

3.0 ELECTRICAL SPECIFICATION

3.1 SCHEDULE OF WORKS

3.1.1 Introduction

The works comprise the supply and installation of new Electrical Services within the refurbishment of an existing warehouse to form artists' studios at Stoddart Street, Newcastle. Refer to the Architect's drawings and associated documentation for further information.

The Main Contractor shall employ an Electrical Services Contractor to undertake the works detailed in this specification. The Electrical Contractor shall be a full member of the NICEIC/ECA with a broad experience of undertaking projects of a similar nature and value.

This specification shall be read in conjunction with the Architectural Specification and Drawings, the Electrical Drawings, the Mechanical Services Specification and Drawings and the Structural Engineers Specification and Drawings.

3.1.2 Scope of Contract

The Contract includes the supply, delivery to site, off-loading, positioning, installation and commissioning of all items of equipment and materials required for the following works including all skilled and unskilled labour and all incidental items necessary for the full completion of the Electrical Services Installation ready for handing over to the Client in working order and in accordance with the agreed programme. Throughout this specification the word 'Contractor' shall read as meaning Electrical Engineering Services Contractor.

The works comprise the complete supply and installation of new Electrical Engineering Services to the site comprising:-

- a) LV distribution system
- b) General power installation
- c) General lighting installation
- d) Emergency lighting installation
- e) External Lighting
- f) Fire detection and alarm system
- g) Mechanical services wiring
- h) CCTV system
- i) Access control system
- j) Disability assistance systems
- k) Earthing and bonding
- l) Inspection testing and commissioning
- m) As Installed drawings, maintenance manuals, system demonstration and training
- n) Equipment warranties and plant maintenance

3.1.3 Programme

Commencement and completion on site shall be agreed with the Main Contractor and shall be in accordance with the Main Contractor's Programme of Works.

The Contractor shall pay particular attention to site access and traffic restrictions, noisy work limitations and permitted working hours, the details for which are contained within the Main Contract Conditions of Contract and Preliminaries.

Allowance for such factors shall be included within the tender. Claims for lack of knowledge shall not be considered.

3.1.4 Co-ordination

Prior to the installation of any equipment the Contractor shall agree with other trades, the location of equipment, routes for cables, trunking, ductwork, pipework etc. in order to avoid friction between the trades. This shall include all structural elements and services running through or adjacent the respective areas.

3.1.5 Duplication of Specification Clauses

The specific technical details contained within Section 3 shall take precedence over the General Technical Clauses of Section 2 of this specification.

Reference shall be made to Section 2 for details of any item of plant, equipment or ancillary components not specifically identified in Section 3.

3.1.6 Design Standards

The installation shall be installed in accordance with good current practice and shall comply specifically with the following:-

- a) CIBSE Codes, Technical Memoranda and Guides
- b) BS 7671: 2008, Requirements for Electrical Installations (including all amendments to date)
- c) All relevant British Standards/Codes of Practice, whether mentioned or not
- d) Health and Safety at Work Act 1974 and all current amendments
- e) Electrical Supply Regulations 1988 and all current amendments
- f) Current Building Regulations
- g) CDM Regulations 2007
- h) General Technical Clauses - Section 2
- i) Electricity at Work Regulations 1989
- j) Water Regulations
- k) The Electromagnetic Compatibility Regulations - S1-1992/2372
- l) Part L of the Building Regulations
- m) Part M of the Building Regulations

3.1.7 Data to be provided with Tender Submission

The Contractor shall submit with his tender a brief description of the proposed Electrical Services Engineering systems and equipment for comment by the Employer, Consultant and Contract Administrator.

The Contractor shall also provide the following minimum information:

- a) Properly completed tender summary sheets.
- b) Schedule of proposed manufacturers for plant and equipment where not uniquely specified.
- c) Proposed programme identifying design and installation periods and key procurement dates.

3.1.8 Data to be provided upon Acceptance of Tender

Prior to commencing works on site, the Contractor shall prepare and submit to the Employer detailed working drawings and supporting information of the Electrical Services design. The drawings shall include plans, sections, elevations, wiring diagrams, schematic diagrams and details to show the proposed installations accurately reflecting the design specification.

All drawings shall be comprehensively detailed giving dimensions, tolerances, finishes, fixings, builders work, materials etc. Drawings and equipment details to be included as a minimum requirement are:-

- a) Wiring diagrams for all plant and equipment requiring electrical connections. Where manufacturer's original drawings are used, they shall be specific to the relevant plant and all references to optional features, other machines of a range etc. shall be deleted. All wiring diagrams shall clearly indicate the wiring which forms part of or is connected to the equipment as delivered.
- b) Detailed installation drawings of all plant and equipment.
- c) Installation drawings showing the incoming and external services and the general distribution of services from the main service intake up to and including the point of final connection at a scale of not less than 1:50.
- d) Any detailed drawings, or manufacturers drawings required prior to, or found necessary during erection, manufacture and progress of the works.
- e) Detailed drawings of all fabricated items.
- f) Circuit schedules for all main supply, sub circuits and final circuits.
- g) Detailed plans, sections and elevations showing all required builders work, including the size and position of all bases, plinths, holding down bolts, holes, chases, trenches etc. in the structure or building fabric related where applicable to the column/building grid lines, steelwork to be built in or attached to the structure.
- h) Diagrammatic, schematic and wiring diagrams of all automatic control systems, including arrangements and description of operation of the automatic control installation.
- i) Manufacturers' data/drawings of all equipment, assemblies, components and installation clearly indicating operating characteristics of the equipment.
- j) All associated design calculations and commissioning schedules. The Contractor shall provide 3 copies of the above information.

3.1.9 Site Visit

The Contractor shall be deemed to have visited the site during the tender period, acquainting themselves fully with local conditions and to obtain all information required to accurately formulate the tender including existing building details and arrangements and site topography. The Contractor shall liaise with the client to gain access to the property.

Any apparent discrepancies or queries shall be referred to the Consulting Engineer for clarification prior to submission of tender.

Claims for lack of knowledge shall not be considered.

3.1.10 Installation Requirements

All services shall be installed to achieve reliability and disruption free operations. All components shall be fully accessible for maintenance and replacement. Items requiring regular adjustment or affording isolation facilities, where located in concealed positions shall have removable access covers, tiles, or other suitable provision made to afford ease of access.

Contractor to satisfy himself that all plant spaces are adequate to house all items of plant as described.

All services shall be installed with all aspects of Health and Safety at Work fully considered. All systems shall be installed to be economical in operation and particular emphasis shall be placed on the use of energy conserving design techniques and reliable components.

When preparing installation drawings, the Contractor shall have due regard for all aspects of the building design, location of all proposed services and shall make himself aware of any co-ordination problems which need to be resolved before the installation commences.

The Contractor shall retain on site a full set of up to date drawings, marked up showing current progress including any agreed amendments and these shall be available for inspection at all times.

All dimensions given on drawings shall be verified by the Contractor on site before the installation commences.

The Contractor shall comply fully with Section 2 (Inspection and Testing) of this specification. The Contractor's attention is drawn to the requirement to comply with Building Regulations.

This includes the requirement to comply with Part L – Conservation of Energy. In addition to suitable metering of energy usage, energy saving measures must be provided, including photoelectric and presence detection for lighting.

3.1.11 Tender Summary

The Contractor shall complete all sections and elements of the Summary of Tender enclosed with this specification and return it with the tender submission.

3.1.12 Construction (Design and Management) Regulations 2007

The Contractor shall note that this project shall be carried out in accordance with the Health & Safety Executive Construction (Design and Management) Regulations 2007.

The Contractor shall include in the tender for complying with the CDM Regulations 2007 in full and as detailed in the Main Contract Preliminaries.

3.1.13 Builders Work

The builders work associated with the Electrical Installation works shall be executed by the Main Contractor.

The builders work comprises the elements of building work necessary to incorporate the services installation into the building/structure, fabric and finishes including cutting out of all chases, holes, forming openings and trunking sleeves, provision of supports/noggins in walls to accommodate fixing of services equipment and the provision of plywood backboards for the support of ceiling mounted luminaires, smoke detectors, etc.

The Contractor shall be responsible for producing detailed builders work schedule for pricing, drawings and for marking out work required.

All making good and painting shall be carried out by the Main Contractor.

3.1.14 Type of Installation

The electrical installation shall be concealed where possible in the building fabric i.e., installed in ceiling voids and partition walls (where available).

The proposed system shall be installed as follows:

System	Installation Method
Sub Main Cabling	XLPE/SWA/LSF multicore on galvanised steel cable tray within ceiling voids (where available) and service risers. Sub-main cabling installed externally to the building shall be XLPE/SWA/PVC. All internal cables shall be clipped to cable tray using proprietary cable cleats or all round band with plasticised covering.
Small Power	LSF insulated twin and cpc cables installed on galvanised steel cable

	tray within ceiling voids (where available) and concealed within the building fabric.
General Lighting	LSF insulated twin and cpc cables installed on galvanised steel cable tray within ceiling voids (where available) and concealed within the building fabric.
Emergency Lighting	LSF insulated twin and cpc cables installed on galvanised steel cable tray within ceiling voids (where available) and concealed within the building fabric.
Fire Alarms	Multi-core enhanced fire resistant soft skin cables with red sheath in accordance with the requirements of BS: 5839-1-2002 and the fire alarm system manufacturers recommendations.
Mechanical Services	Generally as per Small Power and Sub Main cabling, to be agreed with the Mechanical Contractor.
Security Systems	Multicore cable on galvanised steel cable tray, trunking and PVC conduit concealed within the building fabric/ceiling voids (unless specifically noted otherwise).

3.1.15 Approved Specialist Sub-contractors/ Manufacturers

This specification (including the schedules included in this specification) details the approved manufacturers/installation contractors for this project. The tender shall be fully compliant with these manufacturers/installation contractors.

Should the tendering contractor wish to use any alternatives, details shall be submitted at tender stage, along with any programme or financial incentives to the client. Once tenders have been let, no alternatives will be permitted.

The electrical contractor shall liaise with their selected specialist sub-contractors throughout the installation process, ensuring that the client's requirements are met in full. In addition, the electrical contractor shall provide and install all power supplies and containment as necessary for these systems.

Orders for all sub-contractors and manufacturers shall be placed to allow sufficient time for lead in times, including any holiday periods, to allow materials and labour to arrive on site in accordance with the main contract programme. The Engineer and Client reserve the right to inspect any orders for materials or labour in the event of any delays on site. The Main Contractor shall ultimately be responsible for the overall timely completion of the project, with the expectation that progress meetings between the various trades be held at least monthly, with minutes being forwarded to all parties within two weeks of each meeting.

3.1.16 Deleterious Materials

The use of the following materials or components is not acceptable on this project:

- Asbestos or asbestos based products
- Urea formaldehyde foam
- Silicone bricks or tiles.
- Re-wireable fuses
- Halon/CFCs
- Any other material generally known or thought to be deleterious to health or in contravention of any relevant British or European Standard Specification, Code of Practice or EEC Legislation.

In addition, the contractor shall not install (without written permission from the Architect or Engineer) any materials which emit any environmentally damaging gases where alternatives, less damaging to the environment are readily available.

3.1.17 Stripping Out of Redundant Services and Protection of Existing Services

The contractor shall include for the isolation and stripping out of any temporary services that become redundant as part of the project works.

Stripping out shall include plant and equipment, wiring and associated containment, isolation and control devices etc.

The full extent of any stripping out will be ascertained during the installation phases of the works.

3.0 PARTICULAR SPECIFICATION

3.2 INCOMING SERVICES

3.2.1 Design Objectives

To provide a new electrical supply to the new main switch panel located on the lower ground floor area from a new network connection.

Provide a 100mm ducted network connection to the building from the local telecoms infrastructure for IT/telecoms equipment.

3.2.2 Design Parameters

Three phase and neutral supply connections having a service capacity of 150kVA are required to the building. The new supply shall include 20% spare capacity to allow for future growth of services.

3.2.3 System Description

The Contractor shall procure the new LV electrical supply for the development and liaise with the REC and main contractor accordingly to ensure the construction programme is met.

The new supply cables shall be installed below ground and routed to the service position located on the lower ground floor. Where cables are required to cross roads or other hard features, ducts shall be installed to protect cabling. Cables shall be installed to the REC's specification.

The Client shall procure the telecoms service directly to provide a telephone provision to the building.

3.0 PARTICULAR SPECIFICATION

3.3 LV DISTRIBUTION EQUIPMENT

3.3.1 Performance Objectives

To provide low voltage power distribution from the new distribution equipment to serve the proposed refurbishment.

3.3.2 Design Parameters

Distribution equipment including sub main cables shall be selected fully in accordance with BS 7671: 2008.

3.3.3 System Description

A new panel board and new distribution boards shall be provided and installed as detailed below and identified on the drawings to serve the building refurbishment.

A new main LV switchboard is to be installed in the lower ground floor of the building as shown on the drawings. Switchboard to be manufactured in accordance with BSEN 60439-1 wall mounted, front access cubicle switchboard constructed to form 3b type 2 ASTA BEAB certified 36kA fault rated for 1s with bottom cable entry and top cable exit. 20% spare capacity on outgoing ways to be provided. Panel board as Square D I-Line 4 way TP&N rated at 400A.

Incoming devices to the new switchboard to be non-automatic moulded case circuit breaker (MCCB). Outgoing devices shall be suitably rated MCCBs complete with electronic trip units. All outgoing devices to be lockable in the 'off' position.

Electronic surge protection units are to be provided within the main switchboard arrangements in accordance with BS EN 62305 (and BIP 2118 'A UK Guide to the Application of BS EN 62305) and as detailed elsewhere in the specification.

Switchboards shall be of metal construction with a suitable quantity of outgoing ways to serve the circuits required including 20% spare for future expansion.

A rubber mat complying with BS 921 shall be provided in front of the new switchboard. A framed LV distribution schematic shall also be provided adjacent the switchboard position.

3.3.4 Metering

The metering strategy shall comprise a main REC meter monitoring the incoming supply to the entire site and sub meters installed within section boards on each floor to monitor the individual studios and landlord's areas.

3.3.5 Distribution Boards

A distribution board shall be located as detailed on the drawings on each floor of the building. These in turn shall provide each studio and landlord area with their own consumer unit and meter.

The distribution boards shall be provided to serve lighting and power circuits within the respective areas and shall be of metal construction, with a suitable quantity of outgoing ways to serve the circuits required. An integral isolator shall be provided with minimum rating of 125A. As Square D Load Centre KQII 12 way TP&N.

The new distribution boards shall be generally located at a height which will enable access to circuit breakers without resort to step ladders etc.

The distribution boards shall be complete with DB reference, supply and sub main detail labels, warning labels and circuit schedules as detailed in Section 2 of this specification.

Sub circuit protective devices in the consumer units/distribution boards shall be generally as follows:

Lighting Circuits	Type C MCB 10A rated
Ring Circuits serving general equipment	Type B 32A/ 30mA combined RCBO
Radial Circuits serving Hand Dryers	Type B MCB 20A rated
Ring Circuits serving specific equipment	Type B MCB 32A rated
Fixed Power	MCB type rated in accordance with equipment requirements.

Radial/ring circuits serving fixed items of equipment via fused connection units shall be protected by suitably rated type B miniature circuit breakers.

All unused distribution ways shall be fitted with proprietary blank plates.

3.3.6 Sub Main Cabling and Earthing

Sub main and fixed supply cables serving the new distribution boards shall be XLPE/SWA/LSF multicore on galvanised steel cable tray within ceiling voids (where available) and service risers. Sub-main cabling installed externally to the building shall be XLPE/SWA/PVC. All internal cables shall be clipped to cable tray using proprietary cable cleats or all round band with plasticised covering. Cables are to be installed in accordance with Section 2 of the specification.

All cables are to be BASEC approved with cables having a BASEC or BASSC<HAR>marking on the outer sheath as appropriate.

Earthing and supplementary bonding shall be provided in strict accordance with the requirements of BS 7671.

All new cables shall comply with European harmonisation of cable colour standard section of BS 7671 This shall include the identification of phase conductors as L1, L2 & L3 and neutral conductors as N (Appendix 7).

3.0 PARTICULAR SPECIFICATION

3.4 GENERAL POWER INSTALLATION

3.4.1 Performance Objectives

To provide supplies for fixed and portable items of equipment via radial or ring main final circuits, throughout all areas.

3.4.2 Design Parameters

Provide and install outlets to serve portable and fixed items of equipment as indicated on the design drawings. In addition, outlets shall be provided for miscellaneous items such as cleaner's sockets.

Power supplies shall also be provided to all other equipment to be provided by the main contractor or client for use within the proposed development. Fixed items of equipment shall be served via fused connection units or switch disconnectors, as appropriate to suit the rating of the equipment.

All cabling, accessories, etc. shall be installed fully in accordance with BS 7671, including section 543.7 for power supplies to ICT equipment.

3.4.3 System Description

The Contractor shall provide and install all containment, socket outlets, fused connection units, isolators, isolation devices, miscellaneous power outlets and associated wiring to provide a complete working installation.

Cables shall generally be twin and cpc LSF insulated concealed within walls and ceiling voids.

Generally socket outlet ring circuits shall be protected by MCB/RCBO devices in accordance with BS 7671.

Refer to the Architect's drawings for details of proposed furniture layouts and the Electrical drawings for the quantity of accessories/outlets required in each room.

All accessories serving fixed items of equipment or are dedicated to a specific use, shall have the front plate of the accessory engraved with its function e.g. hand dryer.

Cleaner's sockets on dedicated circuits shall be provided in areas as shown. The front plate of the cleaners sockets shall be engraved 'cleaners' and fitted with a circuit reference label.

The following additional supplies/fixed power services are required:

- a. Power supplies to security equipment, CCTV cameras, access control equipment.
- b. Power supplies to platform lift.
- c. Power supplies to mechanical services equipment including automatic ventilation controls.
- d. Power supplies to assisted WC alarm systems.
- e. Power supplies to fridges and dish washers located within kitchens. Allow one fused connection unit above bench, with a single gang socket outlet below bench per item of equipment.
- f. All other items of plant or equipment requiring a power service.

Fused connection units and flex outlet plates shall be provided to minimise surface mounted cabling with all cabling concealed as far as possible. HR flex cabling shall be provided for final connections to equipment, suitably rated for electric load and anticipated temperatures.

All accessories shall be from the same manufacturer throughout. All general area accessories shall be from a single range and shall generally be recessed white plastic, as MK Logic Plus.

Accessories in the plant room are to be surface mounted metal clad type, such as MK Metalclad Plus or equal and approved.

3.4.4 Platform Lift Supply

The contractor shall provide a supply to serve the new platform lift as detailed on the drawings. Rating of the supply and all associated switchgear and supply control units shall be installed in accordance with the requirements of the manufacturers.

The supply shall be made available for the lift installing contractor to carry out his work including final commissioning.

3.0 PARTICULAR SPECIFICATION

3.5 GENERAL LIGHTING INSTALLATION

3.5.1 Performance Objectives

To provide a new general lighting installation throughout all areas as detailed on the drawings.

3.5.2 Design Parameters

To meet the requirements of CIBSE Code for Interior Lighting, CIBSE Lighting Guide 3 and Lighting Guide 7, Building Regulations Part L2 and Guidance notes GIL20: 2002 and BS EN 12464.

Refer to the Architect's drawings for further information regarding ceiling types, void depths etc.

3.5.3 System Description

New general lighting shall be provided in accordance with the drawings and specification.

3.5.4 Controls

Lighting controls shall generally be as shown on the drawings.

To office areas lighting control shall be provided via the use of manual on/off wall mounted light switches with movement detectors providing automatic 'off' should the office be vacated for a predetermined period.

Circulation spaces and WCs shall be provided with presence automatic 'on' and automatic 'off' control via the use of ceiling mounted movement detectors.

Lighting control within the studios will be manually controlled and where windows are present the lighting will respond to daylight levels. The studio lighting will automatically dim via photocell control to compensate for natural daylight.

Lighting to the disabled WC will operate in presence mode via the automatic presence detector. On entrance to the WC an automatic presence detector shall switch the lighting 'On'. If the WC is then unoccupied for a period greater than 20 minutes, the lighting shall automatically switch 'Off'.

Controls as CP Electronics Vitesse lighting control modules.

Control of lighting within all areas shall comply with the requirements of the Building Regulations.

All luminaires shall incorporate DSI, DALI, switchDIM or SMART control gear where required.

3.5.5 Luminaires

Luminaire types shall be as detailed in the Schedule of Luminaires Section of this specification.

The contractor is to ensure that all luminaires are suitable for their intended location and environment and their mounting and wiring configuration can be integrated into the ceiling system/background to which they are to be installed.

Luminaires integrated into suspended ceiling arrangement shall be independently supported from the building structure by 'grippler' wires or similar proprietary system.

3.5.6 Lamps and LED Light Sources

All lamps and control gear shall be selected to meet the requirements of Building Regulations Part L, and as detailed in this specification.

All lamps and LED light sources shall utilise a common colour temperature throughout.

High power LED light sources shall be provided as detailed in the Luminaire Schedule. Luminaires utilising LED light sources shall be designed and manufactured for the use of LED's and shall not be

standard fittings with retrofit LED technology.

LED light sources shall be manufactured by a single reputable manufacturer and shall be from a stringent 'binning' process which will guarantee that colour temperature shall not differ between light fittings. Where LED luminaires are installed and differing colour temperatures are visible, the contractor shall be requested to replace the luminaires and/or LED light source to achieve a constant light colour temperature.

The Contractor shall ensure that all lamps are sufficiently 'burnt in' prior to any dimming controls being applied in accordance with Manufacturer's recommendations.

All linear and compact fluorescent lamps shall be 4000K and all LED light sources shall be neutral white unless indicated otherwise.

3.5.7 Cabling

Cables shall be as detailed in clause 3.1.15.

The contractor shall use lighting control modules/marshalling boxes as CP Electronics Vitesse with plug-in type modules with HR flex to luminaires.

Where lighting control modules/marshalling boxes are utilised they shall be mounted to the building structure in ceiling voids at locations to avoid excessive lengths of cabling between marshalling units and individual luminaires. Luminaire flexes (multi core HR flex) to be complete with plug arrangement for connection to the output channel of the associated marshalling box.

Where luminaires are mounted directly to the structure or directly onto conduit boxes final connections shall be carried out as described in Section 2 Part 12 Method iii.

3.5.8 Manual Switching

Where shown, manual 20 amp rated switches shall be provided. Switches shall match the electrical accessories proposed for that space. Light switches in plant rooms etc. shall be surface mounted metal clad type mounted on metal back boxes.

3.0 PARTICULAR SPECIFICATION

3.6 EMERGENCY LIGHTING INSTALLATION

3.6.1 Performance Objectives

To provide and install escape lighting to the building to allow occupants to safely evacuate the building in the event of local or general lighting failure.

3.6.2 Design Parameters

To meet the requirements of BS 5266 Part 1:2005 Building Control/Fire Authority requirements. Maintained emergency illumination levels through escape routes shall be not less than 1 lux average, with anti-panic areas illuminated to 0.5 lux minimum.

3.6.3 System Description

The emergency lighting system shall be provided throughout consisting of self-contained standalone units serving LED luminaires in the positions identified on the drawings. The systems shall include an automatic self-test facility.

Luminaires shall be a combination of open area/anti-panic, escape route, illuminated exit and overdoor external emergency LED fittings in accordance with BS 5266. Refer to the Schedule of Emergency Luminaires for selected fittings.

Where luminaires are mounted to the underside of fibre ceiling tiles the contractor shall provide plywood reinforcement panel to the rear of the ceiling tile.

Emergency luminaires shall provide a combination of 3 hour maintained or non-maintained coverage as appropriate.

Wiring shall be via the local lighting circuit and shall generally be routed in ceiling voids, service risers and plant rooms. Cables shall be clipped to a galvanised steel cable tray system.

The contractor shall include for the testing, programming, commissioning and demonstration of the system prior to handover.

Handover will not be permitted until full certification has been provided, including certification to conform satisfactory design, installation and commissioning of the system in accordance with BS 5266.

3.0 PARTICULAR SPECIFICATION

3.7 EXTERNAL LIGHTING INSTALLATION

3.7.1 Performance Objectives

To provide and install a new external lighting system to the external areas of the building namely external to the Reception and in the rear car park.

Reference shall be made to the Architectural site plans and drawings and specifications. All lighting proposals shall be fully coordinated with the landscaping provisions.

3.7.2 Design Parameters

The system is to be installed in accordance with the requirements of ILE's Guide on obtrusive light, Architectural Liaison Officers comments and local planning authority planning conditions and approvals.

3.7.3 System Description

The external lighting installation is to be supplied from a dedicated circuit with controls to include time switch and photocell. The building mounted external lighting is to be installed as shown on the drawing and controlled via a 24 hour 7 day time switch with photocell arrangement and override switch.

Cables to building mounted luminaires shall be concealed within the fabric of the building. No visible cables shall be permitted to the external façade.

3.0 PARTICULAR SPECIFICATION

3.8 FIRE DETECTION AND ALARM SYSTEM

3.8.1 Performance Objectives

To ensure that all areas concerned are provided with a system which will automatically detect fire and warn all occupants so that they may evacuate the building.

3.8.2 Design Parameters

The completed installation shall comply fully with BS EN 54 Parts 2 and 4, BS 5839-1:2002 providing L2 category protection and shall comply with LPCB approvals and Fire Officer/Building Control requirements.

3.8.3 System Description

The Contractor shall supply and install a system to cover all areas of the building as detailed below and on the drawings. The system shall include all manual and automatic detection devices, sounders, control and indicating equipment, cabling, interfaces, power supplies, containment etc. as required forming a fully operational system.

The control and indicating equipment shall be flush mounted at the locations identified on the drawings and agreed with the Fire Officer.

Cables shall generally be installed within the building fabric, ceiling voids etc. concealed throughout. Single run cables shall be concealed and clipped using LSF (red) sleeved metal wraparound 'P' clips with brass round head screws. Multiple runs of cable (two or more) shall be clipped to metal cable tray using LSF (red) sleeved metal 'P' clips or LSF (red) sleeved metal banding fixed by brass round head screws.

Detection devices shall generally be ceiling mounted optical/heat types, except for any specific areas shown on the drawings where surface mounted heat detectors shall be provided and installed (rate of rise type). Devices shall be installed a minimum of 500mm from partition walls where possible. Where devices are mounted to the underside of fibre ceiling tiles the contractor shall provide plywood reinforced panels to the rear of the tile.

Manual call points shall be semi-flush mounted, coloured 'red'. Sounders shall have a minimum output of 98dB(A) at 1m, either red coloured wall mounted types or sounder base type, with a minimum output of 90dB(A) at 1m. Visual beacons shall be provided in all WCs and other identified areas to aid hearing impaired building users and shall comply fully with the recommendations of Part M of the Building Regulations. All beacons shall be suitably ingress protected to suit the location.

The Contractor shall employ the manufacturer to install cabling and devices, program, test, commission, certify and fully demonstrate the systems on completion of the works. 'As installed' drawings shall include the recorded audibility levels in each room. The audibility tests shall be carried out with all doors and windows closed and internal partitions installed/constructed. All necessary containment systems and power supplies shall be provided and installed by the Contractor.

Handover of the works will not be permitted until full certification has been provided, including the relevant certificates in Annex G of BS 5839-1.

3.8.4 Interfaces/external monitoring

The fire alarm system shall include all necessary loop and independently powered fully addressable interface units. The individual interface units shall connect into other building services systems to operate/deactivate that system upon activation of the fire alarm.

Systems requiring fire alarm interfacing include:

- Platform Lift Control System (lift to return to ground floor and open doors)
- All other systems required to operate in the event of a fire alarm

3.8.5 Power Supplies and Containment Systems

All containment and power supplies associated with the Fire Detection and Alarm system shall be provided and installed by the Contractor. All cabling shall be fully segregated from all other services, in accordance with BS 7671 and BS 5839.

3.0 PARTICULAR SPECIFICATION

3.9 MECHANICAL SERVICES WIRING

3.9.1 Performance Objectives

Provide and install power supplies and cabling associated with the proposed mechanical services installations.

All control cabling and power supplies emanating from the mechanical control panels shall be provided and installed by the Mechanical Services Contractor.

3.9.2 Design Parameters

All cabling shall be installed fully in accordance with BS 7671:2008. Locations of equipment are provided on the Mechanical Services Drawings. Any additional information shall be obtained from the Mechanical Services Contractor. The system shall include all necessary containment and isolation devices.

3.9.2 System Description

The Contractor shall provide power supplies to mechanical services equipment generally as follows: -

- Toilet Extract Fans - Provide a supply and final connections to the toilet extract fans via the local lighting circuit and include a dedicated PIR to control the system. The fan is to operate when occupancy is detected.
- Heat Recovery Units – Provide a supply, final connection and control wiring to the heat recovery units as located on the mechanical services drawings.
- Gas Fired Boilers Pumps and Ancillary Equipment – Provide a supply, final connection and control wiring to each of the gas fired boilers, pumps and ancillary equipment as located on the mechanical services drawings.

The approximate position of the items of equipment and plant are noted on the mechanical services drawings.

All services shall be co-ordinated with the building structure/fabric and with new services, equipment, plant etc.

Refer to the Mechanical Services Contractor for further information.

3.0 PARTICULAR SPECIFICATION

3.10 CCTV SYSTEM

3.10.1 Performance Objectives

To monitor specific internal areas of the building for security purposes.

3.10.2 Design Parameters

The system shall be supplied, installed and commissioned by the contractor as detailed below and as shown on the drawings and shall comply with NSI Code of Practice NCP 104:Issue 2 and BS EN50132-7:1996

Power supplies and containment shall be compliant with BS 7671.

The installation and configuration of the CCTV system shall fully comply with the Data Protection Act and Information Commission Office regulations and guidelines.

All cameras are to be monitored and images digitally recorded.

3.10.3 System Description

The Contractor shall employ a specialist CCTV installation contractor to supply, install, test and commission the system serving the areas as shown on the drawings.

3.0 PARTICULAR SPECIFICATION

3.11 ACCESS CONTROL SYSTEM

3.11.1 Performance Objectives

To provide a door access control system such that authorised personnel only can access specific areas of the building.

3.11.2 Design Parameters

Controllers, locks, networking equipment, etc. shall be provided and installed to suit the manufacturer's requirements as well as to comply with all British Standards and NSI guidance documents.

All components shall be selected from a single manufacturer to provide a fully warranted system. Spare capacity shall be provided to allow the system to be extended in future.

3.11.3 System Description

The Contractor shall employ a specialist installer to supply, install, test and commission the door access system to provide secure entry to the premises via the main entrance.

Proximity readers shall be provided on the 'unsecure' side of controlled doors, with a combination of push to exit buttons and green break glass units or door furniture incorporating a fail-safe door release mechanism on the 'secure' side.

The system shall include door controllers requiring an electrical supply, fire alarm interface connection and data point to allow the controller to be networked for centralised monitoring and programming. Individual door control equipment shall be connected to the associated door controllers and door furniture (where required) with all cabling concealed within the building fabric and at the door position.

The location and mounting height for each door controller is to be agreed on site prior to installation.

The door controllers shall be interlinked to the fire alarm system. The system shall automatically release secured doors in the event of a fire alarm condition within the building.

3.11.4 Power Supplies and Containment Systems

All containment and power supplies associated with the Access Control system shall be provided and installed by the Contractor. All signal cabling shall be fully segregated from mains voltage cabling in accordance with BS 7671.

Cable baskets shall be installed along major routes, with PVC conduits provided for minor routes. The use of supertube or similar will be permitted as an alternative to PVC conduits. All conduits shall be provided with draw ropes ready for use by the Access Control specialist sub-contractor.

The contractor shall include for the testing, commissioning, demonstration and certification of the system on completion.

The contractor shall also include for 12 months maintenance of the system following practical completion of the project works.

3.0 PARTICULAR SPECIFICATION

3.12 DISABILITY ASSISTANCE SYSTEMS

3.12.1 Performance Objectives

To provide an alarm system for the use of people with disabilities to the accessible WC.

3.12.2 Design Parameters

As manufacturer's recommendations, as well as to meet the requirements of Part M of Building Regulations, DDA recommendations and BS 5839 Part 9.

3.12.3 System Descriptions

Accessible Toilet Alarm System

Provide, install, test and commission accessible toilet alarm systems to the accessible WC as indicated on the drawings. The system shall comprise the following:-

- Pull cord located in the WC, complete with two red triangular bangles or similar to aid use by the mobility impaired. Heights of these shall be in accordance with the recommendations of BS 8300. Pull cord units shall be complete with reassurance lights.
- Local reset and re-assurance lights visible from the WC.
- Over-door indicator and sounder located at suitable location outside the WC to allow local identification of an alarm situation.
- All necessary power supplies, cabling, containment systems, etc. to provide a fully operational system.

The Accessible Toilet Alarm system shall comply fully with the recommendations of BS 8300.

The system shall be installed and commissioned by a contractor approved by the manufacturer. The completed system shall then be demonstrated to building users to ensure that they are fully aware of the operation of this system.

The Contractor shall include for all associated certification and 'As Installed' information. The Contractor shall also include the first 12 months maintenance of the system following practical completion.

3.0 PARTICULAR SPECIFICATION

3.13 EARTHING AND BONDING

3.13.1 Performance Objectives

To provide an installation where the exposed conductive parts of the installation are connected to an earthing system in accordance with the requirements of BS7671:2008.

3.13.2 Design Parameters

Comply with the relevant sections of BS 7430 and BS 7671:2008 including all amendments to date.

3.13.3 System Description

Supplementary equipotential bonding shall be installed to meet the requirements of BS 7430 and BS 7671: 2008, including (but not limited) to 4mm² PVC bonds between the main earth bar at the associated distribution board and the following where applicable to the newly altered works:

- i) Hot and cold water pipes at all sinks and basins
- ii) Cold water feed pipes at all WC cisterns
- iii) Isolated lengths of ventilation ductwork and tray systems
- iv) Metal sinks and basins
- v) Suspended ceiling system metal grid
- vi) Extraneous metalwork within showers or bathrooms
- vii) Any other specialist pipework not covered by the above.

In addition, bonding shall be provided to incoming services, the lightning protection, etc. as required.

3.0 PARTICULAR SPECIFICATION

3.14 INSPECTION, TESTING AND COMMISSIONING

3.14.1 Performance Objective

To certify that the installations comply fully with the IEE wiring regulations and the individual system requirements, operational arrangements and associated standards and regulations.

3.14.2 Design Parameters

Prior to energising any part of the installation the Contractor shall fully inspect and test the works to prove that the requirements of BS 7671 and this specification are fully met.

3.14.3 System Description

The Contractor shall provide all the necessary instruments for testing the installation, in accordance with the Regulations, standards and requirements, and any extra tests called for in this Specification. Evidence of accuracy of all testing equipment and instrumentation shall be provided by the Contractor for all test instruments. Failure to provide such evidence will invalidate the test.

Final testing shall be carried out in the presence of the Engineer and three copies of the test results, the completion certificate and the inspection certificate, as described in the Regulations, shall be supplied by the Contractor, for each completed phase of works.

The installation shall not be accepted until such certificates have been approved.

3.0 PARTICULAR SPECIFICATION

3.15 'AS INSTALLED' DRAWINGS, MAINTENANCE MANUALS AND TRAINING

3.15.1 Performance Objectives

To provide the necessary 'As Installed' documentation to allow the client to operate and maintain the installation beyond the defects liability period.

3.15.2 Design Parameters

During the progress of the contract, the Contractor shall record on drawings (in an approved manner) the information necessary for preparing the 'As Installed' record drawings.

These record drawings shall be included within the operation and maintenance manuals, which shall also include test certificates, manufacturer's literature, system description, etc.

Provide the relevant information to the Main Contractor to permit the collation of the Building Log Book (in CIBSE TM31 format) to comply with Building Regulations.

The above information shall be provided to the main contractor to allow the completion of the Building Manual and the Health and Safety File(s).

3.15.3 System Description

The marked-up drawings shall be made available to the Engineer for inspection and checking at any time during the contract.

Installation record drawings shall clearly indicate:-

- a) The position of newly installed plant and apparatus.
- b) Type, position and depth of all cable joints.
- c) Earth loop impedance of the installation.
- d) Prospective short circuit at the origin and other key points of the installation.

The "As Installed" drawings shall be provided prior to the issue of the Practical Completion Certificate and shall be provided as AutoCAD DWG files on recordable CD.

3 No. printed copies of the final drawings to be provided as part of the Operating and Maintenance Manuals. In addition, 3 No. copies of the Operating and Maintenance Manuals as detailed in Section 2 of this specification shall be provided.

The Operation and Maintenance Manuals and 'As Installed' drawings shall be provided by the Contractor at Practical Completion.

The relevant information for the Building Log Book shall be provided to the Main Contractor prior to practical completion to allow sufficient time for the completed Log Book to be forwarded to the client at Practical Completion.

3.0 PARTICULAR SPECIFICATION

3.16 EQUIPMENT WARRANTIES AND PLANT MAINTENANCE

3.16.1 Performance Objectives

The installations shall be warranted and maintained for twelve months following practical completion and the provision of maintenance of specific systems for a period of 12 months following practical completion of the project.

3.16.2 Design Parameters

Provide all maintenance and periodic testing as required by BS 5266, BS 5839 and manufacturer's and specialist supplier's recommendations to ensure that all systems have been correctly maintained and are in full working order at the end of the defect liability period.

3.16.3 System Description

Equipment Warranties

The Contractor shall ensure that all manufacturers' equipment warranties are to run for twelve months from the practical completion of the main contract.

Plant Maintenance

After completion of the works and acceptance of the installation by the Client, the Contractor shall be responsible for the maintenance of the specific systems listed below in accordance with the manufacturer's recommendations, inclusive of the provision of all consumable items, for the duration of the twelve months following practical completion. The requirement does not affect the contractors contractual obligations associated with the 12 month defect liability period.

Systems included in the maintenance shall be as follows:

- Access Control System
- Disability Assistance Systems
- Platform Lift
- CCTV system

The cost of providing the 12 months maintenance shall be separately identified for each system in the priced Summary of Tender.

The contractor shall provide a schedule of proposed maintenance visits and the activities to be carried out during each visit for each individual system. Each visit shall be recorded and signed off with the completed schedule issued by the contractor at the end of the 12 months defects liability period.

3.0 PARTICULAR SPECIFICATION

3.17 SCHEDULE OF MANUFACTURERS

Item	Manufacturer(s)	Note(s)
Distribution Boards	Schneider Square D	12 way TPN rated at 125A as KQII
Switches, sockets and accessories	MK Electric	MK LogicPlus Range
Cables	AEI Tyco Draka	All cables to be BASEC approved
Trunking and trayplate	Salamandre UniTrunk Wallsall	
Basket Tray	Marshall Tufflex MK Electric Mita	
Luminaires	Various, refer to luminaire schedules	
External Luminaires	Various, refer to luminaire schedule	
Lamps	Philips Osram	
MT Supertube conduit	Marshall Tufflex	
Fire Detection and Alarm System		
CCTV		
Access Control		
Lighting Controls	CP Electronics	As Vitesse modular range

3.0 PARTICULAR SPECIFICATION

3.18 SCHEDULE OF DRAWINGS

The proposals for the services are illustrated on the tender drawings listed below. These drawings are to be read in conjunction with the following:

- a) The Architectural drawings
- b) The Structural drawings
- c) The Mechanical Services drawings and Specification

Drawings to be read in conjunction with this specification.

<u>Drawing No.</u>	<u>Title</u>
2012057/E - 001	Lower Ground Floor Electrical Layouts
2012057/E – 002	Ground Floor Electrical Layouts
2012057/E – 003	First Floor Electrical Layouts
2012057/E – 004	LV Distribution Schematics

Distribution Board Schedule



Revision	Date	Description	Made	Chk	App
-	08.06.12	DB Schedules	EM	KA	PO