.

The external speakers will be at least 15Watt horn type and be mounted at 3m AFFL in the locations outlined on the drawings. These speakers will be constructed of ABS plastic and must be IP64 rated. To be CES PRH-10301/8, or equivalent. Protective galvanised steel caging required. Speakers to be mounted 2100mm above ground level.

- d) CD player/tuner for the PA system, as Bosch LBB-1961/00 CD player/tuner, or equivalent. Allow for connecting the cabling for the PA speakers in the new Extension to the new main console. The new main console shall be located in the Principals Office.
- e) Power amplifier for the PA system, as Bosch LBB-1938/00 plena booster 720/480W, or equivalent.
- f) Paging microphone on desk stand with 'press-to-talk' button for the PA system to be located within the Principals Office as Bosch LBB-1946 6 zone call station, or equivalent. Final location to be agreed with the Client.
- g) Integral class change timer unit integrated into the PA system.
- h) All control equipment to be housed in 19" rack in the Principal's Office.



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Wiring:

Cabling to each new speaker indicated throughout the building from the main console in the Principals Office shall be wired in a 2 x 1.5mm² screened speaker cable as Procab LS15W/1. Each conductor shall be fitted with a highly flexible jacket made of PVC and the whole inner section shall be packed by a paper foil into a highly flexible outer jacket made of PVC. Cable shall be 100 Volt rated cable.

The new main console shall be installed in the same location where the existing PA main console is located which is in the Principals Office.

If applicable, in order to reduce the number of cables and reduce the space needed for cable containment, the Contractor shall allow for bringing the cabling as indicated above in a multi-core cable to certain parts of the building and splitting to the relevant rooms one in that area of the building.

The wiring to each new speaker shall be housed in a steel conduit system. Main runs of cable throughout the building shall be installed on a suitable cable tray which shall be installed surface mounted on the existing purlins in the corridor. See cable containment drawing for further information. Cabling to the main console in the Principals Office shall be terminated at a DIN rail within a junction box located adjacent to the cabinet rack in the Office. These cables will be terminated in a junction box installed no greater than 2m from the final console location.

64.03 Induction Loop System

A suitable Audio Frequency Induction Loop System (AFILS) shall be provided for the following areas as indicated on the drawings:

- Classroom – Class Base

Allow for supplying and installing an independent Audio Frequency Induction Loop System (AFILS) for the cash desk identified above as AKM1 system from C-TEC, or equivalent.

Each system shall consist of the following:

- Audio input signal (e.g. microphone or other audio source) as APM plated microphone
- 'AFILS fitted' sticker
- Induction loop amplifier as PDA200E
- Induction loop cabling/tape
- Suitable Microphone
- Wall mounted metal enclosure



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The induction loop shall be linked to a dedicated amplifier shall be installed at the area. The amplifier shall incorporate a minimum of two audio input sockets, one for the permanent link via the audio socket to the fire alarm voice activation system while the other one is available for a link to a stand.

A specialist AFILS provider should be consulted to design the optimum system for each cash desk. The layout of each system shall be designed to ensure that any spill over from one loop will not affect any other loops in the facility. This may require the installation of phased loop systems. Where applicable the installations shall be low spill array type loop systems in order to avoid cross talk between adjacent rooms. The induction loops shall comprise of a dual loop array installed beneath the finished floor covering at each area. The cable shall be an insulated flat copper foil tape.

- Type: Current Thinking ETFC. The loop drivers shall be Current Thinking ET-Secure amplifiers with dual loop array phase shifted drivers

Please note that all required equipment to supply a fully function system shall be provided for each system. (Source –Amplification –Loop)

The following points from BS7593-2006 shall be considered as a minimum requirement.

- Magnetic field strength produced by the loop (including the minimum compression to EN60268-3 0.56A m +/- 3dB
- Frequency response – 100Hz to 5kHz
- Distortion- Within IS EN 60118.1.1981 minimum.





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68.0 SECURITY AND PROTECTION

68.01 Fire alarm system

General:

A new fire alarm installation shall be installed for the building as indicated on the drawings. The system to be installed shall be in compliance with I.S. 3218:2024. All new devices as indicated for the building shall be wired back and connected to the new main fire alarm panel which shall be located in the entrance lobby to the main building. See drawings for the locations in the building where new fire alarm system devices shall be installed.

A fully addressable L1 type fire alarm system fully in accordance with I.S. 3218:2024 and as identified in the drawings shall be provided for the building. The system shall comprise ionisation and optical smoke detectors, heat detectors, sounders, combined heat detectors, combined smoke detectors, alarm beacons/sounders, visual alarm devices, manual call points, fire alarm interfaces, short circuit isolators and similar alarm input devices, located as shown on the drawings.

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

Approved Fire Alarm System:

Fire alarm systems by the following companies is acceptable:

1. Sidemen's
2. Tyco
3. Morley
4. Nulli Fire
5. Menveir Limited

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

Existing Main Fire Alarm Panel:

The exiting main fire alarm panel shall be retained and extended to cater for the new fire alarm devices in the new extension. This panel shall be a compact wall mounted addressable control and indicator panel located at the main entrance to the school. All devices within the new extension building shall be connected in loops, to this panel.



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Smoke & heat detectors:

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

The Contractor shall supply necessary address flags and address labels for all devices.

All new automatic fire detectors shall generally be of the optical smoke detectors type. These detectors shall have an address code setting and shall be addressable and suitable for an addressable fire alarm system. Separate addressable plugs for each detector shall be provided. The Electrical Contractor shall label each detector and base with address number. The colour of detectors shall be white. Detectors to be of the optical point type unless otherwise indicated on the drawings and shall be in accordance with BS 5446-1, IS EN 54-7 and IS3218. Sensitivity of the smoke detectors shall be set by the main panel control software.

Heat detectors to be of the type indicated on drawings and be in accordance with BS5446-2, IS EN 54-5 and IS3218:2024.

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

Combined smoke detectors and sounders:

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

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

The Contractor shall supply necessary address flags and address labels for all devices.

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

Combined smoke detectors and beacons:

The Contractor shall allow for the supply and installation of all combined smoke detector and flashing beacons throughout the building as indicated on the



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drawings. Each head shall include a condition indicating LED light and a suitable flashing beacon. All new detector heads shall include a condition indicating LED light and the smoke and heat detectors sensors shall be complete with flashing beacons. Quantities and locations of devices as indicated on the drawings.

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

The Contractor shall supply necessary address flags and address labels for all devices.

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

Void Detectors:

New smoke void detectors shall be installed in the in the building to protect the ceiling void as indicated on the drawings. Detectors above the ceiling shall be complete with remote monitoring indicating LED. Allow for installing detectors in the ceiling spaces and subsequent LED indicators in the ceiling below the detector. Quantities and locations of devices as indicated on the drawings.

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

The Contractor shall supply necessary address flags and address labels for all devices.

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

Manual Call points (break-glass units):

The Contractor shall allow for the supply and installation of all manual call points as indicated on the drawing. The supply and installation of the manual call points shall comply with the following standards: IS EN 50130-4, IS EN 54-11 and IS3218. Quantities and locations of devices as indicated on the drawings.

All manual call points shall be fully resettable type via key operation. Break glass units will not be accepted as all manual call points shall be PVC. All call points shall be supplied c/w surface mounting back box to suit. Call points to be installed 1100mm from the finished floor level and 150mm from doorframes. Allow for installing plastic protective covers on all manual call points throughout the Warehouse area of the building.

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



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Visual Alarm Devices (VAD's):

The Contractor shall allow for the supply and installation of all visual aid devices (VAD's) as indicated on the drawing. In some areas, a visual alarm device (VAD) shall be installed due to the nature of use of the room/area. Quantities and locations of devices as indicated on the drawings.

The VAD shall be ceiling mounted shall be EN54-23 Compliant VAD and shall have low current consumption.

The VAD shall adhere to the following specifications:

- Mounting Height: 3m
- Mounting type: Ceiling mounted
- Flash rate: Once per second
- Operating Voltage: 17-60V DC Polarity Sensitive
- Max current cons.: 45mA @ 1 Hz
- Switch-on surge: 120% for 1 sec
- Monitoring: Reverse Polarity
- IP Rating: IP65
- Body Colour: White
- Flash Colour: White
- Coverage : 3m
- Coverage Code: C-3-3
- Coverage Volume: 21m³

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

External Alarm Sounders:

A suitable weather resistant flasher and electronic bell sounder shall be supplied and installed by the Contractor at front of the building as indicated on the drawing. Quantities and locations of devices as indicated on the drawings.

External fire alarm sounders must have a distinct sound to any other sound activating unit such as intruder alarm system. The sounders shall automatically silence after a period of 15minutes but the visual indicator on the external sounder shall continue to operate until the panel is reset.

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

Internal Magnetic Door Contacts:

The Contractor shall include for the supply and fitting of new magnetic door holders which shall be linked/interfaced to the fire alarm system and power supply units as required.



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

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

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

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

Interface Units:

The Contractor shall allow for the supply and installation of all fire alarm interface units as indicated on the drawing and for the linking of these to the relevant systems as indicated. Quantities and locations of devices as indicated on the drawings.

Interface units (Input/Output models) shall be provided as indicated on the system drawings. These shall have separate 230 volt supply provided to them. Short circuit isolators shall be installed where the loop wiring crossed a fire compartment wall and where the wiring enters another fire zone.

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

- Door access systems.
- MCC controls panel.
- Gas detection system.
- Lift.
- Heat recovery systems.
- Any other items described on the drawings or highlighted in this specification.

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



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Drawing/Map:

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

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

Wiring:

All new cabling used for the fire alarm system throughout the building shall meet classification PH120 enhanced when tested in accordance with I.S. EN 50200. The entire fire alarm system shall be wired in 2 x 2.5 sq. mm 'Firetuff Enhanced PH120' with red LSF outer sheath and copper conductors (or equivalent).

The cable shall meet the requirements of IS 3218:2013, BS7629-1; BS 6387 C, W & Z; IS EN 50200; BS 8434-2 and BS5839-1 Clause 26.2 PH 120 'Enhanced'. The cable shall meet the enhanced PH120 class for integrated water spray and mechanical shock as described in Clause 26.2e, and detailed in BS 8434 Part 2:2003:

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

- 120 minutes fire and shock
- 60 minutes fire and mechanical impact, followed by
- 60 minutes fire, mechanical impact and water

The Contractor shall allow for all necessary power supplies to the fire alarm devices and equipment. The Contractor shall ensure that any other attendances or modifications required to the installation in order to leave the whole of the completed installation in a satisfactory condition are included in his tender.

B.S. 5445 Parts 1:1977, 5:1977, 7:1984, 8:1984, and 9:1984.

B.S. 5839 Parts 1:1998, 3:1988, 4: 1988, and 5:1988

All to the approval of the Employer's Representative.

Remote Monitoring:



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The fire alarm system shall be connected to the digital communicator so that when the fire triggers, a fire alarm alert signal shall be transmitted to the 24-hour central station.

The Contractor shall provide a 4-way digital dialler for remote monitoring for the Fire Alarm system.

The Contractor shall allow for bringing a 2-pair copper multipair cable link between the incoming Eircom incomer in the building to the digi-dialler for the remote monitoring of the fire alarm system. Allow for connections at each end.

Testing & Commissioning:

The Contractor shall test all items of equipment individually and shall commission the full installation as a unified system. All testing and commissioning shall be carried out in the presence of and to the satisfaction of the Engineer. The Contractor shall give to the engineer seven days notice in writing before testing or commissioning is carried out. Commissioning shall comply with IS 3218:2024.

The Contractor shall allow for the following during the commissioning:

- Carry out a full test on the fire alarm system which includes all devices, panels, etc. to ensure that the items are fully operational.
- Test every device in situ including manual call points, sounders, detectors, interfaces, etc. To test each item the Contractor shall use appropriate test method/device.
- Confirm sound levels throughout the building.
- The Contractor must confirm that the entire system all components operate satisfactorily. The Contractor shall test for:
 - Operation of each device function
 - Operation of integral indicators (LED's, etc)
 - Fire alarm panel indications and functions
 - Network functions

Certificates:

When completed, in compliance with IS 3218:2024, the Contractor shall provide the following certificates for the fire alarm system:

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



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Cable Carrier:

A new cable carrier shall be installed for the new fire alarm installation in the new extension of the building as indicated on the drawings. The contractor shall allow for surface mounted conduit installation for the existing areas where it isn't possible to get into the ceiling voids. The electrical contractor shall allow for surveying the building to determine the exact routes to be taken for fire alarm devices in the existing areas of the building. All new fire alarm cables and distribution shall be installed in a steel conduit/trunking system. See section 62.05 for further information on cable carrier.

ASD Unit:

In the ASD area of the building, all conduits shall be recessed and hidden in the building fabric. The new electrical distribution system shall be installed in a steel conduit/trunking system throughout which shall be located in the ceiling void. This includes all horizontal runs in false ceilings or exposed on walls/ceilings. If it is possible, the conduits and trunking system shall be installed in the ceiling void.

General areas:

In the General areas of the building, all electrical containment (conduits, tray, trunking, etc.) shall be exposed and surface mounted. The new electrical distribution system shall be installed in a steel conduit/trunking system throughout the general area which shall be located exposed at high level.

68.02 Emergency call systems

There are 2no. accessible toilets throughout the new extension as indicated on the drawings. For each of these toilets, the Contractor shall allow for the supply and installation of an emergency call system consisting of alarm cords, reset button and over door buzzers/light, for the accessible toilets as indicated on the drawings.

The reset button for each toilet shall be within each WC to ensure the assistant check the room prior to resetting the alarm. The pull cords for the alarm shall be installed in the immediate vicinity of the WC and the shower in each toilet, to allow the users to call for help. The over door buzzer/light for each alarm shall be installed in a place adjacent to the toilet, where it is highly visible.

A remote zone controller shall be installed to monitor the alarm in each toilet and this shall be located in the Admin office. Wiring shall be carried out in 4-core security cable. See detail on drawing for further information.

The Contractor shall allow for the following for each accessible toilet in the building (2no in total):



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- 1no 'One Zone' controller
- 2no Ceiling pull cords
- 1no Overdoor light with sounder
- 1no Reset button (located within the toilet)
- 1no Accessible WC sticker
- 1no Call latch module
- 1no 12volt power supply unit to cater for each system.

The Contractor shall allow for 2no zone controllers in the Admin office. This shall cater for all of the new emergency call systems installed in each of the accessible toilets.

Allow for a 230Volt 3amp fused spur switch at the location of each zone controller.

See drawings for quantity of emergency call systems required.

68.03 CCTV system

General

The Electrical Contractor shall be responsible for the supply, cabling, installation, testing and commissioning of the complete CCTV system for the building as indicated on the drawings. The CCTV system shall be an IP networked CCTV system and shall be installed and commissioned by the contractor.

The Electrical Contractor shall allow for supplying all necessary power supplies and data points to the CCTV system installation as indicated on the drawings. Quantities and locations of all CCTV camera, monitors and recorders are as indicated on the drawings.

A fully digital closed circuit television system shall be provided to ISEN50131/1 and IS199. Camera positions and type shall be as indicated on the drawings and as specified in these documents. Recording equipment shall be located in the Admin office as indicated on the drawings. The Contractor shall employ a suitably qualified ISIA company to install the CCTV system. The specialised CCTV Contractor shall design, install and commission a fully digital closed circuit television system, which shall comply to ISO EN50131/1 and IS199. The specialised CCTV Contractor must be a suitably qualified ISIA company and NSAI accredited.



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Electrical attendances:

The Electrical Contractor shall allow for providing the following electrical attendances to the CCTV system:

Internal cameras in the Building:

- 1no CAT6 data point terminated in a RJ45 outlet to each internal CCTV camera. Height of the data point is highlighted on the drawings. The CAT6 data point to each CCTV camera shall be supplied from the comms cabinet in the staffroom as indicated on the drawings. Final location of data point to be confirmed by the CCTV system installer.
- 1no 13amp fused spur outlet power supply to each CCTV camera. Height of the fused spur is highlighted on the drawings. The spur shall be supplied from the new electrical board in the building. Final location of the spur outlet to be confirmed by the CCTV system installer.
- Supply and installation of the CCTV camera and final connection of power supply and IT cable to the camera.

External cameras on the Building:

- 1no CAT6 data point terminated in a RJ45 outlet to each internal CCTV camera. Height of the data point is highlighted on the drawings. The CAT6 data point to each CCTV camera shall be supplied from the comms cabinet in the staffroom as indicated on the drawings. Final location of data point to be confirmed by the CCTV system installer.
- 1no 13amp fused spur outlet power supply to each CCTV camera. Height of the fused spur is highlighted on the drawings. The spur shall be supplied from the new electrical board in the building. Final location of the spur outlet to be confirmed by the CCTV system installer.
- Supply and installation of the CCTV camera and final connection of power supply and IT cable to the camera.

Wall mounted CCTV monitors in the Building:

- 1no CAT6 data point terminated in a RJ45 outlet to each wall mounted CCTV monitor in the building. Height of the data point is highlighted on the drawings. The CAT6 data point to the CCTV monitor shall be supplied from the comms cabinet in the in the staffroom as indicated on the drawings. Final location of data point to be confirmed by the CCTV system installer.
- 1no 13amp single socket power supply to each CCTV monitor in the building. Height of the single socket is highlighted on the drawings. The socket shall be supplied from the new electrical boards in the building. Final location of the socket to be confirmed by the CCTV system installer.



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All cabling shall be run in galvanised steel conduit. Refer to the drawings for the location of all the CCTV equipment in the building.

Conduit runs serving wall mounted CCTV devices shall terminate in the devices own box.

A 13A-power fused spur outlet with neon indicator shall be provided at each of the CCTV cameras, monitors, multiplexer/recorder and video positions indicated on the drawings. CCTV cabling and devices shall be supplied and installed by the Electrical Contractor.

The Electrical Contractor shall co-ordinate and optimise the location of the external light fittings with the external CCTV cameras. Where possible, the light source should be above and behind the camera. If this is not possible, the light source shall be at 90° to the main viewing axis of the camera.

Proposed equipment layouts are as shown on the drawings, however all precise locations to be confirmed on site with the Employer's Representative. All mounting structures and brackets for all devices shall be included for in the tenderer's price.

Cable containment:

A new cable carrier shall be installed for all cabling to the CCTV system throughout the building as indicated on the drawings. All new IT cables and power supplies to the CCTV system installation shall be installed in a steel conduit/trunking system. See section 62.05 for further information on cable carrier.

ASD Unit:

In the ASD area of the building, all conduits shall be recessed and hidden in the building fabric. The new electrical distribution system shall be installed in a steel conduit/trunking system throughout which shall be located in the ceiling void. This includes all horizontal runs in false ceilings or exposed on walls/ceilings. If it is possible, the conduits and trunking system shall be installed in the ceiling void.

General areas:

In the General areas of the building, all electrical containment (conduits, tray, trunking, etc.) shall be exposed and surface mounted. The new electrical distribution system shall be installed in a steel conduit/trunking system throughout the general area which shall be located exposed at high level.



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Cameras:

Internal CCTV cameras

Fit internal network dome cameras in the building with the following specifications (refer to drawings for quantities):

- Type: 4MP high resolution network dome camera
- Network: Yes
- POE: Yes
- IP rating: IP67
- Housing Colour: Ivory or White
- Image Resolution: 2688 H x 1520V
- Image Sensor: 1/2.9" Progressive Scan CMOS
- Day and night: IR cut filter with auto switch
- Min. Scene Illumination: 0.01lux @ (F1.2,AGC ON),0lux with IR
- DNR: 3D DNR
- Wide dynamic range: 120db
- Iris: F2.0
- Shutter time: 1/3 s to 1/100,000 s
- Lens: 4mm
- Synchronisation: Internal synchronisation
- Communication Interface: 1 RJ45 10M/100M self-adaptive ethernet port
- Auto gain: Low/Middle/High/Off
- D/N mode: Colour/BW/EXT
- White balance: Auto/manual
- Privacy mask: On/Off
- Motion detection: On/Off
- Integrated IR Lighting: Yes (IR LEDs)
- Infrared: Yes
- IR distance: 30metres
- Iris Mode: AES only
- Power Source: 12V DC
- Power Consumption: 5.0W
- Approximate Dimension: 115mm (diameter) x 83mm (height)
- Approximate Weight: 500g
- Operating Temperature: -30° C to 60° C
- Humidity: 0% to 95% relative, non-condensing
- Notes: Compatible with network system
- Camera manufacturer: Hikvision, or equivalent.

Allow for supplying the following in conjunction with the camera:

- The necessary brackets for wall or ceiling mounting the camera.



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- Allow for supplying and installing all junction boxes and all necessary accessories for installing all the cameras
- Any other items that the Contractor deems necessary.



External CCTV cameras

Fit external network bullet cameras in the building with the following specifications (refer to drawings for quantities):

- Type: 4MP high resolution network bullet camera
- Network: Yes
- POE: Yes
- IP rating: IP67
- Housing Colour: Ivory or White
- Image Resolution: 2688 H x 1520V
- Image Sensor: 1/2.9" Progressive Scan CMOS
- Day and night: IR cut filter with auto switch
- Min. Scene Illumination: 0.01lux @ (F1.2, AGC ON), 0lux with IR
- DNR: 3D DNR
- Wide dynamic range: 120db
- Iris: F2.0
- Shutter time: 1/3 s to 1/100,000 s
- Lens: 2.8 - 12 mm @ F1.4, motorized lens (-Z), angle of view: 112°~33.8°
- Synchronisation: Internal synchronisation
- Communication Interface: 1 RJ45 10M/100M self-adaptive ethernet port
- Auto gain: Low/Middle/High/Off
- D/N mode: Colour/BW/EXT
- White balance: Auto/manual
- Privacy mask: On/Off
- Motion detection: On/Off
- Integrated IR Lighting: Yes (IR LEDs)
- Infrared: Yes
- IR distance: 30metres
- Iris Mode: AES only
- Power Source: 12V DC, POE



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- Power Consumption: 5.5W
- Approximate Dimension: 95mm x 105mm x 260mm.
- Approximate Weight: 1200g
- Operating Temperature: -30° C to 60° C
- Humidity: 0% to 95% relative, non-condensing
- Notes: Compatible with network system
- Camera manufacturer: Hikvision, or equivalent.

Allow for supplying the following in conjunction with the camera:

- The necessary brackets for wall mounting or pole mounting the camera as advised by the supplier.
- Allow for supplying and installing all junction boxes and all necessary accessories for installing all the cameras
- Any other items that the Contractor deems necessary



Specification:

The installation shall comply fully with IS EN 50132, IS EN 50131, IS 199:1987 and ISO: 9002: 1987 and all subsequent amendments. The specialised CCTV Contractor that the Contractor employs must be ISIA qualified and NSAI registered.

Monitors:

The Contractor shall allow for the supply and installation of 1no. 22" LCD flat panel colour monitors in the following areas:

1. Admin office (Monitor located within the secure cabinet used in conjunction with digital recorder).

All flat panel monitors shall adhere to the following specifications:

- LED backlit technology with full HD 1920x1080
- Wide view angle: 170° (H)/160° (V)
- 3D comb filter
- 3D De-interlace
- 3D noise reduction
- Multiple inputs: HDMi, VGA, audio in,
- Built-in speaker.



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Final locations of the monitors within the rooms are to be agreed with the Employer's Representative.

Digital Recorder:

General:

Supply and install a 32-Camera NVR to receive video output from all cameras.

The digital recorder shall be a network recorder and shall be set up so that the system can be accessed via phones and computers.

The proposed NVR is a Hikivision DS-9600NI-I8, or equivalent.

Digital recorder for this project shall adhere to the following specifications:

Video/Audio Input:

- Audio input: 32-channel
- Two Way Audio: 1-ch, RCA (2.0 Vp-p, 1 K Ω) (using audio input)
- Audio Input Interface: 4-ch, RCA (2.0 Vp-p, 1 K Ω)

Network:

- Incoming bandwidth 320 Mbps
- Outgoing bandwidth 256 Mbps
- Remote connection: 128

Video/Audio Output:

- HDMI Output: 4K (3840 x 2160)/60 Hz
- Recording resolution: 12MP
- Frame rate: 8 MP@8fps
- Audio Output: 2-ch, RCA (Linear, 1 k Ω)
- Playback Resolution: 12MP
- Synchronous playback: 16-channel

Hard disk driver:

- Interface type: 8 SATA Interfaces
- Capacity: Up to 6TB capacity for each HDD
- E-SATA Interface: 1 eSATA interface



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External interface

- Network interface: 2; RJ-45 10/100/1000 Mbps self-adaptive Ethernet interface
- USB Interface: 2 USB 2.0 Interface on the front panel
1 USB 3.0 Interface on the rear panel
- Alarm input: 16-channel
- Alarm Output: 4-channel

General information:

- Power Source: 230V
- Power Consumption: 30W
- IP rating: IP66
- Approximate Dimension: 450mm x 470mm x 90mm
- Approximate Weight: 700g
- Operating Temperature: -10° C to 55° C
- Humidity: 10% to 90% relative, non-condensing
- Notes: Compatible with network system

68.04 Attendances to the AOV installation

General:

A new automatic opening vents (AOs) shall be supplied and installed by others in the building. All AOV and controls shall be supplied, fitted and commissioned by others. The AOV system installer will be employed directly by the Main Contractor.

However, the Electrical Contractor shall allow for supplying all necessary power supplies and cabling to the AOV system installation as indicated on the drawings. Quantities and locations of all AOV's and control devices are as indicated on the drawings. Also, refer to the AOV wiring schematics on the drawings for information on the cabling and attendances required for the AOV installation.

Electrical attendances:

All AOV's, control panels, fireman breakglasses, etc. shall be supplied by others but shall be handed over to the Electrical Contractor for installation and wiring.

In total, there is 1no. AOV control systems to be installed as indicated on the drawings. The Electrical Contractor shall allow for providing the following electrical attendances to the AOV control system:



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- 13amp 230volt fused spur outlet power supply to each control panel. Height of the panel is highlighted on the drawings. Final location of the spur outlet to be confirmed by the AOV system installer.
- Fire alarm interface (I/O unit) from the fire alarm system to each AOV control panel at low level. Refer to section 68.01 for further information on the fire alarm interfaces. The door release facility for each system shall also be linked to the fire alarm system so that in the event of fire activation the respective doors shall open.
- Installation of the AOV control panel and fire man break glass unit in the locations as indicated for each AOV system. All control panels and break glass units shall be supplied by other and handed over free issue to the Electrical Contractor for wiring and installation.
- All necessary cabling from each AOV control panel to its associated AOV in the roof. See below for specification on cabling required and refer to the schematic on the drawings for details on the cabling required between devices.
- All necessary cable containment for all power supplies to all control panels and fire alarm cabling between devices.

Cabling:

All new cabling used between the control panel and the devices for each AOV control system installed throughout the building shall be wired in 3 x 2.5 sq. mm 'Firetuff Enhanced PH120' with red LSF outer sheath and copper conductors (or equivalent). All cabling shall meet classification PH120 enhanced when tested in accordance with I.S. EN 50200.

The cable shall meet the requirements of IS 3218:2013, BS7629-1; BS 6387 C, W & Z; IS EN 50200; BS 8434-2 and BS5839-1 Clause 26.2 PH 120 'Enhanced'. The cable shall meet the enhanced PH120 class for integrated water spray and mechanical shock as described in Clause 26.2e, and detailed in BS 8434 Part 2:2003:

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

- 120 minutes fire and shock
- 60 minutes fire and mechanical impact, followed by
- 60 minutes fire, mechanical impact and water

The Contractor shall allow for all necessary power supplies to the AOV control panels. The Contractor shall ensure that any other attendances or modifications required to the installation in order to leave the whole of the completed installation in a satisfactory condition are included in his tender.



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Cable carrier:

A new cable carrier shall be installed for the new AOV installation throughout the building as indicated on the drawings. All new cables and distribution for the AOV installation shall be installed in a steel conduit/trunking system. See section 62.03 for further information on cable carrier.

In the ASD part of the building, all conduits shall be recessed and hidden in the building fabric. The new electrical distribution system shall be installed in a steel conduit/trunking system throughout which shall be located in the ceiling void. This includes all horizontal runs whether in false ceilings or exposed on walls/ceilings. If it is possible, the conduits and trunking system shall be installed in the ceiling void.

In the general school area of the building, all electrical containment (conduits, tray, trunking, etc.) shall be exposed and surface mounted. The new electrical distribution system shall be installed in a steel conduit/trunking system throughout the Warehouse which shall be located exposed at high level on the wall or on the roof purlins.

68.05 Wireless Panic button system

An Emergency Call/Panic Alarm System consisting of a central control station in the Office and emergency assist panic pendants worn by staff shall be supplied and installed as part of the electrical installation. The system provided shall cover both the new ASD Unit as well as the outdoor spaces associated with this. This shall be an addressable system comprising of mobile pendant/handheld panic button units and a panic button controller.

The contractor shall allow for providing the school with 6no. wireless panic devices as part of the contract.

The intention is that a panic button/unit shall be assigned to a staff member and when it is triggered, an alarm will sound and the display unit will digitally indicate a number assigned to the staff member who triggered the alarm. The system shall have a two phase panic mode which shall consist of the following:

- Setting 1 will indicate that the person feels threatened
- Setting 2 indicates that a more serious emergency situation has occurred.

The Central Control addressable unit shall be located in the Admin Office and all wireless panic buttons shall be linked back via a receiver back to this addressable unit so that in the event of an activation; it will state on the addressable unit the number assigned to the staff member who triggered the alarm. The wireless panic attack button systems shall consist of a belt clip with a transmitter.



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68.06 Intruder alarm system

General:

The Contractor shall be completely responsible for supply and installation of the intruder alarm system in the building as indicated on the drawings.

All cabling shall be run in galvanised steel conduit. The Contractor shall be completely responsible for the supply, installation, testing, commissioning and handover all elements of the security installation.

An intruder alarm system shall be installed in the extension of the building comprising of passive infrared (PIR) dual tech movement detectors and window/door contacts as indicated on the drawing.

The intruder alarm system for the extension of the building and devices shall be supplied and installed by the Contractor. The Contractor shall provide a 3 gang 220-volt 13-Amp fused spur outlet with neon indicator at all necessary equipment positions such as panels, etc. Spur outlets shall be located at the equipment positions as required.

Proposed equipment layouts are as shown on the drawings, however all precise locations to be confirmed on site with the Employer's Representative. The systems installed shall also comply fully with IS 199:1987, ISO: 9002: 1987, DD243:2004 (sequential verification of alarms) and all subsequent amendments.

Intruder Alarm installations to be in compliance with EN50131/1 Intruder Alarm Systems. Compliance with I.S. 228:2007 Monitoring Centres for Intruder Alarm Systems. Security equipment in compliance with ISO 9001 Registered by an Accredited Certification Body. The Contractor shall employ a suitably qualified ISIA company to install the Intruder Alarm system.

The specialised Contractor shall design, install and commission a fully operational intruder alarm system, which shall comply to IS199. The specialised Security Contractor must be a suitably qualified ISIA company and shall be NSAI accredited. A certificate of compliance shall be required on completion of the works as will a unique reference number from the Garda Authority for monitoring purposes.

Main control panel:

The contractor shall allow for retaining the existing main intruder panel for the building. The location of the panel is located on the drawing. The contractor shall allow for connecting all new devices back to this panel and the contractor shall



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also allow for linking the new main fire alarm panel to the existing intruder alarm panel.

Key Pads:

Install remote setting digital keypads in the locations as indicated on the drawings. Keypads shall be complete with digital display. Final location of keypads shall be decided in conjunction with the Employer's Representative.

The keypads shall suit the intruder alarm system to be installed and shall adhere to the following specifications:

- Wired version
- ABS housing
- Hinges lid and hinged cover
- High speed keypad bus
- Graphics LCD with blue back-lighting
- Audible word library
- Built-in panic feature; press * and # together
- No DIP switch settings required
- Keyprox version available for BS8243
- Approximate size of 167mm x 125mm x 26mm
- EN 50131-1 EN Grade 2
- Environmental Class II

Movement Detectors:

Install PIR movement detectors as indicated on drawings. Detectors shall be dual technology type incorporating passive infra-red and microwave technologies, and remote walk test facility to enable routine testing. Movement detectors shall be of the Passive Infra-Red/Microwave 'Dual Tec' type of sufficient range and coverage for areas indicated. They shall be suitable for Wall or Truss Mounting as appropriate. The sensor shall be suitable for the coverage of the perimeter window areas as indicated on the drawing. All alarm sensors shall be suitable for the areas and locations which they are installed and shall include full anti-tamper facilities.

Dual technology sensors shall adhere to the following specifications:

- Dual element pyro-electric sensor
- X-band DRO based microwave
- Optional lenses 18m and 30metre
- Anti-masking detection
- 0-1m adjustable mask detection
- Selectable EOL (End Of Line) resistors
- AND/OR technology



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- Patented Independent Floating Thresholds (IFT)
- Blue wave technology
- Auto sensitivity feature
- Digital temperature compensation
- Triple LED indication
- Sealed optics
- Tamper proof brackets included
- ABS plastic
- Tested and certified to IS EN 50131-2-4

Internal Sounders c/w flash:

Internal sounders shall be 12volt d.c. electronic 'SQR Sounder'. As 'HKC HN8-ECHOFLR' low profile sounder complete with strobe (or equivalent). Sounders shall be configured to silence after 30 minutes in operation.

Internal sounders shall adhere to the following specification:

- High output dual piezo
- Variable volume control
- Housing with tamper switches
- Sounder shall come with strobe (red or blue). Strobe and sounder shall adhere to the following specifications:
 - Strobe Current: 120mA
 - Siren Current: 135mA
 - Strobe: 1W
 - Siren: 104dB at 1m
 - Weight: 150g
 - Size: 150mm x 100mm x 36mm
 - EN50131-4
 - EN Grade 2
 - Environmental Class II

Magnetic Reed Door Contacts/Inertia Sensors:

Magnetic reed contacts for external doors and windows where indicated on the drawings shall be of the double reed magnetic type with shock sensors as required.

Cable containment:

A new cable carrier shall be installed for all cabling to the intruder alarm system throughout the building as indicated on the drawings. All new cabling for the intruder alarm system installation shall be installed in a steel conduit/trunking system. See section 62.03 for further information on cable carrier.



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ASD Unit:

In the ASD area of the building, all conduits shall be recessed and hidden in the building fabric. The new electrical distribution system shall be installed in a steel conduit/trunking system throughout which shall be located in the ceiling void. This includes all horizontal runs in false ceilings or exposed on walls/ceilings. If it is possible, the conduits and trunking system shall be installed in the ceiling void.

General areas:

In the General areas of the building, all electrical containment (conduits, tray, trunking, etc.) shall be exposed and surface mounted. The new electrical distribution system shall be installed in a steel conduit/trunking system throughout the general area which shall be located exposed at high level.

Commissioning:

Allow for commissioning and testing of the entire intruder alarm installation. Commissioning Certificates to be included within as fitted manuals. The intruder alarm panel shall be fully labelled and the zone charts handed over to the Client before the system is fully commissioned.

A certificate of commissioning shall be forwarded to the Employers Representative on the day after commissioning. Commissioning Certificates to be included within 'As-Built' O&M manuals.

Intruder alarm cabling:

All intruder alarm cabling to devices and between intruder alarm panels shall be 6-core security alarm cable and shall adhere to the following specifications:

- 6-cores
- White jacket colour
- Maximum Resistance less than 155 Ohm/km
- BS4737-3.30: 2015 Type 3 (Yellow Rip Cord)
- Voltage Rating 50Vrms
- Jacket Material Lead and Tin Free PVC
- PVC Insulation – BS EN 50636-3 TI 1
- PVC Sheathing - BS EN 50636-4.1 TM1
- Conductor Material Tinned Copper
- External Diameter 3.8mm (nominal)



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68.07 Internal door access systems

General:

A new number of door access systems shall be supplied, installed and commissioned by the Electrical Contract in the building.

The Electrical Contractor shall allow for supplying all necessary power supplies and cabling to the door access system installation as indicated on the drawings. Quantities and locations of all door access devices are as indicated on the drawings.

Electrical attendances:

The Electrical Contractor shall allow for providing the following electrical attendances to the door access installation. Quantities and locations of all electrical attendances are as indicated on the drawings:

- 13amp 230volt fused spur outlet power supply at high level above the door where each door access system is to be installed. This is for the power supply to the door access system controller. Height of the fused spur is highlighted on the drawings. Final location of the spur outlet to be confirmed in conjunction with the door access system specialist on site.
- 1no CAT6 data point terminated in a RJ45 outlet to each door access system. Height of the data point is highlighted on the drawings. The CAT6 data point to each door access system shall be supplied from the comms cabinet in the staffroom as indicated on the drawings. The data point for the door access system shall be wired in series back to the comms cabinet in conjunction with all the other data points for the door access systems. Final location of data point to be confirmed in conjunction with the door access system specialist on site.
- 1no fire alarm interface (I/O unit) from the fire alarm system to each door access controller at high level above the ceiling. Refer to section 68.01 for further information on the fire alarm interfaces. The door release facility for each system shall also be linked to the fire alarm system so that in the event of fire activation the respective doors shall release.
- All necessary cable containment for all electrical attendances to each door access system.
- For each door access system the Contractor shall allow for installing the necessary back boxes for the door release button, emergency break glass unit, proximity reader or keypad. See drawings for quantities, locations and items required at each door.
- For each door access system the contractor shall allow for installing the necessary conduit to the back boxes for the door



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Door access equipment to be supplied and installed:

The Electrical Contractor shall allow for the following quantities for the internal doors:

Readers:

- 14no. proximity readers as 'Paxton Proximity P50 reader', (or equivalent).
- 14no. mounting brackets and plate for proximity readers.
- 7no 'Paxton Net2 Plus' one door ACU's with 2A PSU's in plastic cabinet, (or equivalent).

Software:

- Paxton Net2 standard software to suit the networked door access system, (or equivalent).

Door release buttons:

- 14no Single gang door release buttons as 'AEB2 Flush vandal resistant Press-To-Exit button' (or equivalent). Button shall have 'PRESS TO EXIT' printed on the screen.
- 14no suitable MK gang back boxes for the door release buttons which shall be flush mounted.

Keypads:

- 14no keypads as 'Switch2 range KP series' (or equivalent).
- 14no. mounting brackets and plate for keypads.

Magnetic locks and power supplies:

- 14no 2amp 12VDC single output switch mode boxed PSU 13.8v charging circuits for the access systems. 7AH BB.
- 14no 12/24vDC magnetic door locks for the doors as 'Deedlock AEM10020 Single Monitored Magnet' (or equivalent).
- 14no 'L' & 'Z' bracket kits for the mini-mag locks.
- Lock shall be suitable for a single door with a holding force of 1200lbs.
- The finish on the lock shall be satin anodised aluminium finish.
- Include for safety bolts which prevent magnet from detaching from bracket.
- Include for 7no power supply units for the magnetic door release.

Fobs:

- 25no. proximity keyfobs for use with above as Paxton Net2 proximity keyfobs (or equivalent).



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Power supplies:

- A 13amp 230volt single phase fused spur outlet to each power supply unit for the door access system (4no in total).

Cable carrier:

A new cable carrier shall be installed for the new electrical attendances to the door access system throughout the building as indicated on the drawings. All new cabling shall be installed in a steel conduit/trunking system. See section 62.03 for further information on cable carrier.

ASD Unit:

In the ASD area of the building, all conduits shall be recessed and hidden in the building fabric. The new electrical distribution system shall be installed in a steel conduit/trunking system throughout which shall be located in the ceiling void. This includes all horizontal runs in false ceilings or exposed on walls/ceilings. If it is possible, the conduits and trunking system shall be installed in the ceiling void.

General areas:

In the General areas of the building, all electrical containment (conduits, tray, trunking, etc.) shall be exposed and surface mounted. The new electrical distribution system shall be installed in a steel conduit/trunking system throughout the general area which shall be located exposed at high level.



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69.0 COMMISSIONING, INSTRUCTION TO CLIENT AND HANDOVER

69.01 Commissioning of systems

Scope

Testing, Commissioning, Certification (TCC) and handover of the works specified.

Standards

- The sections of any standard specified for these works, that dictate testing, commissioning and/or certification formats or procedures
- RECI

Procedures

All systems and equipment must be fully tested and commissioned by the Contractor in accordance with the standards specified, the manufacturer's instructions and the specific requirements of these specifications. Spot testing will not be acceptable for any systems.

The Contractor shall supply, at his own expense, any and all equipment, labour and materials necessary to carry out these works as specified.

Practical Completion shall be withheld until all TCC is complete.

Prepare a schedule of all TCC works required for the project and proposed dates for the execution of same. the Engineer shall be informed of all TCC works a minimum of 3 working days in advance.

Submit written confirmation of all tests executed. Present clearly written or typed commissioning reports and provide original certificates where available.

Testing and Commissioning

Carry out testing and commissioning as follows:

- To all manufacturers specifications.
- For all cable systems (By installer of cable systems).
- Fully test and commission fire alarm panel and all devices individually (By system supplier).



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- For addressable systems, verify addresses by confirming same during device test activation (By system supplier).
- Test battery back-up operation (by system supplier).
- Perform audibility test throughout facility. Provide written confirmation of test results (by system supplier).
- Test all external interfaces with the fire alarm system (e.g. HVAC panel, gas detection, etc.) and confirm results in writing. Overall responsibility for this test is with the Electrical Contractor. The Systems Supplier will also be involved.
- Perform sounder sequencing tests and confirm operation of sounders is in full accordance with the specifications.

Certification

- To IS 3218: 2009, 4 part Model Form.
- RECI Certificate as required.
- Systems/components certification.

Commissioning Records and Reports

All checks, measurements and adjustments must be recorded in writing at the time they are made by the commissioning staff, and copies made available immediately to the Engineer. The form that this report will take shall be agreed with the Engineer prior to commissioning.

When the Contractor is satisfied that the plant and systems have been correctly commissioned, he shall submit a final report to the Engineer, setting out all matters relevant. The final format of this report shall be agreed with the Engineer before completion.

Handover of systems

When the Contractor has satisfied the Engineer that all commissioning has been completed satisfactorily, that the Clients staff have been adequately briefed on all plant and in all maintenance procedures, that all spares have been duly handed over and placed in stores, and that all instruction and maintenance manuals, together with all record drawings, have been delivered to the Client and the Engineer, the Engineer shall issue Completion Certificates to the Contractor. Each section of the plant shall then be handed over to the Clients representative in the presence of the Engineer.



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69.02 O&M Manuals

The Contractor shall provide a Class D Operating & Maintenance manual.

To facilitate submission of record drawings, the Contractor shall keep on site a complete set of all drawings used on the Contract Works, on which he shall mark alterations to the designs shown thereon as such alterations are carried out. THIS PROCEDURE SHALL BE STRICTLY ADHERED TO.

Three prints shall be supplied of each drawing in addition to 3no compact disks containing all drawings in AutoCAD 2008 Format.

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

Three complete sets of Operating and Maintenance Manuals and record drawings shall be supplied to enable the Employer to operate and maintain the systems correctly. The manuals must therefore contain all necessary technical information on each item of equipment and the associated components which have been used to assemble and construct the system(s). Three no. hard copies and three no. soft copies of the final approved O&M documentation will be required.

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

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

Contents of Manual

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

- | | |
|-------------|-------------------------------|
| ➤ Section 1 | Description |
| ➤ Section 2 | Plant and Engineering Systems |



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- Section 3 Lighting Control Systems
- Section 4 Operating and Maintenance Procedures
- Section 5 Commissioning and Testing
- Section 6 As-Built drawings

Section 1 – Description

This section shall comprise:

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

Section 2 - Plant and Engineering Systems

This section shall comprise:

- Detailed technical information as published.
- Manufacturers drawings (where applicable) showing all components of the plant item with each component number in accordance with the parts list
- Parts list for each item of plant
- Manufacturers addresses and telephone numbers
- Complete instructions for ordering replacement parts in a manner that will prevent errors or misunderstanding including order number for each plant
- Installation instructions as provided by manufacturer
- Colour coding identification schedule for each building services system
- Detailed schematics of the installed electrical boards, including manufactures details, board charts, etc.

Section 3 - Lighting Controls System

This section shall comprise:

- Wiring diagrams of lighting and lighting control systems.
- Parts list for each different type of item.
- Manufacturer's addresses and telephone numbers.
- Complete instructions for ordering replacement parts in a manner that will prevent errors or misunderstanding, including order number for each component item.
- Installation instructions as provided by manufacturers.



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Section 4 - Operating and Maintenance Procedures

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

Section 5 - Commissioning and Test Report

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

Presentation:

- Indexing System

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

- Paper Sizes

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

Diagrams shall be prepared on A4 or A3 (297 x 420mm) paper

- Section Dividers

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



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- Files for Manual

A4 lever arch files with rigid plastic coated covers shall be used which shall be EMGEE or equal and approved

Inlaid lettering on the front cover shall indicate the title, i.e. Operating and Maintenance Manual, the Name of the Project and Volume Number. A label shall be fitted in the window on the spine of the file listing its contents.

The Trade Contractor is advised that all Record Drawings and O & M Manuals in the form described herein must be handed over to the Engineer prior to the issue of a Practical Completion Certificate for the Trade Contract Works. Failure to issue these Record Drawings and O & M Manuals will also defer the issue of the Practical Completion Certificate until such time as they are received.

If the Trade Contractor fails to issue such documentation on time, then the Engineer will have the right to engage such other third parties to prepare these Record Drawings and O & M Manuals and any resultant cost incurred by him shall be borne and set against the Contract.

Identification of Services and Plant

All cable trays and trunking shall be labelled clearly with colour coded bands which identifies its content.

Section 6 – As-built Drawings

The Contractor shall include for a complete set of as-built drawings which shall incorporate all works carried out and completed by the Contractor. All services, trunking/tray, routes and circuits within the building shall be identified on these drawings.

To facilitate submission of record drawings, the Contractor shall keep on site a complete set of all drawings used on the Contract Works, on which he shall mark alterations to the designs shown thereon as such alterations are carried out.