

London Road Fire Station
50 London Rd,
Manchester
M1 2PH

RIBA Stage 4 – Particular Specification

For the

Electrical Services Installation

CONSOLUX

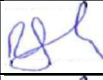
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1 INTRODUCTION

This specification relates to the provision of the complete Electrical Engineering Services Installation, for the refurbished Old London Road Fire Station building at:

London Road Fire Station
50 London Road,
Manchester.
M1 2PH

In brief, London Road Fire Station (LRFS) is a Grade II listed building, first constructed in the early 1900's, comprising of a fire station, police station, coroners court, ambulance station and living accommodation for personnel and their families employed on the site. LRFS which has been closed since the mid-1980s, positioned at the gateway to Manchester opposite Piccadilly Station.

The proposed redevelopment will be mixed use, including, hotel, workspace, commercial floorspace for shop and food and beverage uses and leisure. Building spaces will also provide for artisan markets / farmer's markets, Street food, food and beverage events, gallery space, community activities (such as exhibition spaces and information points), craft studios and workshops, art exhibitions, performances, hospitality and events, filming / theatre space. In summary, consisting primarily of the three main areas:

- Food & Beverage/leisure units.
- Workspaces.
- Hotel.

The Contractor shall review the Architects proposed GA's in order to understand the segregation of each area/space. The full general arrangements are available to the tendering Contractors.

This Electrical Services Particular Specification shall be read in conjunction with the Mechanical Services Standard Specification, Public Health Services Standard Specification, and Electrical Services Standard Specification. This specification shall also be read in conjunction with and meet the requirements of the Architectural and Structural drawings / specifications, Allied London Developers Specification, all drawings, schematics, room data sheets and all other tender documentation.

This specification provides an outline description of the construction works to be carried out by the Contractor to complete the building to a shell and core & Enhanced Category 'A' Fit-out specification.

The Contractor shall refer to the Allied London Developers Specification to fully understand the Category assigned for each area/space and their respective detailed Category definitions.

The Contractor shall be responsible for the design, supply, installation, testing, commissioning and setting to work of the entire electrical services installation, in accordance with the requirements of this specification, CIBSE and BSRIA guides and manuals, and all relevant British Standards and codes of practice.

This Specification shall be used to define the requirements for the building. The Contractor shall however be responsible for demonstrating and achieving compliance with Building Regulations L2A & L2B (new build part of the hotel) and all Planning requirements and conditions. In particular the contractor shall take cognisance that the building is Grade II listed, and all installations shall be undertaken in accordance with the Listed Building Consent requirements.

It shall be noted that all manufacturers and suppliers have been specified within this document, however, alternative manufacturers/suppliers will be considered during the mid-tender review.

The main contractor will provide the site welfare accommodation; any other site accommodation or storage will be provided by the service contractor.

DEFINITIONS

The following terms are used within this specification and shall be interpreted accordingly:

- i. **Architect** – Architect and Contract Administrator for the works;
- ii. **Contractor/Electrical Services Contractor** - person or persons appointed to carry out the Contract works;
- iii. **Employer** - person or persons employing the Contractor to carry out the Contract works;
- iv. **Engineer** - person or persons appointed by the Employer to represent him in connection with the installation of works described in this Specification;
- v. **Mechanical Services Installer** - For the purposes of the Tender, the Services Installer shall be the person or persons invited to prepare a Tender for the works described within this Specification, including all ancillary work and information requirements.

TENDER DOCUMENTATION

This specification shall be read in conjunction with the Standard set of Technical Preliminaries and Standard Mechanical and Electrical Specifications which detail the quality of workmanship and materials and contractual obligations of the Contractor.

In addition, this specification shall be read in conjunction with tender documents issued by Purcell Architects, Structural engineers, Acousticians, Principal Designer, Allied London Developers specification and all other consultants specified by the Client.

NOTE:

In choosing to submit a price for the project the Contractor is confirming that they have undertaken all the relevant due diligence checks on the entire design package to satisfy themselves that the concepts set out in this tender package are achievable.

As part of these checks the Contractor shall query with the Client and his consultant team any errors, omissions or ambiguities he believes exist in the designs and documentation. Given the foregoing, it is therefore a condition of this contract that in the instance of an error, omission or ambiguity not being clarified during the tender process shall be resolved with the solution selected by the consultant at no additional cost to the Client.

The Contractor shall carry out a site survey during the tender period to familiarise themselves with the site and overall LRFS development and assess how the new works may be implemented.

Due to planning constraints and the nature of the existing Grade II* listed building, the Contractor shall be responsible for obtaining approval from the Structural Engineer and Architect for the selection and positioning of all plant and equipment.

Furthermore, the Contractor shall obtain the approval of the Architect for all services and items of plant and equipment that will be visible on completion of the works.

No additional costs will be accepted due to failing to fulfil this requirement. The survey shall be by prior arrangement with the project management team.

GENERAL

This Specification forms part of a set of design documents associated with the Electrical requirements for the the Old London Road Fire Station (LRFS), Manchester.

The Contractor shall include for the detailed design, supply, delivery, co-ordination (including working and installation drawings), installation, setting to work, testing and commissioning of all engineering services required for the project as outlined on the drawings and this Specification.

The Contractor shall note that the drawings associated with this suite of documents are indicative/proposed at this stage and show the design intent agreed with the Client.

SCOPE OF WORKS

The Scope of Works shall be that covered by the full extent of works outlined on the drawings and in this Specification and any variation work which may be ordered during the progress of the Contract. In addition, all drawings subsequently issued showing further details of requirements shall similarly be held to be included in the Scope of Works.

The works described herein relate to the provision of new electrical services required to serve the development.

The Contractor is to be responsible for the detailed design, supply, installation and commissioning of the following items. The list is for guidance only and is not exhaustive:

- Provision of fully Coordinated Installation Drawings.
- Co-ordination / Management of all Incoming Services.
- Coordination of the M&E services with all other services, building fabric and structure.
- Co-ordination and liaison with the Project Team, Main Contractor, Designers and other sub-Contractors.
- Provision and installation of the following Electrical Services
- Survey of existing services to determine suitability for reuse/strip out.
- LV Distribution & Switchgear
- Cable Containment systems
- Metering system
- Distribution & Panelboards
- AHF
- Balancing
- Small Power & Data
- Mechanical services power supplies
- Final Circuit cabling
- Wiring accessories
- Lighting installation including general, emergency, external and controls.
- Fire alarm including Disabled refuge and WC systems.
- ICT (Telecoms, TV and data)
- Security including CCTV and Access control
- Lightning & Surge Protection
- Earthing & Bonding
- Provision of builder's work information
- Provision of Operation and Maintenance Manuals for all Electrical Services.
- Provision of Record Drawings.
- Testing and Commissioning.

The Contractor shall carry out the works in such a manner to minimise disruption to the existing building and shall ensure that all installations are implemented in accordance with the planning and listed building consent requirements.

The Contractor shall also be responsible for the production of co-ordinated working and installation drawings as part of their Contractors Proposals. The Contractor shall submit all working and installation drawings and all relevant calculations to the Consulting Engineer for comment / approval prior to undertaking any installation works.

All installation drawings shall be co-ordinated with the architect's drawings, existing structure, structural designs and ALL sub-contractors' construction drawings.

ADDITIONAL INFORMATION

The Contractor shall be responsible for procuring any additional architectural or structural drawings required to undertake the installation and co-ordination of services.

SUPERVISION ON SITE

The Contractor shall be responsible for ensuring that a competent Electrical Foreman is retained on site at all times. It shall be the Foreman's responsibility to liaise with the Professional team to ensure a high level of workmanship, co-ordination with other trades and compliance with the listed building consent and project programme.

Structural Limitations and Aesthetic Approvals

Due to planning constraints and the nature of the existing Grade II listed building, the Contractor shall be responsible for obtaining approval from the Structural Engineer and Architect for the selection and positioning of all plant and equipment.

Furthermore, the Contractor shall obtain the approval of the Architect for all services and items of plant and equipment that will be visible on completion of the works.

PRODUCTION OF INFORMATION

The electrical sub-contractor shall carry out the above works and include for production of the following information:

1. Full survey prior to commencement of works to determine where services can be routed, placed, reused and where these will require replacement.
2. Detailing including provision of information to other sub-contractors and liaison with the clients, project team and other contractors.
3. Co-ordinate with other services, plant and building elements.
4. Supply.
5. Delivery.
6. Erection.
7. Testing (both on and off site) and the provision of test and inspection plans.
8. Pre-commissioning Work and Checks.
9. Commissioning.
10. Other specified items.

1.1 SUB-CONTRACT PERFORMANCE SPECIFICATION WITHOUT QUANTITIES:

A SCHEDULE OF RATES:

It must include all items and materials included in the tender, together with their rates, extended and totalled. Preliminaries are to be separately priced. Such totals shall agree with the Sub-Contract Sum and sub-totals shall agree with the priced breakdown of the tender. Correction of errors in the quantification will not lead to adjustment of the Sub-Contract Sum. Rates shall include Contractor's cash discount.

A LIST OF PROPOSED MANUFACTURERS/SUPPLIERS

Products, equipment and plant, including all items for which the choice of manufacture/supplier is at the discretion of the Electrical sub-contractor, must be submitted with the tender.

STANDARDS

The design, installation, testing, commissioning and setting to work of the electrical services shall be in accordance with accepted good practice and the following reference standards (current editions) and all other information relevant to the Works. Whilst the standards are listed in categories, it shall be assumed that all categories shall be cross-referenced.

HEALTH AND SAFETY

THE CONSTRUCTION (DESIGN AND MANAGEMENT) REGULATIONS.

- Health and Safety Legislation.
- Health and Safety at Work Act.
- Environmental Protection Act.
- COSHH Regulations.
- HSE Guidance Information and Codes of Practice.
- Site waste management regulations 2008.

GENERAL REGULATIONS

- Disability Discrimination Act (DDA)
- Local Authority Planning.
- Local By-Laws.
- Offices, Shops and Railway Premises Act and Workplace Regulations.
- Building Regulations L2A & L2B (new build part of the hotel)
/Acts (including any necessary submissions by the Contractor).
- Building Control Requirements.
- All relevant British and European Standards and Codes of Practice relative to the UK.
- WEEE Directive.

BUILDING SERVICES DESIGN

- Equipment and materials manufacturers and supplier's recommendations for handling, supply, installation, handing over, operation and use.
- CIBSE Guides, Codes, Technical Memoranda and Practice Notes.
- The IET Wiring regulations Eighteenth Edition (BS 7671), including all current Technical Guides and Amendments up to commencement of works.
- BSRIA Application Guides and Technical Notes.
- Electricity at Work Regulations (EAWR) 1989
- Code of Practice for Energy Efficiency of Lift and Escalator Installations, 2007.
- Requirements of appointed Crime Prevention Designers or Police Architectural Liaison Officer

FIRE SAFETY

- Local Fire Authority requirements and fire safety requirements.
- The Regulatory Reform (Fire Safety) Order 2005.
- Fire Officer and fire safety requirements.
- Loss Protection Council Rules.

CLIENT SPECIFIC SPECIFICATIONS

- Allied London Developers Specification

Where any discrepancy exists between two or more of the above, the higher standard shall be adopted. Where any discrepancy exists between drawings, specification or employer's requirement documents the contractor shall inform the client/design team and the more onerous standard shall be applied.

CO-ORDINATION OF ENGINEERING INSTALLATIONS

The Mechanical and Electrical Sub-Contractors shall be entirely responsible for the co-ordination of all building services installations, including the works of sub-contractors.

Ensure the compatibility of the various building services installations with one another, the existing services and with the building structure, fabric, finishes, furniture and fixtures so that all services may be installed without conflict in the positioning of ducts, pipes, cables, plant and equipment and the like.

Note, the final locations & setting out of electrical accessories shall be agreed prior to installation between the Architect/Interior Designer and the Sub-Contractors.

APPROVALS BY BUILDING CONTROL, LOCAL AND STATUTORY AUTHORITIES

The electrical sub-contractor shall obtain all necessary approvals for his designs and layouts from Building Control, Local Authority, Environmental Health and other Statutory Authorities as may be required to complete the various installations.

EQUIPMENT REQUIRED TO OPERATE PRIOR TO PRACTICAL COMPLETION

The electrical sub-contractor shall be responsible for paying all charges arising from the running of equipment included in this sub-contract, which is used for testing and commissioning purposes, prior to practical completion. In addition, the warranty on the equipment must operate for 12 months following practical completion. (To be agreed between the Main Contractor and the Sub Contractor as a domestic issue)

OPERATIONAL CONSIDERATIONS

The electrical sub-contractor shall design and install the various services installations and components with careful consideration to their performance and suitability for operating in their designed ambient conditions, and also to ensure system reliability and adequate safe maintenance access are provided.

TENDER DOCUMENTATION

This Particular Specification shall be read in conjunction with the following: -

- I. Main Contractor's Preliminaries and Enquiry Documentation.
- ii. Consolux M&E Consulting Ltd Standard Electrical Specification.
- iii. Full Set of Architects Drawings & Specifications
- iv. Full Set of Structural Engineers Drawings and Specifications.
- v. Consolux M&E Consulting Ltd Tender drawings
- vi. Allied London Developers Specification

DOCUMENTS TO BE PROVIDED BY SUB-CONTRACTOR DETAILING

Detail the work and provide complete production information necessary for construction (including, as appropriate, fabrication/installation drawings, etc.) based on this Particular Specification and other information provided, liaison with the Contract Administrator, Contractor and others as necessary to ensure co-ordination of the work with related building elements and services.

INFORMATION

Request additional information as necessary from the Contract Administrator and/or Contractor in good time to allow a minimum period of 10 working days from receipt, for a response and provide information as necessary in time to meet the program.

SUBMISSION

Submit production information, checked and signed, comprising of 6 copies for the Contract Administrator and Consultants, and 2 sets to the Contractor, or the Contract Administrator if the Contractor has not been appointed. (The Contract Administrator will hold the information until a Contractor has been appointed). The Contractor will check the production information and submit his comments to the Contract Administrator. Failure by the Employer's Agent to identify errors will not relieve the Contractor from his sole responsibility for correctness of the information provided.

INSPECTION BY CONTRACT ADMINISTRATOR:

The Contract Administrator will inspect the production information, record his comments and return to the Contractor (or Sub-Contractor if Contractor has been appointed) within 15 working days of receipt.

AMENDMENTS:

Make any necessary amendments without delay. Unless and until it is confirmed that re-submission is not required, re-submit for further checking and comment, and incorporate and necessary amendments all as before.

VARIATIONS:

If submitted production information differs from the requirements of the Sub-Contract documents, each such difference must be the subject of a request for a variation, supported by all relevant back up information.

AMENDMENTS REQUIRED BY CONTRACT ADMINISTRATOR:

Should the Contract Administrator require any amendment to the production information, and this is considered to involve a variation (which has not already been acknowledged as a variation by the Contract Administrator).

The Contractor shall notify the Contract Administrator without delay and, in any case, within 7 days. The Contractor shall not proceed with ordering, fabrication or fixing until subsequently instructed. Claims for the extra cost of such work, if made after it has been carried out, will only be allowed at the discretion of the Contract Administrator.

DISTRIBUTION OF FINAL VERSION:

Submit sufficient copies of final production information, including 6 copies for the Contract Administrator and consultants, to the Contractor (or Contract Administrator if Contractor has not been appointed) for distribution to all affected parties.

THE DRAWINGS AND OTHER INFORMATION TO BE PROVIDED MUST INCLUDE:

- Builders-work Drawings
- Installation Drawings
- Test and inspection plans
- Co-ordination Drawing
- Control Drawings
- Switch-gear, Starter and Control/Installation, Drawings
- Equipment Drawings
- Record 'As Installed' Drawings incorporating relevant existing services to provide a single and full set of record information.
- Testing and Commissioning Certificates
- Operating and Maintenance Instructions
- Building Log Book
- Procurement Schedules

BUILDERS-WORK INFORMATION:

It is the electrical sub-contractor's responsibility to:

Confirm and amplify any information provided by the Contract Administrator.

Provide full details of all builders-work information to the Main Contractor and Contract Administrator.

Co-ordinate the builders-work with the Main Contractor and ensure for its timely implementation.

TECHNICAL LITERATURE: The electrical sub-contractor is required to keep copies of manufacturer's current literature (relating to all products to be used in the Works), readily accessible for reference by all supervisory personnel.

MAINTENANCE INSTRUCTIONS AND GUARANTEES: The electrical sub-contractor shall provide copies of the above in manuals. The electrical sub-contractor shall register with manufacturers as necessary and hand over to Contract Administrator on or before Practical Completion. The mechanical sub-contractor shall notify the Contract Administrator of telephone numbers for emergency call-outs by Sub-Contractors after Practical Completion.

1.2 MANAGEMENT OF THE WORKS

MAIN CONTRACT PRELIMINARIES: Apply to the management of the whole of the Works, including this Sub-Contract. The electrical sub-contractor shall comply with the requirements specified therein insofar as they apply to the Sub-Contract Works and co-operate with and assist the Main Contractor in complying with them.

SUPERVISION: The electrical sub-contractor shall provide a Supervisor having thorough experience of the class of work covered by the Performance Specification from a date to be agreed with the Contractor Administrator until practical completion.

OPERATION/MAINTENANCE OF THE FINISHED BUILDING

SPARE PARTS: At least 4 weeks prior to Practical Completion, the electrical sub-contractor shall submit to the Contract Administrator a schedule of spare parts recommended by the electrical sub-contractors to be obtained and kept in stock by the Employer for maintenance of the services installations included in the Sub-Contract. The electrical sub-contractor shall state against each item the manufacturer's current price, including packaging and delivery to site.

OPERATING AND MAINTENANCE MANUALS

Operating and maintenance manuals must include the following:

A full technical description of each of the systems installed, written to ensure that the Employer's staff fully understand the scope and facilities provided.

1. A technical description of the mode of operation of all systems.
2. Diagrammatic drawings of each system indicating principal items of plant, equipment, etc.
3. A photo-reduction of all record drawings to A3 size, together with an index.
4. Legend for all colour-coded services.

Schedules (system by system) of plant, equipment, valves, etc. stating their locations within the building, duties and performance figures. Each item of plant, equipment, valves etc. installed, shall have a unique code number cross-referenced to the record and diagrammatic drawings and schedules. The name, address and telephone number of the manufacturer of every item of plant and equipment together with catalogue list numbers.

Manufacturer's technical literature for all items of plant and equipment, assemblies specifically for the project, excluding irrelevant matter and including detailed drawings, electrical circuit details and operating and maintenance instructions. A copy of all Testing and Commissioning Certificates (including, but not limited to, electrical circuit tests, corrosion tests, type tests, start and commissioning test) for the installations and plant, equipment, valves, etc., used in the installations.

A copy of all manufacturer's guarantees or warranties.

Instructions for starting up, operating and shutting down of all equipment and systems installed.

Schedule of all commissioning set points.

Procedures which, should be adopted by the Employer to ensure the most efficient operation of the systems.

A list of normal consumable items.

A list of recommended spares to be kept in stock by the Employer, being those items subject to wear or deterioration and which may involve the Employer in extended deliveries when replacement is required at some future date.

Procedures for fault finding.

Emergency procedures, including telephone numbers for emergency services.

Information to be provided must also include: Information to be included in the buildings user guide for residents and non-technical staff & details of any existing systems related to or interfaced with the new installation.

PRESENTATION OF MANUALS:

The Electrical Services Sub-Contractor shall allow for providing and issuing of all operation & maintenance information (drawings and equipment literature) on a presentation CD, which will be book formatted to allow quick access of the information. The manuals shall be A4 size, in plastic covered, loose leaf, ring binders with hard covers. Each shall be indexed, divided and appropriately cover titled. Drawings larger than A4 are to be accommodated in the envelopes within the binders or so folded that they may be unfolded without being detached from the binder rings.

The electrical sub-contractor shall prepare two temporary manuals with provisional record drawings and preliminary performance data available at commencement of commissioning to enable Employer's staff to familiarise themselves with the installation. These shall be of the same format as the final Manuals with temporary insertions for items which cannot be finalised until the installations are commissioned and performance tested.

The electrical sub-contractor shall provide the Contract Administrator with 3 copies of the final Manual not less than 2 weeks before Practical Completion.

RECORD DRAWINGS:

During the progress of the works, the electrical sub-contractor shall record on drawings in an approved manner, the information necessary for preparing installation record drawings. The electrical sub-contractor shall make the marked-up drawings available to the Contract Administrator for inspection and checking upon his request.

Record drawings shall show all information necessary to safely operate, inspect, test and maintain all systems, plant and equipment and shall incorporate the following information: -

1. The location and details of all items of plant, equipment, apparatus and engineering terminals including vents, grilles, diffusers, luminaires, lamps, fan coil, radiators etc.
2. The routes, type, size and locations of all pipe-work, ducts, valves, grilles, cables, conduits, trunking, and cable tray.
3. All electrical and mechanical circuit references corresponding to the actual installation.
4. Diagrams of connections for all systems and equipment including cylinders, ventilation systems, interfacing, signalling etc.
5. Locations of access panels provided in connection with engineering services.

The electrical sub-contractor shall provide three complete set of prints. The drawings shall contain all the information necessary to comply with BS: 8210:1986 Guide to Building Maintenance Management.

The electrical sub-contractor shall ensure that the drawings, when read in conjunction with the Operating and Maintenance Manuals, are sufficient to enable full understanding of the installed arrangement and to maintain, dismantle, re-assemble and adjust all part of the works.

The electrical sub-contractor shall ensure drawings are produced compatible with AutoCAD and also in PDF (portable document format).

All information shall be provided on a CD disk in addition to the hard copies specified above. The contractor shall provide one Read only CD disk and one Read/Write Disk for each Operating and Maintenance Manual.

The electrical Services Sub-Contractor shall allow for providing and issuing of all operation & maintenance information on a presentation CD, which will be book formatted to allow quick access of the information.

PROGRAMME

The electrical services Sub-contractor's attention is drawn to the requirements of the Main Contract Program. The electrical Services Sub-Contractor shall liaise with the Main contractor to produce a detailed integrated programme of works compliant with the requirements of the Main Contract Programme.

The electrical Contractor shall also refer to any phasing requirements outlined within the main contractor's programme. (One handover on completion of our complete works proposed).

The electrical Contractor shall ensure that all commissioning meets the needs of contract restraints.

SITE SUPERVISION AND CO-ORDINATION OF WORKS

The Electrical Sub-Contractor shall appoint an Engineer as Contracts Manager in supervisory charge of all work carried out under the Electrical Engineering Sub-Contract.

The Contracts Manager shall be experienced in work of a similar nature.

He shall be available at all times from the commencement of the Contract until the date of the final practical completion and hand-over to the Employer.

The Electrical Sub-Contractor shall vest in the Contract Manager the necessary authority to discuss with, accept from, and execute for the Main.

Contractor all modifications and such supplementary instruction as are found necessary during the duration of the Contract.

The Contract Manager shall be supported on-site by such staff as are appropriate and necessary for the proper execution of the works.

SITE MEETINGS

Site Meetings will be arranged by the Main Contractor and/or the Contract Administrator and the Electrical Sub-Contractor's Contract Manager shall arrange to be present at these meetings, whenever called upon, to discuss the Contract with all interested parties.

BUILDING PROGRAMME

The Electrical Sub-Contractor shall provide labour and materials in accordance with the Main Contract Programme.

The details of this programme shall be agreed with the Main Contractor, and the Electrical Sub-Contractor is required to maintain a rate of progress satisfactory, at all times, to the Main Contractor, in accordance with this programme, and carry out any particular section of the work when called upon to do so.

STANDARDS AND REGULATIONS

All work shall comply with the following;

The Electricity at Work Regulations (EAWR)

The Electricity Safety Quality and Continuity Regulations (ESQCR)

The Construction Design and Management Regulations (CDM)

The 18th Edition of the IET Wiring Regulations

The Building Regulations L2A & L2B (new build part of the hotel) including Approved Documents A, B, C, E, F, L1 and M.

All relevant British Standards.

DESIGN CONDITIONS

This particular specification forms part of a set of documents listed below which when taken together detail the extent of the complete Electrical Services Installation, the required quality of workmanship and materials, and the contractual obligations of the Contractor: -

- Electrical Standard Specification

In addition, this specification shall be read in conjunction with all other Contract Documentation, some of which has been produced by other members of the Client's Design Team: -

- Mechanical Standard Specification
- The Architect's Specification and Drawings
- The Quantity Surveyor's Contract Documentation
- The Main Contract Preliminaries
- The Structural Engineer's Specification and Drawings
- The CDM Plan
- Lift Specifications and Reports

In brief, the Contractor shall be responsible for: -

- The design, supply and installation of the complete Electrical Services Installation.
- Coordination and Liaison with the Mechanical Services Contractor
- Coordination and Liaison with the Main Contractor
- Coordination and Liaison with Any Specialist Sub-Contractor
- Liaison with the Architect and Structural Engineer
- Liaison with the Heritage Architect
- Coordination and Liaison with the Client and/or his representatives regarding the final positioning of all Specialist Equipment and any associated electrical attendances

The installation shall be carried out in strict compliance with the latest editions of the following documents, applicable to all relevant elements of the works.

Requirements for Electrical Installations, IET Wiring Regulations, Eighteenth Edition, BS 7671:2018 & any latest amendments:

- Guidance published by IEE and IET.
- CIBSE The SLL Code for Lighting
- BS EN 12464-1:2011 Lighting of indoor workspaces
- BS 5266-1:2016 Emergency Lighting
- BS EN 50172 (BS 5266-8)
- CIBSE LG7 Lighting Guide Offices
- BS 5839-1: 2017 - Fire Detection & Alarm Systems
- BS8300
- BS EN 50173-1,2,5:2018 Information technology. Generic cabling systems.
- BS EN 50174-1,2,3:2018 - Information Technology - Cabling Installation. Specification and quality assurance.
- BS EN 12464
- Electricity at Work Regulations 1989
- Control of Substances Hazardous to Health (COSHH) Regulations
- Health and Safety at Work Act
- District Surveyor & Building Control Officer
- Building Regulations L2A & L2B (new build part of the hotel)
- British Standards
- Construction (Design & Management) Regulations.
- The requirements of the local Regional Electricity Company.
- Recommendations advised by all relevant local authorities.
- Manufacturer's recommendations relating to performance of motors, switchgear, luminaires, wiring and any other items of equipment.
- Good working practice for standards of workmanship & quality of materials.
- All product and materials shall have product conformity certification (e.g., BSI Kitemark, BSI Safety Mark or CARES scheme) or product approval (e.g., British Board or Agreement Certificate)
- All products must have the recognised 'CE' mark attached.

Note that in the case of any conflicting standards or requirements, the contractor shall allow for the most onerous conditions but notify, in writing, to the CA of any such discrepancy.

ADDITIONAL DOCUMENTATION

The Contractor shall be responsible for the provision of all documentation necessary to enable the Engineer/Client to carry out a comprehensive appraisal of their design and installation intent.

This documentation shall include, but shall not be limited to, the following:

- Fully detailed & coordinated drawings.
- Working Drawings
- Technical Submissions for All Plant and Equipment
- Comprehensive Schedule of All Plant and Equipment
- Confirmation of all Specialist Suppliers and Sub-Contractors
- Cable Sizing Calculations
- Lighting Level Calculations

Coordinated M&E Reflected Ceiling Plan Layouts

- Full Protective Device Selectivity/ Discrimination Check
- Builder's Work drawings
- Fire Alarm 'Cause & Effect' Schedule

All drawings shall be submitted in AutoCAD electronic format and all calculations. shall be carried out using appropriate and recognised computer software. packages, e.g., Amtech, Dialux, etc.

The Contractor shall issue a file containing all documentation to the Engineer. allowing sufficient time for review and comment, and in accordance with the overall programme.

2 INCOMING SUPPLIES

The Contractor shall undertake the design, supply, installation, testing, commissioning and setting to work of all aspects associated with the required incoming HV, LV and comms supplies, and provide adequately sized new LV & Comms supplies to serve the building.

The new incoming supplies shall be provided at agreed locations with the Client.

2.1 INCOMING ELECTRICAL SUPPLY

The Electrical maximum demand for the whole building has been assessed to be a total of 1350 KVA. This is summarised as below:

- Supply 1 (Workspace, F&Bs, Landlord loads & Leisure units) = 1100 kVA
- Supply 2 (Hotel) = 250 kVA

Grand Total = 1100KVA + 250 KVA = **1350 kVA**

The contractor shall coordinate with the local authorities (DNO/iDNO) to arrange for the provision of a 1500kVA substation. This new metered distribution substation will be located to the west, Minshall Street, section of the building within a specially constructed substation room, on the Ground Floor.

It is envisaged the new incoming High voltage (HV) supply, Ring Main Units, and transformer shall be owned and installed by the iDNO/DNO.

The contractor shall be responsible for all negotiations and full liaison with the DNO/iDNO on all aspects and demarcation of scope of works that are required by the Contractor & DNO/iDNO respectively up to and including any builderswork, containment & below ground ducting required.

These agreed works by the Contractor for the DNO/iDNO shall be included within the Tender package.

The LV Side of the Transformer shall have a Fuse/ACB mounted cabinet, from which the two outgoing supplies (Supply 1 and 2) shall emanate:

- Supply 1 - connect to the Main Distribution Board, which is located in the adjacent LV switchroom.
- Supply 2 - connect to the Hotel Fuse cut-out, which is located in the Hotel basement LV Switchroom.

Further details of the above are described in the LV Schematics (647-E-(64)-SCH-01 & 02) and (61) Series LV Containment layouts.

The Electrical Services Contractor shall be responsible for liaison and co-ordination of the incoming electrical services cabling and include for any required duct installation from outside & inside the site boundary to the location of the substation & LV Switchrooms.

The Contractor shall ensure the entire electrical installation is installed in accordance with the recommendations of the 18th Edition of the IET Wiring regulations (BS7671:2018 including all current amendments).

The new incoming supplies shall be installed in accordance with the National Joint Utilities Group (NJUG) recommendations.

2.2 INCOMING COMMS

The Electrical Services Contractor shall enter into negotiations with the Client selected Internet Service Provider (ISP) Telcom to determine the new design of the external & internal comms infrastructure required to facilitate the Clients requirements.

The Contractor shall work in conjunction with the selected ISP to bring in the new comms supplies to the building, and to provide the necessary IT Infrastructure.

Two entry points have been proposed to bring in the Comms supplies via universal chambers:

- Fairfield Street – Main Comms room 1
 - Incoming BT Openreach Fibre
 - Incoming Virgin Fibre
 - Incoming Telcom Fibre
- London Road – Main Comms room 2
 - Incoming Telcom Fibre

Further details are as shown on the IT Schematic DRG No. 647-E-(64)-SCH-01

The Electrical Services Contractor shall agree with the nominated ISP, the demarcation of the scope of works the contractor is required to carry out and include these within the Tender.

These envisaged works are, but not limited to the following:

- Main & Sub cabinets
- Power & Data outlets
- Containment
- Fibre and Data cables
- Passive/Active equipment
- Assisting the ISP in finalising the location of the incoming chambers.

The Contractor shall ensure the above Fibre & Copper connections are bought into the building from each chamber to their respective comms rooms.

The Contractor shall develop the IT Infrastructure further in conjunction with the selected ISP (Telcom) and include within the Tender for all their necessary works to be carried out, and shall be responsible for the final design, supply, installation, testing, commissioning and setting to work of the comms supplies.

The new incoming supplies shall be installed in accordance with the National Joint Utilities Group (NJUG) recommendations.

3 LV DISTRIBUTION & SWITCHGEAR

The Contractor shall provide a new suitable incoming utility LV electrical supply to serve the building whilst ensuring there is sufficient spare capacity to facilitate future load growth in accordance with the Allied London Developers Specification.

The contractor shall comply with requirements of the British Standards and the following regulations which include but are not limited to: -

- BS7671:2018 and any latest amendments.
- Factories Act including electricity (Factories Act) Special Regulations, 1981
- Requirements of the Health & Safety Executive under the requirements of
- Health & Safety at Work Act.
- Requirements of the DNO & iDNO
- Electricity Supply Regulations 1988

New LV cabling shall emanate from the substation to serve two LV Switchrooms:

- Main LV Switchroom
 - This switchroom is proposed adjacent to the substation.
 - LV cables are proposed to enter/exit at high level.
- Hotel LV Switchroom
 - This Switchroom is proposed in the basement of the Hotel demise, at the corner of London Road/Whitworth street
 - LV Cables are proposed to be ducted across the courtyard, and then drop to the basement via the riser in the Hotel demise.
 - LV Cables across the external courtyard are to be installed in accordance with the requirements of the DNO/iDNO.
 - LV cables to be connected to a Fuse-cut out in the Hotel LV Switchroom as per the requirements of the DNO/iDNO.

Further details of the above & below are described on the LV Containment (61) series drawings and the LV Schematics (647-E-(61)-SCH-01 & 02).

The Main LV Switchroom shall house the Main Distribution board, DNO/iDNO ACB and Accusine unit as indicated on the (61) series drawings. From this a number of LV panelboards will be fed, which in turn will feed the Workspace units, F&Bs, Leisure units & Landlord areas of the building.

Panelboards are strategically located within the dedicated risers. Distribution boards are generally located within their respective units & areas.

The Hotel Main LV Switchroom shall house the Hotel - Main Distribution board, DNO/iDNO Fuse cut out and PFC unit as indicated on the (61) series drawings. From this a number of LV Distribution boards will be fed, which in turn will feed the Guestroom consumer units and hotel areas.

The contractor shall allow, for the installation of equipment ways within the roof level distribution board serving workspace condensers (MCP-02) and associated containment, cabling and isolators shall be via fit-out contractors.

The Contractor shall be responsible for the design, supply, installation and commissioning of the LV infrastructure throughout the building.

An allowance has been indicated on the electrical drawings for LV panel boards and distribution boards around the building. It shall be the responsibility of the contractor to design and verify the required quantities and ratings of these as part of their detailed design.

Supplies shall be routed through landlord and common areas and shall not pass through demises. Sub-mains supplies shall generally be routed on dedicated containment fixed to the underside of the external balconies/walkways. The Contractor shall be responsible for the selection and provision of all required devices and shall ensure that full discrimination/selectivity/Co-ordination is achieved, and that all switchgear is of the same manufacturer.

All outgoing ways within the switchboards shall be clearly labelled to denote their function.

Switchboards & Distribution board form types, fault duties and IP rating shall be as indicated on the LV Schematics and in accordance with BS61439-2 and shall be left with a minimum of 25% spare capacity in both current and spare ways.

The Contractor shall design & install an all-new Switchgear as indicated on the drawings and LV Schematics, including, but shall not be limited to, the following: -

- Main Distribution boards
- LV Panelboards
- Distribution boards – Three phase and Single
- Accusine unit (Harmonic Filter and Power factor correction unit)
- Meters
- Mechanical Control Centre panels

The ventilation design of the switchboards shall not result in an internal temperature which would mean derating of the outgoing breakers is necessary.

On the front of all LV switchboards, there shall be a permanent single line representation of the busbar and circuit breaker arrangement. This single line representation shall run the full length of the switchboard and run on the front housing showing the location of the busbars and circuit breakers, along with relevant written labels to describe the relevant sections.

Unless specified, the switchboards shall comply with the specialist manufacturer's standard range, be fully type tested and ASTA certified, or equal/approved. Evidence of compliance with the Type Testing shall be submitted. Certified documentation shall also be provided indicating the maximum temperature rise within the switchboard, when operating at full load without diversity. Careful consideration shall be given to the location of control/metering devices etc, to ensure that their operational life is not affected by the heat generated by the switchboard and ease of access is afforded.

Surge suppression to be complete with full mode active tracking Transient Voltage Surge suppression (TVSS) and to be of the form Type 1,2 & 3, and conform to BSEN50174, BS 62305-2/3 AND BS 61643-11.

Front covers to circuit protective device serving life safety equipment such as the fire alarm panel, on the switchboard shall be painted "RED" in colour and labelled as required by the relevant British Standard.

The Contractor shall provide rubber mats to BS 921 for all LV switchboards 900mm wide and not less than the length of each switchboard plus 500mm on each side.

The Electrical Contractor shall design the containment within the switchrooms to suit the proposed cable types and cable bending radii. The cables shall be neatly dressed and fixed to the containment system at regular intervals.

The LV Switchboards shall be mounted on a 100mm builders work concrete plinth, so that the risk of damage to the equipment, from possible flooding of the switchroom, can be reduced.

The LV Switchrooms and substation shall be provided with a bunded threshold to prevent the ingress of water into the rooms.

The contractor shall undertake a cable sizing exercise utilising an industry approved software package (Amtech/Trimble) to ascertain the final sub main cable size and discrimination study. The contractor shall undertake site surveys to ascertain the following design parameters:

- EFLI (Contractor to undertake site measurement)
- PSC (Contractor to undertake site measurement)
- Length of Run (Contractor to undertake site measurement)
- Voltages Drop (In line with BS7671)
- Design Current (Ib) (Based on isolator rating)

The Electrical Services Contractor shall submit cable sizing calculations to the project engineer for approval prior to installation.

All sub main cables shall be supported on a cable tray/ladder system throughout their length. The contractor shall be responsible for sizing and routing of the cable containment systems.

A separate single core CPC shall be ran parallel with all multi core cables runs.

3.1 CABLE CONTAINMENT SYSTEM

Provide suitably sized cable containment systems to facilitate the electrical design for the routing of low voltage and extra low voltage cables.

The contractor shall be responsible for the design, supply, installation, testing, commissioning and setting to work of cable routes and containment to facilitate the installation of the following, but not limited to the following services: -

- LV Submain Cables
- General Power and lighting circuits in emergency lighting
- Fibre, Data, TV and communication cables
- BMS and Controls cables
- Fire Alarm System
- Security, ELV Cables

It shall be the responsibility of the contractor to liaise and co-ordinate with the mechanical sub-contractor, prior to commencing the installation of cable containment in all areas.

The co-ordination shall take the form of fully detailed installation drawings prepared by the contractor at an early stage in the contract programme which shall be approved by the engineer.

Full allowance shall be made for structural beams, heating pipe work and ventilation ductwork in respect of bends, offsets and additional suspensions required.

The contractor shall be responsible for detailing all builders work openings and penetrations associated with the cable containment system internally and externally.

The contractor shall ensure cable support systems are in accordance with BS 7671:2018 and manufactures guidelines and are capable of carrying without undue deflection, the total weight of cables that can be accommodated on the cable containment system.

The containment systems shall be installed complete with all the necessary manufacturers' accessories to provide a complete installation. Where these accessories do not exist, the contractor shall manufacture a site made alternative being free of all protrusions and sharp edges. Where the containment is cut, all cuts are to be coated in a protective paint. All containment shall be suitably earthed in accordance with current regulations.

The sizing and installation of the cable containment shall be in line with the manufacturer's requirements and Guidance Note 1 Selection and Erection published by the IET.

The Primary and Main secondary cable containments system shall be all be sized with a 25% future capacity allowances.

The size and quantity of cables installed in any trunking shall be such that having taken into account the necessary cable grouping/rating factors an overall space factor of 45% is not exceed.

Minimum cable containment sizes:

- Light Duty Tray 50mm Wide
- Medium Duty return Flange 100mm Wide.
- Heavy Duty return flange 150mm Wide.
- The minimum trunking size shall be 50mm x 50mm (Class 3 Pre galvanised)
- The Minimum Conduits diameter shall be 25mm.
- All Conduits shall be hot dipped galvanised Class 4. PVC will not be accepted.

All Dado trunking shall be provided with an EMC screening insert and associated accessories to comply with BS EN 50174, BS EN 50085-1: 2005 and BS 4662: 2006.

The trunking shall be minimum 3 compartment and be sized to accommodate all cabling allowing for space factors and a future spare capacity allowance of 20%.

All dado trunkings shall be complete with all manufacturer's bends, dividers, couplers and end caps and drops.

All trunkings shall be mounted horizontally with vertical risers to the main containment installation at high level or in the ceiling voids final connection between the Vertical dado trunking and ceiling mounted routes shall be via a flexible conduit solution.

Where appropriate light switches shall be located the vertical section of the dado trunkings. All dado trunkings and back boxes shall be suitable for the installation of Cat 6 cables. The electrical accessories shall match the power within the respective area.

The accessories shall utilise modular front plates for use with module data socket outlets.

The distance between data baskets and power trays shall be spaced in accordance with BS EN 50174 to maintain a minimum of 200mm on parallel runs, and 30mm minimum between trunkings.

Each length of containment shall be bonded to the next by means of the manufacturer's earth link and cross bonded in line with BS7671:2018.

3.2 FIRE COMPARTMENTS

The contractor shall comply with the requirements of BS 7671:2018 & BS 5839-1 & 9 and buildings fire strategy report wherever the cable containments and services pass through the perimeter of a fire compartment (wall, floor or ceiling).

Where cables, conduit, trunking and cable trays pass through the fire resistant structural elements such as floors and walls designated as fire barriers, the opening made shall be sealed to the appropriate degree of fire resistance.

Where cables or conductors are installed in channel, ducts, trunking, basket etc. which pass through fire resisting elements, internal fire resistant barriers shall be provided by the contractor to prevent the spread of fire.

Where trunking, ducting and other enclosed electrical services (other than conduit) pass through walls, floors and ceilings proprietary integral fire barriers shall be installed. Fire barriers shall have a rating not less than that of the surrounding materials fire rating.

Where a lidded section of trunking, ducting etc passes through a wall or floor, a fixed section of lid shall be installed extending 100mm either side of the solid construction.

Either side of a solid construction, a traffolite label shall be fixed to the trunking lid "Fire Barrier" (white on red)
Where trunking is exposed on the surface, it shall be powder coated to suit the architect's / interiors designer's requirements.

Surface mounted or exposed containment shall be installed in a neat manner and shall be installed parallel to building lines and shall be co-ordinated with all other services.

Containment to Roof Mechanical Plant shall route from the building structure by means of a cable and MEP Services Gantries.

Provide proprietary sets and bends to accommodate building construction and site constraints. Site manufactured sets and bends are not permitted.

The Contractor shall ensure that the acoustic treatment, fire stopping and weatherproofing of all penetrations as required is carried out.

Provide suitable cable supports for the vertical cable risers in accordance with BS 7671:2018.

Allow for all necessary supports associated with each of the systems to take account of the building structure and other services. There will be a requirement to suspend all containment systems whether demountable ceilings exist or not.

It is the Electrical Sub-Contractor's responsibility to provide adequate support for all containment all duly co-ordinated. The Electrical Sub-Contractor shall ensure that the supports include suitably sized wall brackets and drop rods for the channel. The Electrical Sub-Contractor shall determine the number and size of the drop rods.

Where drop rods are used, they shall be suitably sized, spaced, etc., to allow for the weight of the installation. All drop rods shall be installed true and vertical. Buckling of any containment system support shall be rectified by the Electrical Sub-Contractor at no expense to the Employer.

All costs associated with the containment support systems shall be included within the Tender Summary.

All steel containment systems shall be continuous along their length and joined with proprietary couplers ensuring a sound mechanical bond. Provide earth continuity links throughout including the basket tray installations. In the event of containment systems not being continuous, a separate earth-bonding conductor shall be fitted to span the break in mechanical continuity thus providing equipotential bonding. Ensure that the requirements of the EMC regulations are met in every case.

Where basket systems are installed, provide sweeping radius bends where practicable in lieu of 90° bends. All baskets shall be a minimum of 54mm deep. Widths shall be generally as shown on the drawings. All shall be installed in accordance with the manufacturers' recommendations.

It will be a requirement for the Electrical Sub-Contractor to provide containment for all of their Sub-Contractors. Early liaison with all Sub-Contractors will be a requirement to facilitate accurate containment provision, which shall be shown on the Working Drawings prior to starting on site.

Where multi-compartment containment systems are installed, any intersections, branches or cross-overs shall be so arranged as not to reduce the internal cross-sectional area of any one compartment. Compartmentation shall remain continuous throughout. The use of manufacturers' proprietary accessories to facilitate this, e.g., crossovers for example shall be used.

Where it is unavoidable for circuits of different category designations to cross over, appropriate measures shall be employed to maintain segregation integrity.

All containment systems shall be co-ordinated to avoid clashing with all structures and services and be routed to allow future maintenance.

Conduit installation shall be co-ordinated and rationalised wherever practicable. Submit elevation proposals for the secure and non-secure sides of the doorways.

Conduits shall be sized, supplied and installed in accordance with BS 7671:2018. All conduits shall be heavy gauge, screwed, welded steel conduit with a galvanised finish. Any conduits exposed to moisture/corrosion shall have a finish appropriate to the environment to which it is exposed.

All conduit joints shall be tight and exposed threads painted with galvafruid paint prior to fixing. Conduits shall run parallel and/or perpendicular to the building structure and shall follow the contours of the building constraints as closely as possible. Conduits shall be installed level and true.

No printed text on the conduits shall be left in view.

Where services penetrate fire partitions, the containment systems, e.g., cable basket, shall be fire stopped within the containment system itself. This specific fire-stopping requirement is the responsibility of the Electrical Sub-Contractor. The fire stopping shall match the fire rating of the structure as a minimum. The fire compartmentation drawing shall be prepared by the Architect.

Allow for all BWIC with the proposed installation. Where containment is installed surface mounted, suspended or is visible, finishes shall be agreed with the architect/interior designer prior to installation.

Containment will comprise combinations of trunking, basket, conduit and tray. The trunking will primarily house the 230 Volt supplies, with tray and basket for the ELV systems such as CCTV, data, access control and fire alarms.

LSOH cabling will be utilised throughout.

All cabling including within emergency escape routes will be supported in a manner that provides secure support in the event of fire, in accordance with the BS7671:2018.

3.3 METERING

Sub metering shall be installed to meet the requirements of Part L and BREEAM. This shall include the separate metering of lighting and power from all LV distribution boards, the distribution boards serving mechanical equipment, lifts and the external services boards.

All meters shall be Modbus enabled and shall be connected to the BMS.

As a minimum all meters shall be installed as shown on the LV schematics. This shows Digital multi-function meters and Multi-function MID Approved meters.

All workspace units shall be metered via the MID approved meters within the Panelboards.

The contractor shall include for providing full metering to each distribution board to allow energy to be measured and tenants billing.

All metering shall have the facility for pulsed and Modbus outputs and shall be connected to a central monitoring station (BMS).

All metering to be in accordance with CIBSE Guide TM39.

CT metering shall be installed within a dedicated metering chamber constructed as an element of the main LV Switchboard or housed within local distribution boards as indicated.

Meters shall be complete with pulsed outputs for connection to remote monitoring in the future.

Meters shall monitor the following characteristics:

- Voltage (phase to neutral and phase to phase)
- current (all phases and neutral)
- current demand and peak currents (all phases and neutral)
- PF (all phases and total)
- Maximum and instantaneous values of kW, kVA, kVA_r
- Energy consumption values: kWh, kVA_r and kVA_r
- Frequency
- peak voltage
- peak current
- total neutral current

Ensure that the CT's are correctly rated for the metering application.

A schematic drawing including the locations of the meters and what they serve shall also form part of both the Logbook and O&M Manual.

Advise the Supervising Officer at an early stage of the Contract, as to the type of meters that are to be used to satisfy the above requirements.

All meters shall be clearly labelled and have a unique and logical number applied to them. These ID references shall be cross-referenced on the Record Drawings.

All meters shall be installed and commissioned in accordance with the manufacturer's instructions to ensure accuracy and satisfactory operation. Provide a commissioning report for each meter from the meter supplier.

All costs associated with the metering provision (including ancillary equipment), installation, shall be allowed for with the Tender Summary.

3.4 DISTRIBUTION BOARDS

LV metered sub-distribution supplies will be routed from the LV Switchrooms to appropriate locations throughout the building.

Landlord's distribution boards will provide split metered lighting and power distribution to the common parts.

The Contractor shall install final circuit distribution board(s) to serve the proposed equipment, where and if required.

3.5 FINAL DISTRIBUTION BOARDS

ENCLOSURE TYPE

The Distribution Board shall be fully type tested conditional short circuit rating to BS EN 61439-3. Outgoing ways shall have a non-removable interlock to prevent operation unless an outgoing device is fitted. Neutral bars shall be fully shrouded as well as the main switch connectors. There shall be plug on neutral reference and earth connections. Boards shall have full IP2X internal shrouding. Disconnection to BS EN 60947-3 ensuring unused outgoing ways are isolated. Boards shall be able to accommodate 1P,2P,3P and 4P devices. Any outgoing way can be converted to a distributed neutral. Boards shall be RAL9001.

The distribution boards shall be an Isobar P "B-Type" board from Schneider Electric or equal and approved.

OUTGOING DEVICES

MCBs shall compliant with BS EN 60898 to 10kA and BS EN 60947-2 to 15kA. MCBs shall have a visible window to indicate operation condition. MCBs should have positive contact indication for isolation according to IEC/EN 60947-2 and insulated terminals to IP20. They shall be able to accept auxiliary contacts, under voltage release or shunt trip and have visible tripped indication separate from the toggle operation.

RCBOs shall compliant with BS EN 61009-1 to 15kA. RCBOs shall have a visible window to indicate operation condition. RCBOs should have positive contact indication for isolation according to IEC/EN 60947-2 and insulated terminals to IP20. They shall be able to accept auxiliary contacts, under voltage release or shunt trip and have visible tripped indication separate from the toggle operation. RCBOs shall have a plug on neutral and earth connection.

INCOMING METERING

Distribution boards shall be suitable for tariff/sub-metering applications and shall be assembled from standard manufacturer components either to fully meter the total load or separately lighting and power loads. The meters shall monitor the following parameters, KWH, Voltage ph/ph and ph/n, Frequency, Energy - active, reactive and apparent, Power - active, reactive, apparent (total and per phase), Current – present and maximum, Harmonic monitoring – THD.

SURGE PROTECTION

The Contractor shall install a three-phase surge protection unit to a spare way within each TP&N distribution & Panelboard. A minimum type surge protection as indicated on the LV Schematics shall be fitted.

All electrical distribution boards shall be fitted with a locking assembly (from the manufacturer), clasp for padlock, padlock and keys. Provide 1 No. spare set of keys for each key type. All keys shall be duly numbered and cross-referenced against a schedule of keys, which shall be provided within the O & M Manual.

All electrical equipment shall have a degree of protection (as defined in IEC 529/BS 5420) suitable for its intended use and the environment in which it is installed. For internal, dry area use, this shall mean IP 31. For external or internal wet area use, this shall mean IP 65.

Where High Integrity Earthing is required, the Contractor shall provide and install an additional earth bar within the DB to satisfy the requirements of BS 7671:2018. Ensure that the positioning of the additional earth bar within the DB does not adversely affect cabling installations and terminations. Installation of the additional earth bar shall be evidenced by the Supervising Officer.

Circuit charts and labelling shall be fully updated to reflect the modified installation.

All ways shall be permanently labelled. Provide A4 encapsulated distribution board charts fixed adjacent to the distribution board. The contents of the circuit charts shall indicate all information as required by BS 7671 and to the satisfaction of the Employer's Agent.

Ensure positioning of distribution boards allows full accessibility for future maintenance.

Allow for adequate sub-main and final circuit cable terminations. All spare ways shall be fitted with blanking plates.

Distribution board meters shall be installed within dedicated enclosures, matching the distribution board finishes, within each unit/workspace/area.

Each distribution board shall be left with a minimum of 25% spare ways and capacity.

3.6 AHF

The Electrical Services Contractor shall coordinate, supply, install, test and commission AHF units as indicated on the LV schematic drawings.

The Active harmonic filter (AHF) shall provide three types of correction: harmonic mitigation, power factor correction, and mains current balancing. All functions to be operated independently or in any combination.

AHF shall mitigate harmonics from non-linear loads. AHF operating in dual mode (Harmonic & Power Factor), shall ensure the levels of Total Harmonic Distortion remain within G5/4-1 limit and the target power factor is achieved between 1 and 0.95.

The AHF shall be from Schneider Electric or equal and approved.

3.7 BALANCING

The Contractor shall ensure that the electrical load of the whole building is balanced over the three phases.

This shall be demonstrated to the Supervising Officer by way of on-site measurements or meter readings.

Where an imbalance is observed the Contractor shall bring this to the engineer's attention who will advise on which circuits to swap phases.

The Contractor shall include within his tender an allowance for potential phase balancing works.

4 SMALL POWER

The Contractor shall design, supply, install, test and commission a complete small power installation as detailed within this specification and in line with the electrical services layout drawings.

The small power installation shall comprise switched socket outlets, fused connection units and isolators, to supply both portable and fixed equipment. All new circuit wiring shall emanate from the Distribution boards as detailed on the small power and LV Distribution layouts.

Final circuit wiring shall generally comprise LSOH Singles cabling and shall be contained within galvanised trunking and conduits, the contractor is to determine routing for the small power containment.

Recessed conduit drops shall be via earthed steel conduit.

Socket outlets and miscellaneous small power accessories shall be installed at locations throughout the building for fixed equipment and general use final setting out of all electrical accessories shall be provided by the architect, mounting heights shall generally be in compliance with Part M recommendations.

All socket outlets shall be switched with outboard rockers for Part M compliance and be twin socket outlets, unless specifically indicated. Dedicated small power supplies and outlets shall be provided for various miscellaneous appliances.

Switched, fused connection units are to be provided to control items of equipment such as hand dryers, water boilers, fans etc. to provide a complete working installations. Final connection to all fixed items of equipment is to be provided.

Final connection to all items of equipment shall be complete with accessories, accessory mounting boxes and compatible accessory plates.

Where penetrations through walls and flooring for power and data distribution are required the fire and acoustic integrity of the walls and partitions affected by the penetrations shall be made good upon completion.

All junction boxes, isolators and fused spurs shall be fitted with labels detailing their function. The labels shall be black characters engraved on white traffolyte securely fixed to the equipment.

All circuits that contain socket outlets below 32A shall be, fitted with RCD protection as required by BS7671:2018.

Electrical supplies, socket outlets, fused connection units and isolators shall be installed throughout the area of the works as indicated on the drawings and within this specification required for a complete installation.

Cleaners' sockets shall be protected by combined MCB/RCD protective devices.

Power sockets are to be RCD protected as required within IET Wiring Regulations BS 7671:2018.

Arc fault detection devices (AFDD) and surge protection shall be fitted in line with BS 7671:2018 and as indicated as a minimum on the drawings, schematics & consumer unit diagrams.

4.1 GENERAL FIXED SUPPLIES

Provide local isolation to all fixed items of equipment as indicated on the drawings.

Switched fused connection units will be provided to suit items of fixed electrical equipment, such as hand driers, appliances, door access control, disabled alarm, etc. Where switched fused connection units serve appliances such as kitchen appliances a single un-switched socket outlet controlled by the connection unit shall be provided adjacent / behind the appliance. The exact location of the un-switched socket outlet shall be co-ordinated with the specialist installer prior to installation.

Power supplies for electric hand dryers fed from the landlord's distribution boards shall be provided to each toilet. Hand dryer points shall be provided in each male, female and disabled toilet.

All fused connection units shall be fitted with fuses of the correct rating to protect the final connection cable of the equipment served. Details shall be obtained from manufacturers and Mechanical Sub-Contractor. Each fused connection unit shall be duly labelled with a permanent printed label. Provide samples of labels for approval at an early stage of the Contract.

Larger appliances shall be supplied via local isolators and connection outlets plates. Isolators shall be rated in excess of protective device and to the specification of other accessories in the areas where they are being installed.

Where the equipment is located in close proximity to water sources, provide high level isolator's, with outlet plates located adjacent to the associated equipment.

All circuits shall be protected by miniature circuit breakers or Residual Current Circuit Breakers with Overcurrent Protection (RCBO's) as required to meet BS7671, 18th Edition.

All fused connection units and isolators shall be marked with the circuit reference and shall be labelled to identify the item of equipment served.

4.2 GENERAL SOCKET OUTLETS

13A Socket outlets shall be installed as indicated on the drawings. Socket outlets shall generally be connected to ring or radial final circuits from distribution boards located in electrical risers / electrical switch rooms throughout the building.

All socket outlets shall be wired and connected to the distribution system to comply BS 7671:2018.

All socket outlets shall be provided as indicated on the drawings, in the relevant areas, so as to afford unrestricted access for utilisation.

Socket outlets shall be arranged on ring or radial circuits with no spurs. Where fused connection units are indicated they shall be incorporated in the ring circuit configuration and shall not be 'spurred' unless specified or indicated as a radial circuit.

All circuits will be protected by miniature circuit breakers or Residual Current Circuit Breakers with Overcurrent Protection (RCBO's) as required to meet BS7671, 18th Edition. For radial socket outlet circuits, the maximum over current rating shall be 20A with 30mA RCD in the form of a single pole RCBO.

The finish and construction of the accessories shall be suitable for the likely conditions imposed upon them.

All socket outlets shall be marked with the circuit reference.

Wall mounted cleaners' sockets shall be installed within storerooms and circulation areas as required, generally on 15m spacing. All cabling and accessories associated with the small power installation shall be provided as required to achieve the arrangement indicated on the layout drawings and as detailed within the specification.

All cabling containment within the building shall be carefully co-ordinated with all other services. Within front of house areas or where services are to be exposed, routes and finished shall be agreed with the architect and the heritage architect prior to installation.

Due to the nature of the building, accessories shall be fixed to building fabrics and shall be served via surface mounted, galvanised conduits. All accessories shall be metal clad finish.

The Contractor shall ensure all cabling is protected from other site works throughout the duration of the project.

Small power cabling shall be carried out using LSOH single core cables routed within galvanised trunking and conduits.

The installations will be required to comply with the harmonic limitations identified in Energy Networks Association G5/4 and all British and European standards for relevant levels of harmonic distortion.

The Contractor shall provide all required power supplies to the lifts and shall liaise with the lift manufacturer to ascertain the power requirements prior to installation.

External plant areas will be provided with IP65 rated Masterseal sockets for maintenance purposes.

4.3 PLANT ROOMS

The contractor shall provide all supplies including isolators, socket outlets, switched fused connection units and un-switched fused connection units as required by the Mechanical Contractor. Exact positions of the mechanical equipment and electrical supply locations shall be obtained from the Mechanical Contractor prior to installation.

All socket outlets, fused connection units and isolators shall be marked with the circuit reference. Fused connection units and isolators shall be labelled to identify the equipment served.

The finish and construction of the accessories shall be suitable for the likely conditions imposed upon them.

4.4 MECHANICAL POWER

The Contractor shall provide the Mechanical Sub-Contractor with power supplies to fixed items of plant as required. The contractor shall design, supply, install, test and commission all required supplies and containment to provide a full and complete installation.

The Electrical Sub-Contractor is responsible for providing all, control wiring and containment associated with the mechanical services installations as part of the controls package.

This shall include all wiring from the mechanical control panels to items of equipment such as valves, pumps, actuators, boilers, fans, thermostats etc throughout the installation. The Electrical Sub-Contractor shall also be responsible for all interconnecting control wiring from equipment to controllers.

Small power requirements are generally indicated on the layout drawings but shall be provided to the exact requirements of the Mechanical sub-contractor.

The Contractor shall provide all power requirements to the following mechanical services and as indicated on the layout drawings:

- All Mechanical Plant and Equipment
- New Heating and Cooling System Control equipment
- Water heaters
- Fan coil units
- Sensor flush systems in WC's
- BC Boxes
- Toilet extract fans
- External air handling unit
- Leak Detection Systems
- Air source heat pumps
- Kitchen Extract Fans
- Booster pumps/tanks
- AHUs & HRUs

Mechanical control panels are to be provided, as indicated on the layouts and schematics.

Mechanical control panels will be provided for plant, linked back to the BMS system and the fire alarm system.

Mechanical equipment that does not need control from the BMS such as local toilet extract controlled by local PIR will be from isolators wired to local landlord's distribution boards.

All supplies to mechanical plant will be installed with isolation adjacent to the item of plant.

Provide power supplies and containment to all items of mechanical equipment as required and in accordance with this specification. Include for all final connections between the local isolators and the item of equipment served.

The wiring methods shall be compatible with the final circuit wiring within the area served. Final connection to mechanical equipment shall be selected so as to take regard of vibration, heat and mechanical protection. All of the wiring shall be in full compliance with BS 7671:2018.

All controls wiring shall be installed within trunking and conduits and in accordance with the manufacturer's recommendations. Where flexes are to be used, these shall be of the heat resistant type, sized and number of cores to suit the intended application. The Electrical Sub-Contractor shall be responsible for the installation of containment.

The Installers are reminded that the installations shall be in full compliance with BS 7671:2018. The Installers attention is drawn to segregation of circuits.

There shall be close liaison between the Mechanical and Electrical Contractors to ensure that all systems are co-ordinated and installed in such a manner that they are complete and set to work in accordance with the manufacturer's requirements.

It is the Electrical Sub-Contractor's responsibility to ensure that the Mechanical Sub-Contractor provides all free issue items complete with all relevant fixing and detailed wiring instructions at an early stage. Liaise with the Mechanical Sub-Contractor to ensure that the power and controls provided are installed, meet the design requirements, and are installed in co-ordinated and agreed locations.

4.5 FINAL CIRCUITS CABLING

The contractor shall be responsible for design & installation of all Primary & secondary containment in the form of galvanised conduit from the to the final accessories where required. The secondary containment shall include specialist services such as fire alarm, security, etc.

Final circuits shall generally comprise LSOH Singles Cables run within metallic conduits/trunking

Final circuit containment shall be coordinated with the wall and ceiling finishes.

Final circuit cabling shall be completely separate from the data, communications, fire alarm and security installations for which separate containment shall be installed as required by the individual specialist.

All final circuit cabling shall be fully contained with particular attention being paid to the grouping included within the calculations.

The Electrical Contractor's attention is drawn to the need to run trunking and cables under the beams around the columns and other obstructions, include bends etc., necessary to produce the highest installation standards. Electrical contractor to check cable calculations, installation methods and lengths and recalculate as required.

4.6 WIRING ACCESSORIES

Should an electrical accessory be shown on the drawing and not detailed above the Electrical Contractor shall select suitable accessories with finishes to be confirmed with the architect/interior designer prior to purchase.

The finish and construction of the accessories shall be suitable for the likely conditions imposed upon them.

5 LIGHTING

The contractor shall design, supply, install, test and commission a fully functional General & emergency lighting scheme & lighting control installation as indicated on the drawings and detailed below.

The following standards are applicable to the design and installation: -

- CIBSE The SLL Code for Lighting
- EN 12464-1:2011 Lighting of indoor workspaces
- BS 5266-1:2016 Emergency Lighting
- BS EN 50172 (BS 5266-8).
- BS 5266-2.
- BS 5266-4.
- BS 5266-5.
- BS 5266-6.
- BS EN 1838, BS 5266-7
- BS EN 50171.
- CIBSE LG12.
- CIBSE LG9
- CIBSE LG10
- CIBSE LG3
- BS8300
- Building Regulations L2A & L2B (new build part of the hotel)

Indicative quantities and positions of luminaires have been shown on the lighting drawings. The contractor shall develop this design intent alongside the engineer, the architect and the heritage architect to provide a fully co-ordinated lighting design.

The lighting installation will be in accordance with good practice, CIBSE Guidelines, recommendations all relevant British Standards.

The lighting systems seek to compliment and highlight the architectural and interior design features of the building construction and fabric/finishes.

Due to the heritage nature of the building, lighting shall generally be suspended in the workspace units and surface mounted and affixed to building fabrics in other areas.

Where false ceiling and partitions are to be created/installed, recessed luminaires and services shall be installed.

Lighting circuits shall be derived from local distribution boards and shall be wired using LS0H insulated singles copper cables. Cabling shall be routed within a continuous containment system comprising galvanised metallic trunking and conduits.

Surface mounted, wall luminaires shall be installed along balconies/walkways and shall be minimum IP65, IK10 rated. These luminaires shall be controlled via photocell/timeclock arrangement complete with manual override.

General luminaires shall be controlled using local, automatic presence/absence detection as indicated on the lighting drawings.

The setting out locations shall be dimensioned on the Contractor's working drawing for approval by the design team prior to any installation of any luminaires or associated wiring/containment.

The Contractor shall be responsible for ensuring all selected luminaires are compatible with all other aspects of the installation including ceiling types and finishes.

All light sources within the building shall use LED sources. No other light sources shall be accepted unless specified within the luminaire schedule.

All light fittings shall be selected to satisfy the technical and/or aesthetic requirements of each room and its intended purpose.

All lamps and luminaires shall be agreed with the lighting control specialist to ensure they are compatible with the controls system prior to installation.

The Contractor shall allow for all works associated with the lighting and lighting control system, including commissioning to ensure a fully operational system to the Consulting Engineer's satisfaction.

Lighting calculations for all areas shall be submitted as part of the Contractor's Proposals. All lighting levels shall be in accordance with the CIBSE/SLL Code for Interior Lighting.

Communal facilities lighting, including WC's, showers, circulation areas to be a mixture of fittings including surface, recessed and feature lighting designed in conjunction with the architectural requirements.

Lighting installations within Landlord's plant areas will be surface LED, vapour proof, suspended, in positions co-ordinated with ductwork / mechanical plant.

All workspace units lighting to be installed as part of Category A works as described in the Allied London Developers specification.

Temporary lighting shall be provided in all units for tenant viewing purposes.

Include within the tender price the cost of providing a 12 months' warranty service, that is the Labour and materials associated providing replacement parts for lighting equipment that fails within the first 12 months, except due to vandalism, wear and tear.

Maintained lighting levels to areas of the building shall be in accordance with the CIBSE lighting guides & SLL code for lighting as follows:

- Main entrances 200 lux
- WCs/Showers 200 lux
- Mechanical and Electrical Plant rooms 200 lux
- Circulation Areas/Temporary unit lighting 100 - 150 lux
- Workspace units 500 lux @ desk level

5.1 LIGHTING CONTROLS

The contractor shall design, supply, install test and commission a lighting controls installation as indicated on the drawings and as detailed below.

Lighting to be controlled through a combination of presence/absence complete with daylight sensor detection and manual retractive switching to achieve maximum efficiency within the workspace units.

Hotel corridors shall utilise PIR controls wherever practicable.

Separate controls will be provided to storerooms and plant rooms. Plant areas will have local switching with no automatic off.

5.2 EXTERNAL LIGHTING

The contractor shall develop, design, supply, install and commission a fully functional external lighting scheme.

The external lighting shall comprise wall mounted, LED luminaires located around the walkway/balcony areas, served via local lighting and small power distribution boards.

Lighting circuits shall comprise LSOH single core cables, routed within lighting and small power containment, routed at high level along the balconies with surface, galvanised conduits dropping to luminaire positions.

External feature and functional lighting shall also be provided to the courtyard area and shall be co-ordinated with the proposed lettable space within the courtyard.

Feature lighting to the external 'outward facing' elevations has been detailed on the Architects drawings. The external lighting shall be co-ordinated.

External walkway lighting is to be controlled by an automatic control system via photocell & timeclock arrangement complete with manual override.

The contractor shall make allowance within their tender for the supply, installation and commissioning of a number of distribution boards, sited around the building at ground floor, to serve the external lighting on the 'outward facing' elevations. These distribution boards shall be suitably sized and shall be controlled via timeclock and photocells.

The external lighting scheme shall be provided in accordance with CIBSE Lighting Guide 6 and shall be agreed with the engineer, the architect and the heritage architect prior to procurement.

All external lighting shall be designed in accordance with the ILP Guidance notes for the reduction of obtrusive light.

All external lighting shall be provided in accordance with any local planning conditions, any local lighting constraints and in line with the heritage architects requirements.

Illuminated advertisements, where specified, must be designed in compliance with IP PLG 05 The Brightness of Illuminated Advertisements

5.3 EMERGENCY LIGHTING

The contractor shall design, supply, install test and commission a fully functioning emergency lighting installation as indicated on the drawings and as detailed below.

Emergency lighting shall be provided throughout in compliance with BS 5266 and BS EN 1838.

The system shall illuminate escape routes throughout the building together with toilets without borrowed light and over 8m², all firefighting equipment, manual call points and mounted internally and externally to all final exits. In addition, emergency lighting shall be installed to illuminate each switch panel, control panel and distribution board.

Emergency lighting system to be provided to all areas of the hotel in compliance with BS5266:2011. Generally, Type M3 (3 hour-maintained operation) in public circulation areas and Type NM3 (3 hour non-maintained) in all bedrooms and landlord areas.

The emergency lighting installation within the workspace units shall take the form of a stand-alone Automatic Self-Testing System consisting of self-contained emergency luminaires and emergency exit signs supplied from local lighting circuits all fitted with a built in testing facility, that provides a local indication of the condition of the luminaire, a battery pack and inverter units. The emergency lighting self-testing system shall be in accordance with BS EN 62034:2012 and shall include colour LED status indication.

6 FIRE ALARM SYSTEM

The Contractor shall employ a fire alarm specialist to design, supply, install, test and commission the fire alarm system. Consolux specification and the electrical layout drawings are for design intent only and shall be developed by the fire alarm specialist over and above the design intent.

A complete fully automatic fire alarm and detection system shall be included within the building and on roof levels. The system shall meet the requirements of a type 'L1' system as defined within the current edition of BS5839 part 1, and in

accordance with the Fire Strategy report. The system shall also comply with the requirements of the local fire officer and building control.

Special consideration shall be given to guest rooms to meet DDA requirements in accordance with the following Regulations which include but are not limited to: -

- BS 5839: 2017 - Fire Detection & Alarm Systems
- BS 9999: 2017 – Fire precautions in the design, construction and use of buildings
- CIBSE Guide E - Fire safety engineering

The system shall be of the analogue addressable type and controlled via Landlord fire alarm panels located strategically throughout the building and as shown on the drawings and schematics.

The fire alarm system shall be as open protocol type and shall incorporate autodial, firefighting telephone system, system printer, main and mimic panels.

The building shall be separately zoned in accordance with BS5839 Part 1 L1 standard.

6.1 DISABLED ALARM SYSTEMS

The Electrical Services Contractor shall design, supply, install, commission and set to work disabled alarm call systems as indicated on the drawings and schematics.

The following standards are applicable to the installation & commissioning of the disabled toilet alarm system

- BS 7594: 2011
- BS8300:2009 + A1:2010
- Building Regulations Part M
- The Disability Discrimination Act 1995

A complete disabled WC alarm call system shall be provided in each disabled toilet.
The system shall consist of:

- Call point / pull cord
- Ceiling mounted reassurance light,
- Manual reset/reassurance button within the room and
- Over door indicator/tone unit.

6.2 DISABLED REFUGE CALL SYSTEM

The Contractor shall be responsible for employing a Fire Alarm specialist to design, supply, install, carry out final connections and commission a new disabled refuge alarm installation within the building. Consolux specification and the electrical layout drawings are for design intent only and shall be developed by the specialist over and above the design intent

This system shall facilitate audio communication for Fire Officers/Building Management to maintain 2-way communication with disabled people who have been relocated to a disabled refuge point in the event of an emergency situation.

A two-way communication system shall be provided within the designated areas of the building to allow occupants using the refuge areas within each protected stair to communicate with those managing the evacuation.

These refuges are located at each level and as detailed on the architect's fire plan drawings and the Fire strategy report.

The disabled refuge area shall be provided a Type B outstation in accordance with BS 5839-9:2011.

Master stations for the two-way communication system shall be provided next to the main fire alarm panels.

6.3 FIRE ALARM CAUSE AND EFFECT

The fire alarm system shall be interfaced into the minimum following system(s): -

- Mechanical control panels
- AOV's
- Smoke Dampers
- Background Music/PA system
- Door Access / Security Systems
- Door hold open devices
- Lifts
- Gas solenoid valves
- Ventilation systems
- Fire Curtains
- Fire Suppression systems

Any security doors that are locked will release on the activation of the fire alarm.

The Electrical Services Contractor shall be responsible for producing a fully detailed building specific cause and effect schedule prior to commencement of installation and in compliance with the fire evacuation strategy as detailed in the Fire Strategy report.

6.4 FIRE ALARM LOOP CABLE AND WIRING

The system will be wired in enhanced grade fire rated cable with red LSF sheath or equal and approved to comply with BS5839 Part 1 2017 and shall be concealed within galvanised steel conduits.

All call points shall be capable of being tested using a key without the need for shattering the glass.

All Fire alarm cables shall be tested and approved by LPCB, BASEC and in compliance with BS5839.

6.5 TESTING AND COMMISSIONING

Each detector shall be provided with a red plastic dust cover when installed prior to handover, to prevent false alarms and build-up of dust. The covers shall be removed at handover.

The testing and commissioning of the system will be carried out in accordance with BS 5839-1:2017, Section 5, Clause 39.

On completion of commissioning a Commissioning Certificate in accordance with BS 5839-1:2017, Clause 39 will be provided by the Electrical Services Contractor.

7 ICT

The Contractor shall employ an Information and Communication Technology (ICT) specialist to design, supply, install, commission and set to work a new communication / data infrastructure for the building. This shall also include for all new connections to the building, and all required internal / external containment/cabling, as required.

The following standards are applicable to the design and installation: -

- European Committee for Electro technical Standardisation (CENELEC) – European
- Telecommunications Industry Association (TIA/EIA) – American
- International Organisation for Standardisation (ISO) – International
- BS EN 50173-1:2018 Information technology. Generic cabling systems. General requirements and office areas
- BS EN 50173-2:2018 Information technology. Generic cabling systems. Office premise
- BS EN 50310:2016 - Application of equipotential bonding and earthing in buildings with information technology equipment

The Contractor shall liaise with the ICT Specialist and include for all their Small Power, Data and Containment, cables (fibre & Data) etc. requirements within the Tender package.

The Electrical Services Contractor shall ensure that all data outlets for both client requirements and building services systems shall be included for within the tender submission.

The Electrical Services Contractor shall allow for full liaison with the Internet service providers & ICT Specialist and make necessary provision for all associated containment, power supplies and cable links from the incoming service provider's point of termination to the relevant equipment.

The Electrical Services Contractor shall include for all passive equipment including but not limited to Server/Comms Cabinets, PSU's, connection boxes, fibre splitter panels, patch panels and patch leads. Fibre & Cat 6 Patch leads shall be included for "cabinet end" and "field end" based on one patch lead for every data outlet.

A fully integrated structured cabling system shall be provided, supported by a fibre backbone Infrastructure via a number of risers as shown on the layouts.

The horizontal cabling shall be distributed from the Data Cabinets to serve final data outlets throughout the area of the works. Cable runs shall not exceed 90m as defined in BSEN 50173.

All Category 6 data cables shall be installed via new containment. 20mm conduit shall be used for all single RJ45 outlets. 25mm conduits shall be used for twin RJ45 outlets.

The ICT system will be used to connect voice and data services, building management systems (BMS), WLAN, security and CCTV solutions and Access Control devices to the network as a minimum – all 3rd party system requirements shall be co-ordinated by the Electrical Services Contractor in conjunction with the IT specialist.

7.1 FIBRE CABLING

Fibre Optic cables shall be terminated with a minimum of 3m slack. All data cabling shall be terminated within data racks with standards adhering to TIA / EIA 568B. Fibre bend ratios and installation standards ISO/IEC 11801 ISO/IEC 14763-3 fibre optic cable shall be tagged with fibre optic warning labels.

All cables shall be suitable for operating within operating temperature -10oC to + 70oC Fibre cables installed external to the building or in damp conditions shall have a moisture barrier. Fibre cables installed within the building must use flame retardant sheath with low smoke zero halogen (LSZH) Characteristics.

All cables shall be terminated to TIA 568B specifications.

A limited telephone installation will be provided to service the Building Management facilities as follows;

- Local Supply Authority Remote Metering
- Direct Dial Security System (Red Care)
- Building Managers Office
- Entry Phone Systems
- Lift Autodiallers

8 TELEVISION

The Electrical Services Contractor shall employ the services of a TV specialist to undertake this work which shall include designing, installing, testing, commissioning and setting to work a complete TV distribution system for the:

- Hotel
- Remaining building including Workspaces, F&Bs, Leisure units & landlord areas.

Provide a suitable fibre optic Integrated Reception System (IRS) consisting of Satellite Dish Receiver, Digital Terrestrial, FM and DAB signal distribution system to the building.

The Consolux design indicated is design intent only, the Electrical Contractor shall develop the proposed TV Schematic/infrastructure as shown on the DRG 647-E-(64)-SCH-01 and finalise a TV Solution/infrastructure in conjunction with the TV Specialist to meet the requirements for both areas.

The Contractor shall liaise with the TV Specialist and include for all their Small Power, Data and Containment, etc. requirements including cabling (Coax and Cat 6/Fibre) within the Tender package.

TV antenna/Sky dishes/aerials shall be installed on the building depending on a survey and agreed locations with the Client, suitable for optimum signal strength and fixing capacity.

9 LIFTS

The Contractor shall employ a lift specialist/manufacturer to design, supply, install, commission and set to work the required number of lifts to adequately serve the building.

The Lift specialist shall be responsible for the provision of the following: -

- The design of the appropriate passenger and goods lifts systems for the building
- The supply and delivery of the lift systems
- Installation of the lift systems
- Testing and commissioning
- Record documents and maintenance manuals
- Instruction of maintenance staff
- 12 months lift maintenance contract (starting from practical completion)

All lifts shall comply with the following:

- BSEN 81-20:2014 - Safety rules for the construction and installation of lifts - lifts for the transport of persons and goods. Passenger and goods passenger lifts (incorporating corrigendum November 2015)
- BS EN 81-50: 2014 - Safety rules for the construction and installation of lifts - examinations and tests. Design rules, calculations, examinations and tests of lift components
- BSEN 81-28:2018 - Remote alarm on passenger and goods passenger lifts
- BS EN 81-70:2018 - Accessibility to lifts for persons including persons with disability.

10 SECURITY SYSTEMS

The Contractor shall be responsible for the design development, supply, installation, testing, commissioning and setting to work of the security system, as described below and on the drawings & Schematics.

The Contractor shall liaise with the Security specialist and include for all their Small Power, Data, cabling and Containment etc. requirements within the Tender package.

10.1 CCTV

The Electrical Services Contractor shall be responsible for all works in connection with the supply, installation and commissioning of a standard IP CCTV system. Consolux specification and the electrical layout drawings are for design intent only and shall be developed by the CCTV specialist over and above the design intent.

The system shall allow for high resolution fully functional IP cameras mounted by various methods, to provide effective surveillance Provide and install a fully addressable CCTV system to monitor the building main entry points and internal areas.

The CCTV system will allow for high resolution, colour fixed and PTZ CCTV cameras, monitor and image recorder. The CCTV system shall be open protocol.

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The contractor shall comply with requirements of the Standards and the following regulations which include but are not limited to: -

- BS 8418:2015+A1:2017 Installation and remote monitoring of detector activated CCTV systems, Codes of practice.
- BSEN 50131-1, BS EN 50132-7, NACP20 in conjunction with BS 7958 and BS8418.
- BS EN 60839-11 Access Control Systems for use in security applications.
- CIBSE application manual AM4 1991.
- Secured by Design requirements.

The CCTV system shall have on site digital video recording facility which shall be located in a secure room at basement floor.

The Contractor and specialist system suppliers shall compile the CCTV Operational Requirements and security system design proposals to reflect the requirements set out above and submit for client approval prior to commencement of the works.

A CCTV integrated system shall be installed at critical areas of the building for surveillance. One colour monitoring station will be provided at the reception desk for CCTV monitoring, with control equipment located in the BMS room.

10.2 DOOR ACCESS AND INTERCOM SYSTEM

The Contractor shall employ the services of an Access control specialist to undertake this work which shall include designing, installing, testing, commissioning and setting to work to a complete door access control and intercom system for the whole building and the Hotel. Consolux specification and the electrical layout drawings are for design intent only and shall be developed by the Access Control specialist over and above the design intent

The Contractor to provide an Access Control based on the following:

- Hotel, Units & Workspace units – SALTO Bluenet Wireless Wi-Fi based system,
- AFBO to Hotel bedrooms
- and XS4 to suites/ core

The Contractor shall finalise the Access control system details with the Client prior to procurement.

An electronic, open protocol, access control security system will be provided and incorporated within the building as required to include (but not limited to) the following key entrance areas;

- Perimeter protection at Ground Level to openable doors and stairs
- Perimeter protection at Basement Level to openable doors and stairs (as required)
- Access control to lifts
- Refuse stores
- Goods entrances
- Workspace, F&B and Leisure units

A door intercom phone system will be provided to both reception areas and the goods entrance door.

The door access control system shall comprise of RFID proximity card readers incorporated as standard for entry to doors where required. Push to exit switches with an emergency green break glass unit shall be provided on the secure side of the access-controlled doors. Each door shall have a magnetic lock on each leaf and shall be interfaced to the fire alarm system.

The Contractor shall provide all necessary power supplies, data outlets, containment, cables, recessed back boxes and face plates of the finishes for all devices indicated as being wall mounted. The Electrical Contractor shall liaise with the security specialist for location and details of all necessary power and containment requirements.

A wall mounted reader shall be provided at the entrance doors, which has RFID / BLE mobile smart phone technology so anyone using the building can gain entry with their RFID / mobile smart phone credential. All transactions to be communicated back to the main P.C. into the software for record/audit purposes.

The Hotel guestrooms shall have their door ironmongery installed, tested, commissioned and set to work with the necessary VingCard door ironmongery.

The Electrical Services Contractor shall make adequate allowance to connect the guestroom VingCard system back to the PC based 'head end' programmable system (location to be Agreed by the Client).

The final requirements and locations for door access control shall be determined from the Architects access control strategy drawings and associated door schedules.

11 LIGHTNING & SURGE PROTECTION SYSTEM

The Contractor shall employ a lightning protection specialist to undertake this work which shall include testing the existing system. The Specialist shall carry out all modifications to the existing system including designing, installing and commissioning all necessary air termination network points, down conductors and earth rods including all bonding fixings for a complete lightning and surge protection system for the building.

The existing system will be assessed and upgraded where necessary to comply with all the requirements of BS EN 62305.

The lightning protection system shall comply with requirements of the following regulations which include but are not limited to: -

- BS EN 62305 - all relevant parts therein

The whole of the structure should be protected with a fully interconnected lightning protection system i.e., no parts of any structure should be protected in isolation.

All metallic projections on or above the main surface of the roof which are connected, intentionally or fortuitously, to the general mass of earth should be bonded to and form part of the air termination network.

The Contractor shall design, supply and install a complete surge protection installation throughout the premises, as detailed on the LV schematics, and as required in the BS7671:2018 & recommendations of the BS62305.

The installation shall entail the provision of 3phase 'all mode' transient voltage surge suppression as a minimum to the following: -

- Each distribution board which provides 'Computer Power'
- Each distribution board feeding all external mechanical and electrical equipment.
- Each distribution board feeding comms
- Fire alarm
- Main LV switchboard

12 ELECTROMAGNETIC COMPATIBILITY (EMC)

All items of electrical plant and equipment should fully comply with the EMC Directive 89/336/EEC and subsequent amendments.

In brief all electrical plant and equipment must be designed & installed in such a way that: Electromagnetic disturbances generated by any electrical plant and equipment do not cause interference to any other systems.

The performance of the product is not affected by electromagnetic disturbances within the environment in which the product is intended to operate.

The Contactor shall ensure that all items of electrical plant and equipment have the required EMC Directive Declaration of Conformity.

If the manufacturers proposed products do not comply with the EMC Directive the engineer must be informed before purchase and installation.

13 EARTHING AND BONDING

The Contractor shall carry out electrical system earthing work in accordance with BS 7671:2018 (IET wiring regulations), BS 7430; Electricity Supply Regulations; iDNO and Local Electricity Supply Authority Requirements.

Provide all earthing associated with the new Utility/iDNO Supply and Substation.

Provide earthing and bonding in compliance with BS 7671:2018

Provide main equipotential bonding to the incoming water, gas and building structure.

Provide supplementary bonding to all extraneous metal works.

Provide supplementary bonding to all exposed conductive parts.

Test and commission the system in accordance with BS 7430 and BS 7671:2018 and as specified. Record all test measurements.

The Electrical Services Contractor is responsible for the design, supply, install, testing, commissioning and setting to work of a complete general earthing and bonding system

All non-current carrying metalwork associated with the electrical power distribution network equipment and ancillaries, and all extraneous metalwork of and in the building, structure shall be effectively bonded and connected to earth at a common potential earth continuity system.

14 COMMISSIONING

The Electrical Contractor shall on completion of the works, test the entire electrical installation and provide full documentation and record details to BS 7671:2018 including all amendments.

Attention is drawn to the requirements of IET Guidance Note 3 (GN3) Inspection, Testing and Certification. Certificates shall be NICEIC standard test sheets and include all circuits within boards including existing circuits that do not form part of the works.

The Electrical Contractor's tender price shall include any specialist charges associated with commissioning and testing of the electrical installation. Consolux shall be given seven days' notice of the tests, to enable a representative to be present.

Commissioning of developer mechanical and electrical plant shall be undertaken in a progressive manner in general accordance with the recommendations in the CIBSE commissioning codes, with pre-checks undertaken on system cleanliness, static completion and the like, prior to the pre-commissioning, testing, commissioning and witness testing of each of the building services systems.

An independent Commissioning Validation Engineer shall be appointed by the contractor to monitor the commissioning of the building and works.

15 BUILDER'S WORK

The Electrical Contractor shall be responsible for supplying of all building penetration details that will require works by others in order to complete the electrical installation.

16 AS FITTED DRAWINGS

On completion of the works and necessary approved tests, the Electrical Contractor shall be responsible for supplying three set of as fixed drawings and wiring diagrams of the completed installation.

The Electrical contractor will also issue copies of the as fitted drawings in dwg format.

17 CLEANING

The Electrical Contractor shall allow for the cleaning of the Electrical Installation including the equipment, at the end of the contract to the satisfaction of the Consulting Engineer.

18 CO-ORDINATION OF ENGINEERING INSTALLATIONS

The Mechanical and Electrical Sub-Contractors shall be entirely responsible for the co-ordination of all building services installations, including the works of sub-contractors.

Ensure the compatibility of the various building services installations with one another and with the building structure, fabric, finishes, furniture and fixtures so that all services may be installed without conflict in the positioning of ducts, pipes, cables, plant and equipment and the like.

Note, the locations of electrical accessories shall be agreed prior to installation between the Architect, Engineer and the Sub-Contractors.

19 APPROVALS BY BUILDING CONTROL, LOCAL AND STATUTORY AUTHORITIES

The Electrical sub-contractor shall obtain all necessary approvals for his designs and layouts from Building Control, Local Authority, Environmental Health and other Statutory Authorities as may be required to complete the various installations.

20 EQUIPMENT REQUIRED TO OPERATE PRIOR TO PRACTICAL COMPLETION

The electrical sub-contractor shall be responsible for paying all charges arising from the running of equipment included in this sub-contract, which is used for testing and commissioning purposes, prior to practical completion. In addition, the warranty on the equipment must operate for 12 months following practical completion. (To be agreed between the Main Contractor and the Sub Contractor as a domestic issue).

21 OPERATIONAL CONSIDERATIONS

The electrical sub-contractor shall design and install the various services installations and components with careful consideration to their performance and suitability for operating in their designed ambient conditions, and also to ensure system reliability and adequate safe maintenance access are provided.

22 SCHEDULE OF ELECTRICAL DRAWINGS

Drawing/Document Title	Drawing/Document No.
Small Power & Data Layouts	
Basement - Small Power & Data Layouts	647-E-(62)-B1-01
Ground Floor - Small Power & Data Layouts	647-E-(62)-00-01
First Floor - Small Power & Data Layouts	647-E-(62)-01-01
Second Floor - Small Power & Data Layouts	647-E-(62)-02-01
Third Floor - Small Power & Data Layouts	647-E-(62)-03-01
Roof Void - Small Power & Data Layouts	647-E-(62)-RS-01
Roof Level - Small Power & Data Layouts	647-E-(62)-RL-01
Fire Alarm Layouts	
Basement - Fire Alarm Layouts	647-E-(67)-B1-01
Ground Floor - Fire Alarm Layouts	647-E-(67)-00-01
First Floor - Fire Alarm Layouts	647-E-(67)-01-01
Second Floor - Fire Alarm Layouts	647-E-(67)-02-01
Third Floor - Fire Alarm Layouts	647-E-(67)-03-01
Roof Void - Fire Alarm Layouts	647-E-(67)-RV-01
Roof Level - Fire Alarm Layouts	647-E-(67)-RL-01
Security Layouts	
Basement - Security Layout	647-E-(64)-B1-01
Ground Floor - Security Layout	647-E-(64)-00-01
First Floor - Security Layout	647-E-(64)-01-01
Second Floor - Security Layout	647-E-(64)-02-01
Third Floor - Security Layout	647-E-(64)-03-01
Roof Void - Security Layout	647-E-(64)-RV-01
Roof Level - Security Layout	647-E-(64)-RL-01
Lighting Layouts	
Basement - Lighting Layout	647-E-(63)-B1-01
Ground Floor - Lighting Layout	647-E-(63)-00-01
First Floor - Lighting Layout	647-E-(63)-01-01
Second Floor - Lighting Layout	647-E-(63)-02-01
Third Floor - Lighting Layout	647-E-(63)-03-01
Roof Void - Lighting Layout	647-E-(63)-RV-01
Roof Level- Lighting Layout	647-E-(63)-RL-01
LV Containment Layouts	
Basement - LV Containment Layout	647-E-(61)-B1-01
Ground Floor - LV Containment Layout	647-E-(61)-00-01
First Floor - LV Containment Layout	647-E-(61)-01-01
Second Floor - LV Containment Layout	647-E-(61)-02-01
Third Floor - LV Containment Layout	647-E-(61)-03-01
Roof Void - LV Containment Layout	647-E-(61)-RV-01
Roof Level- LV Containment Layout	647-E-(61)-RL-01
Schematics	
LV Schematic (Non-Hotel)	647-E-(61)-SCH-01
LV Schematic (Hotel)	647-E-(61)-SCH-02
IT Schematic	647-E-(64)-SCH-01
Fire Alarm Schematic	647-E-(67)-SCH-01
Disabled Refuge & WC Alarm Schematic	647-E-(67)-SCH-02
Security Schematic	647-E-(68)-SCH-01

23 PREFERRED MANUFACTURERS

The following schedule lists preferred electrical manufacturers to be considered for the scheme and used as a quality benchmark: -

Equipment	Manufacturer	Range/Details
Distribution Boards, Switchgear, metering	Schneider	chris.kennedy@se.com 07739242776
External, Internal & Emergency Lighting & Controls	Refer to Lighting Layout Drawings	E-Mail: paul.king@zumtobelgroup.com Mobile 07748775411
Small Power accessories	Schneider	chris.kennedy@se.com 07739242776
Fire Alarm detection system	C-Tec www.solidstatesecurity.co.uk	John Blundell www.solidstatesecurity.co.uk Mobile: 07976020511 john.blundell@solidstatesecurity.co.uk
Security systems	Honeywell, Tyco	
Cables	Prysmian	

24 STANDARD SPECIFICATION

The Standard Specification is issued as a separate document.

The Electrical Services Sub-Contractor will be selected based upon a thorough review of the information returned within this document and allied to any pertinent information contained within a submission letter.

25 TENDER SUMMARY

The Electrical Services Sub-Contractor shall include within his tender all rates, percentages etc. as deemed necessary to complete the works described within the specifications and drawings.

All costs, rates and percentages shall be offered on a fixed price basis all as generally described within the Contract Conditions.

All parts of this tender documentation must be completed by the Services Contractor to deem the submission as compliant.

It is accepted that the Services Contractor shall familiarise himself with all aspects of the main contract conditions and preliminaries together with the Engineering Services specifications and drawings. The tender costs shall be based upon the named manufacturers only, however the tenderer may propose alternatives separately within the schedule of Manufacturers.

25.1 TENDER BREAK DOWN SUMMARY

THIS TENDER SUMMARY RELATES TO THE PROVISION OF ELECTRICAL SERVICES FOR
LONDON ROAD FIRE STATION, PHASE 2 SUMMARY OF ELECTRICAL SERVICES
COSTS

1	Preliminaries Including detailed design	£
2	Incoming Supplies	£
3	LV Distribution & Switchgear	£
4	Cable Containment	£
5	Metering	£
6	Small Power & data	£
7	Lighting, Emergency & Control	£
8	Fire alarm System	£
9	ICT	£
10	Television System	£
11	Lifts	£
12	Security Systems	£
13	Lightning & Surge Protection	£
14	Earthing & Bonding	£
15	12 Months Maintenance	£
17	Testing & Commissioning	£
18	O&M Manuals and 'As Fitted' Drawings	£
19	Builders work	£
20	Other Works	£
21	Grand Total including all profits and overheads	£

Grand Value in words -

.....

Signed : Date;

Print Name :

Position Held :

For & Behalf of :

25.2 SELECTED MANUFACTURERS

Where a choice has been offered in terms of Manufacturer or Range, the Tenderer will confirm below which Equipment upon which his tender is based. Failure to complete this section will void the Tender Submission.

Equipment	Manufacturer	Range/Details

25.3 ALTERNATIVES

Should the Tenderer wish to submit alternative systems to those specified, he will complete the alternative sheets. However, the tendered cost MUST be based upon the Manufacturers and associated ranges, as detailed within this specification ONLY.

Alternatives must be tabulated on the following sheets together with their impact on the costings, which will then be considered post tender by the Building Services Consultant /Client.

Notes to be read in conjunction with the alternative sheets following: -

- 1) It shall be clearly understood that where a particular system is specified, only alternatives of equal quality will be considered.
- 2) The Contractor will be permitted to offer alternatives but only providing these are detailed on the Schedule of Alternatives and submitted with the Tender. Any alternatives which are proposed shall comply with the most recent British Standard Specification and shall be equivalent in standard and operation to those which have been specified.
- 3) The Contractor shall note that he shall in preparing his Alternative Schedule, be deemed to have taken into account the fixed parameters of the building as represented on the Contract Drawings for that purpose and shall be considered to have selected all items of plant accordingly.
- 4) Any costs given with proposed alternatives shall be deemed to take into account any secondary costs associated with or involving provision to meet the requirements entered above including associated sub-contract, main contract, and professional design charges.

The Building Services Consultant reserves the right to object to any alternatives not considered acceptable and to require installation of specified items, at no additional cost.

Signed : Date;

Print Name :

Position Held :

For & Behalf of :