



PROJECT SPECIFICATION

FOR THE

MECHANICAL, ELECTRICAL,
AND PUBLIC HEALTH SERVICES

AT

MCA TARLAIR BUSINESS PARK
TARLAIR CIRCLE
TARLAIR WAY
MACDUFF
AB44 1GD

Client: HM Coastguard Operations
Bay 2/06, Spring Place
105 Commercial Road
Southampton
Hampshire
SO15 1EG

Clients Representative: Graham + Sibbald
233 St Vincent Place
Glasgow
G2 5QY

For the Attention of: Alex Chan Telephone N^o 0141 567 5375

MCA Tarlair Business Park
Tarlair Circle
Tarlair Way
Macduff
AB44 1GD

Specification prepared by: FHP Engineering Services Solutions
1st Floor, I2 Office
2 West Regent Street
Glasgow
G2 1RW

Job No. 30519
Contact Name: Graeme Bruce
Telephone N^o 0141 206 3833
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SECTION 1.00

CONTRACT PARTICULARS AND SCOPE OF WORKS

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SECTION 1.00

1.01 THE SITE

The site address is:

MCA Tarlair Business Park
Tarlair Circle
Tarlair Way
Macduff
AB44 1GD

1.02 THE PROJECT TEAM

Contract Administrator (CA):	Graham + Sibbald 233 St Vincent Street Glasgow G2 5QY
Services Engineer:	FHP Engineering Services Solutions 2 nd Floor, 12 Office 2 West Regent Street Glasgow G2 1RW
Quantity Surveyor:	Graham + Sibbald 233 St Vincent Street Glasgow G2 5QY

1.03 DEFINITIONS

The following definitions apply to the FHP documentation.

Contractor

The company named in the Contract as being responsible for carrying out the works.

Mechanical Specialist

The Company employed as a domestic sub-Contractor to carry out the works.

Electrical Specialist

The Company employed as a domestic sub-Contractor to carry out the works.

Public Health Specialist

The Company employed as a domestic sub-Contractor to carry out the works.

Controls Specialist

The Company employed as a domestic sub-Contractor to carry out the works.

Engineering Services Specialists

The description utilised in Clauses of the FHP ESS Specifications where the work described apply to all of the above specialists.

NB: - No distinction shall be drawn between the term Contractor and Mechanical Specialist etc. etc., and the term Contractor shall apply equally to any of the aforementioned Specialists, there being no contractual distinction between one or the other(s).

1.04 DESIGN

It is a Condition precedent to entering into an agreement with the Employer that the Contractor accepts the responsibility and warrants the design, to the Employer's requirements for:

- The selection of equipment specified within the Drawings and Specification.
- All Supports and Brackets and fixings.
- The selection of the Control items.
- The final positioning of Control devices for optimum performance of the environmental controls systems.
- Compliance with all British Standards, Codes of Practice, Building Regulations and Industry Standards.
- The routing of controls cabling.
- The selection and routing of all cable ways and containment.
- The production of working and installation drawings from the tender scheme design.
- The detailing of Builders work.

Schedule of the Engineering Services Specialists Duties

Stage 1 - Enabling

Consult with Local or other Authorities on matters in connection with the Works including the availability of Public and other Utilities and the installation of New Incoming Supplies.

The Contractor shall liaise, place the order, manage, programme, supervise, provide attendance with the Local or other Authorities to ensure that all new supplies are ordered and installed in a timely manner to meet the programme and that the incoming supply installations are complete.

Prepare, or participate in the preparation of a programme for the installation and construction, taking account of the proposed contract procedures.

Submit method statements (including Sketch Drawings and outline calculations where necessary) in summary of the options available or the conclusions reached for the works to be installed.

Stage 2 - Outline Proposals

Agree with the CA and other members of the design team a programme for this and subsequent stages taking account of the scope and extent of the duties required.

Investigate any reasonably accessible data and information relating to the project and relevant to the works. Consider any reports relating to the works which are made available by the Employer or others.

Consider and comment on any alternative proposals for the systems for each of the Engineering Services to be included in the works.

Agree with the CA the preferred solutions for the project and provide sketch drawings or other documents necessary to clarify the outline proposals.

Stage 3 - Scheme Proposals

Develop the proposals, obtain quotations for the equipment and produce drawings of structural planning requirements associated with the Engineering Services, showing locations and sizes of holes, items of plant, ducts and service runs, also confirm weights of any item affecting the structural design.

Assess and prepare schedules of power, heating and cooling loads as applicable, and confirm insulation and glazing standards with the design team. Review and update as necessary the general considerations affecting the selection of energy resources.

Submit final scheme proposals for each of the Engineering Services to be included in the works, and collaborate with the Employer, CA, and the Employers Engineers in preparing a report to the Employer.

Stage 4 - Working Drawings

Collaborate throughout this stage with the Employer and the CA to ensure that designs of Engineering Services are developed in a manner compatible with the Architectural, structural and services design information provided.

Agree with the CA the scope of the Installation/Co-ordination Drawings with particular reference to the demarcation of each service.

The Contractor shall carry out detailed site surveys, prepare the co-ordination working drawings, and installation drawings for all the services.

Incorporate in the co-ordination drawings details of any Engineering Services.

Provide builderswork information to the CA based upon co-ordination drawings for the works.

Prepare any report or additional documentation required for consideration of any alternative proposals for the execution of the works.

The Contractor shall obtain all the information which the Specialist Engineering Services Specialists/Suppliers are required to provide in time to meet the Programme. Thoroughly check that the information is complete, dimensions are correct, that account is taken of all related or adjacent work, and that construction is practicable. The Contractor shall then submit to the CA twelve unmarked copies for comment. Any comments provided will not relieve the Contractor, Engineering Services Specialist or the Sub-Engineering Services Specialist(s)/Supplier(s) of their respective responsibilities for design, co-ordination and implementation.

Stage 5 - Installation

Advise the CA on the appointment of site staff.

Collaborate with the Employer and the CA in resolving any problems which may arise from the installation drawings.

Establish appropriate cost control procedures with the CA.

Supply, deliver, install and set to work the Engineering Services Installations in accordance with the contract programme.

Inspect and witness the testing of materials or equipment during manufacture.
Advise the CA as to the need to vary any part of the project for any reason relating to the works.

Provide technical and cost information to the CA to enable the value of any variation to the works to be agreed.

Carry out commissioning and testing procedures and prepare all necessary associated documentation for permanent record thereof.

Operate the system under automatic control for a period of ten days prior to offering for hand over.

Prepare, prior to the completion of the works, record drawings, operating instructions and maintenance schedules.

Demonstrate the systems to the Employer and the CA.

1.05 LEAD CONTRACTOR

In the event of the Electrical works being let separately to the Mechanical and Public Health works, the Mechanical Specialist shall act as lead Services Specialist in respect of co-ordination of working drawings, the co-ordination of the services installation and the installation on site.

1.06 MECHANICAL SERVICES POWER WIRING

The Mechanical power wiring and containment shall be carried out by the Electrical Specialist as part of the electrical works and the costs included in the Electrical Services Tender return.

It is the responsibility of the Contractor, therefore to ensure that they have received and read all of the tender documentation for all services in order to return full and proper costs for the works.

The Mechanical and Public Health Specialists shall ensure that all manufacturer's plant and equipment details are issued to the Electrical Specialist for inclusion in the works.

1.07 EXTENT OF WORKS

The descriptions included in these documents generally describe the extent and nature of the works, but do not attempt to give a detailed description of the works and moreover do not absolve the Contractor from their responsibility to visit the site and make themselves aware of all factors which may affect the content and programme of works and methods of construction.

No additional costs shall be considered should the Contractor fail to fully familiarise themselves with the complexity of the building and refurbishment works.

The work undertaken by the Contractor shall comprise the survey, design and installation of the services as described in these tender documents.

The survey works required of the Contractor shall be those which are necessary in order to undertake the services design, prepare accurate drawings, and satisfactorily execute the installation.

The work undertaken by the Contractor shall comprise the taking down and removal to scrap of redundant equipment and the installation of new services equipment included in the Tender documents.

The Contractor shall be wholly responsible for the surveys, provision, installation, testing, commissioning and general setting to work of all necessary equipment to complete the installation as described herein, in accordance with the Standard Specification and as shown on the scheme drawings.

1.08 GENERAL DESCRIPTION OF THE WORKS

The detailed description of the proposed works is in Section 2.00, and 3.00 of this documentation. The outline scope works shall comprise:

Mechanical Services

- Provision of new infrared heaters mounted at high level within the garage area including all associated controls and ancillaries.
- Provision of new wall mounted electric panel heaters within store room and WC.
- Provision of new extract ventilation within the WC and the store area including all associated controls and ancillaries.
- Provision of new point of use, electric water heaters to serve the WC and tea prep area including all associated controls and ancillaries.
- Provision of new cold water services pipework to serve the WC and tea prep areas as required.
- Provision of new drainage services and associated pipework connections to serve the WC and tea prep areas as required.
- Preparing the co-ordination working drawings, installation drawings for all the services.
- Testing and Commissioning of Mechanical Services Systems.
- Production of Operating and Maintenance Manuals for Mechanical Services Systems.

Electrical Services

- Provision of new lighting and emergency lighting to the proposed spaces.
- Provision of external, building mounted floodlighting
- Provide new fire alarm panel and devices to suit the proposed spaces.
- Provide new electrical distribution services and small power distribution to the proposed spaces as per the tender design drawings.
- Provide new data points to the proposed spaces as per the tender design drawings
- Provide new intruder alarm and devices as per the tender design drawings
- Provide power supplies to mechanical equipment.
- Carry out strike risk assessment, and install lightning protection installation if deemed necessary.
- Testing & commissioning of the electrical installation.
- Prepare and issue Operating & Maintenance Manuals and Record Drawings.

Items which are described in the Specifications and not indicated on the drawings and Vice Versa shall be deemed to be included in the Tender.

The Contractor shall note that the clauses in this Specification are supplementary to those of the Main Contract and shall not modify or override the Main Contract clauses in any way.

The services drawings for this Project comprise:

Drawing Number:	Title:
30519-(560)00-01	Proposed Heating & Ventilation Layout
30519-(530)00-01	Proposed Water & Drainage Services Layout

Drawing Number:	Title:
30519-(620)00-01	Proposed Small Power Layout
30519-(630)00-01	Proposed Lighting Layout
30519-(670)00-01	Proposed Fire Alarm Layout

1.09 SURVEY AND INVESTIGATION WORKS

The Contractor shall undertake a full survey of the relevant areas of the building to be undertaken during the development of his working drawings in order to both prove co-ordination of services and for developing the most practical routing of services.

No additional costs shall be considered for the Contractor for either under estimating the requirement for detailed survey works or for additional/abortive drawing works resulting from information gleaned during the surveys.

1.10 SECTION 6 BUILDING REGULATIONS

The Contractor shall take into account the guidelines laid down in the latest Building Regulations in order to achieve a building which is environmentally sensitive, affords an internal environment beneficial to the health and safety of the occupants and compliant with the latest issue of these documents.

1.11 SCOPE OF CONTRACT

The works covered by the Contract comprise the services as defined in this project specification.

The Contractor shall include for all work described in this specification and for all necessary work both temporary and permanent that may be required for the proper and correct fixing and functioning of the installation whether particularly mentioned in this specification or shown on the contract drawings or not.

The works shall include, setting out, the preparation of detailed co-ordinated services drawings, working drawings, scaffolding, plant, all labour and labour supervision, the supply, delivery to site, storage, transportation of materials and erection of all materials and components necessary for the complete and satisfactory installation, testing, commissioning, operation, correction of defects, completion, handing over, operational and maintenance manuals.

The Contractor shall allow for all cost in providing office huts, stores etc., telephones, power supplies etc. that may be required for the execution of the contract works.

Should any alterations or additions to the existing services be involved the Contractor shall inform the CA immediately and shall arrange when the work required is to be carried out and shall include for such reinstatement and adjustment as is necessary to ensure the continued satisfactory operation of the affected services.

1.12 WORKING DRAWINGS

General

Working drawings for construction shall be produced as required under the terms of the Preliminaries and Conditions Documents. These shall be produced, utilising the most recent issue of available information, and undertaken by the Contractor. Working drawings shall be issued to the CA for approval prior to ordering materials or putting any work in hand.

These drawings shall be fully co-ordinated include all services and incorporate dimensioned details of all services, cross-over details of services showing spatial requirements, items requiring access, sizes

and positions of all access traps and panels etc. The Contractor shall carry out a full survey of the site and incorporate such information onto his co-ordinated installation drawings.

The working drawings shall incorporate all required builders work details.

From the information provided, the Contractor shall prepare or shall cause his Engineering Services Specialist, Specialist Suppliers/Specialist Sub Engineering Services Specialists to prepare, all necessary co-ordination installation drawings, shop drawings, diagrams and schedules to a minimum scale of 1:50 or 1:20 as may be required to illustrate in detail the arrangements of the various sections of the Works and to identify and describe the various components for the proper execution and installation of the Works in accordance with the best trade practices in a neat and skilled manner to the satisfaction of the CA.

The installation drawings shall be fully co-ordinated with the requirements of all Engineering Services Specialists, whether domestic or nominated, and with the building and its associated services and shall indicate all necessary dimensions for the integration of the works properly within the detail of the building in a compatible manner with the structural and architectural and Employer's requirements.

The Contractor shall prepare his co-ordinated installation drawings in accordance with the agreed contract programme. The Contractor shall attend regular co-ordination meetings and, having agreed layouts, the Contractor shall be then fully responsible for the correctness of his co-ordinated installation drawings, and any subsequent co-ordination clashes shall be corrected at the Contractor's own expense.

The Contractor shall, by reference to the contract drawings, be responsible for ascertaining that his works are fixed correctly in relation to the elements of the building and any special features or fittings attached to it and shall take all steps and measures to ensure that a good and acceptable appearance is achieved which is to the CA's satisfaction.

All Contractor's Co-ordinated Installation Drawings shall be stamped as such and no work shall be carried out other than on these drawings, commented on by the CA as described hereunder.

Builders work Drawings

Builders work drawings and/or schedules shall be prepared by the Contractor to show requirements for architectural or structural provisions necessary to facilitate the execution of the Works and allow its integration into the contract. Such drawings shall include requirements for ducts, holes, chases, trenches, foundations, bases and supporting structures for plant or equipment etc. and all related making good requirements. Such drawings shall be submitted to the CA in accordance with the Contract Conditions and agreed programme.

1.13 INFORMATION/DRAWING REVIEW

The Contractor Co-ordinated Installation Drawings, builders work drawings and Information will be reviewed by the CA and returned with a review code as described below. Upon receipt of such drawings bearing the CA's review code and signature, the Contractor shall immediately take such action as demanded by the CA's review code. The review codes as referred to herein shall be defined as:

Code A Information acceptable, work may proceed in accordance with the Contract and Specifications, no further review necessary.

Code B Information acceptable in principle, work may proceed in accordance with the Contract and Specifications provided that comments annotated on drawings and/or accompanying schedules are incorporated. Incorporate comments on drawings and resubmit.

Code C Information not of acceptable standard, work may not proceed. Correct and/or provide additional intonation and resubmit for review.

Drawings returned to the Contractor for amendment must be re-submitted showing the nature of the amendment in a revision schedule on the drawing, together with the revision number or letter and the date of the revision. The areas amended on the drawing shall be highlighted by means of a 'balloon'.

The CA will review and comment upon the overall layout of plant and equipment, ducting, pipework, cabling, trunking, conduit etc. shown on the co-ordinated installation drawings and their general location in addition to the type and size of such items, in so far as they conform to the Employer's requirements.

The exact position in the Works of items relative to grid lines, floors, beams, ceilings, walls and other structural items and any other services is the Contractor's responsibility and the CA's review and comment does not absolve the Contractor from this responsibility.

The Contractor shall review the co-ordinated installation drawings to satisfy himself that they are in accordance with the Contract. The drawing review and comment procedure shall not relieve the Contractor from responsibility for:

Any deficiency or inaccuracy or non-compliance with the Contract or of the specifications.

Any error in the proper fixing of the Works.

The necessity of providing any work required by the Contract or the Specification not indicated on the installation drawings.

1.14 LIAISON BETWEEN ENGINEERING SERVICES SPECIALISTS AND MANUFACTURERS

The Contractor shall ensure that the closest possible liaison is made between other Specialists and Manufacturers.

The Contractor shall ensure that all aspects of the works whether mechanical, electrical, controls or building are closely co-ordinated as no extra costs shall be accepted for any works required due to non-compliance with this Clause.

The Contractor shall ensure that where necessary, the manufacturer and equipment suppliers receive copies of the electrical and mechanical and building drawings and complete information to ensure the above is fulfilled.

The Contractor shall ensure that where necessary they are provided with all information necessary to ensure complete compatibility.

The Contractor shall ensure that the closest possible liaison is made between and with manufacturers, suppliers and his Specialist Engineering Services Specialists to ensure complete works compatibility.

The Contractor shall ensure that all aspects of the works, whether Engineering Services or Building, are closely co-ordinated as no extra costs will be accepted for any works required due to the Engineering Services Specialist's non-compliance.

The Contractor shall be responsible for ensuring manufacturers and equipment suppliers shall receive details of relevant Engineering Services and Building drawings and information to enable the co-ordination to be achieved.

1.15 INSPECTION OF THE SITE

The Contractor shall be deemed to have visited the site to establish the details, site conditions and existing services before submitting his tender bid.

No claim for extra costs shall be considered in respect of any item the existence of which could have been established by inspection of the site.

The Contractor shall make all arrangements to visit the site during the tender period with the CA.

The Engineering Services Specialists shall liaise with each other to ensure minimum interference between works.

1.16 SERVICES SPACE REQUIREMENTS

The Contractor shall ensure that all plinths, bases, plant rooms, services trench/duct, service risers, structural openings, false ceiling voids, false floor voids and all spaces for the installation are adequate.

1.17 ACCESSIBILITY TO PLANT AND EQUIPMENT

The Contractor shall provide marked up drawings/schedules showing the sizes for all access openings required for maintenance, installation etc., which shall be submitted for approval.

The Contractor shall co-ordinate and agree all such access points with the CA.

1.18 INSTALLATION WITHIN THE EXISTING FABRIC

Where items of equipment or work are located within confines of the new or existing interior fabric, the Contractor shall ensure that all services do not obstruct the fabric installation in such a way that the required equipment cannot be installed or existing equipment cannot be reinstated.

The Contractor shall also carry out the relocation and co-ordination of existing services to enable the new services to be installed.

The Contractor shall liaise with the CA at all times to ensure that the required aesthetic criteria are achieved.

1.19 CONSTRUCTION (DESIGN & MANAGEMENT) REGULATIONS

Tenders shall note that the project comes within the full requirement of the above Regulations and shall make due allowance for this fact.

The Contractor shall fulfil all relevant duties in accordance with the above Regulation including the requirement to produce Method Statements and Risk Assessments for approval by the CA, and shall make due allowance for this within the tender.

1.20 ORIGIN OF EQUIPMENT

All equipment installed shall comply fully with all relevant Standards and Regulations and (unless written authorisation to the contrary is given by the CA) shall have been manufactured in a country within the EEC.

1.21 EARLY PLANT DELIVERIES AND EXTENDED WARRANTIES

The Contractor shall include in their tender for the timely delivery and protection of all equipment, materials, and plant as may be necessary to ensure the works proceed in accordance with the overall programme together with extended warranties to ensure all manufacturers run for at least the full defects liability period, which is a minimum of 12 months from the date of Practical Completion and up to the date of issue of the Certificate of Making Good Defects.

1.22 PLANT INSTALLATION

The Contractor shall include full costs for cramage and general movement of all plant and equipment into all areas of the works, together with subsequent re-assembly of disassembled plant. He shall make himself fully aware of all limitations in respect of lorry size, crane lift, use of existing hoist, limiting factors in access to, in, and around the site. No additional costs shall be considered for the Contractor for under-estimating the difficulty of plant access or for providing plant in a dismantled condition as may be required due to limitations on access.

1.23 WORKMANSHIP

The Contractor shall carry out the works to a high quality of workmanship as described in the FHP Standard specifications. Any part of the installation deemed by the CA to be unacceptable shall be replaced at the Contractor's expense.

1.24 ORDERING OF MATERIALS

All work, including sizes and descriptions of materials, contained in the Specifications and documents were not shown or described on the Contract Drawings or any subsequent drawings or details issued by the Engineer shall be verified by the Contractor with the CA before ordering or embodying the same in the works.

The use of these documents as a basis for ordering materials shall be at the sole discretion and responsibility of the Contractor. No claim shall be allowed for additional costs arising from such ordering unless items are verified in writing beforehand by the CA.

1.25 BUILDERSWORK

The Contractor shall ensure all builderswork associated with the services installation are included in the tender sum.

No additional costs will be considered for builderswork or weathering details omitted from the tender.

All builders work details shall be shown on the working drawings.

1.26 SUPPORTS, HANGERS AND FIXINGS

The Contractor shall prepare and issue for comments to the CA prior to commencement of works, drawings and details showing proposed method of support, including fixings to the structure.

The Contractor shall provide all supports and fixings necessary for the works and shall not assume that any brackets or supports will be provided for their use.

The Contractor shall provide and issue for comments to the CA prior to commencement of works, drawings and details showing the method of support of all services.

1.27 FIRE PROTECTION OF SERVICES

Services and other similar ducts (whether vertical or horizontal) situated within or passing through an existing or proposed fire separated area, staircase, lobby or corridor, shall be enclosed within a 'Fire Restricting' construction to meet with the Local Authority requirements and written approval in terms of integrity, insulation and stability.

The Contractor shall include within the tender return for the above protection as well as the installation of the services to the total satisfaction of the Local Authority and CA.

1.28 PROGRAMME

The Contractor shall produce a project construction programme reflecting the timescales for the incorporation of the installations. The program is to contain details as described in the contract preliminaries.

The Contractor shall provide information during the Contract in accordance with the Contract Programme.

When preparing the Programme the Contractor shall make allowance for completing such design and the production information, checking, inspection by the CA, any subsequent amendment(s), resubmission(s) and inspections and testing and commissioning works etc.

1.29 ATTENDANCE AT MEETINGS

The Contractor and Engineering Services Specialists shall when requested attend such meetings as may be held to discuss the progress of the works and shall furnish any particulars and details which may be required in connection therewith.

These meetings are anticipated to be held at weekly intervals or as required.

1.30 PROTECTION AND CLEANING OF MATERIALS, WORKS AND THE SITE

The Contractor shall include in his Tender for taking all necessary precautions to protect plant, the building, materials and equipment from damage and theft during the execution of the works and shall be liable for such damage and theft.

Goods shall be ordered with protective packaging where practicable and these shall be maintained in their position as long as possible.

The Contractor shall provide full protection for all equipment, plant, motors and materials, fixed or unfixed, to prevent mechanical damage, ingress of dirt, dust and/or moisture. Precautions must be taken and all protection provided to safeguard the works during frost and inclement weather.

Any damaged or defective items shall be replaced to the satisfaction of the CA, at the Contractor's own cost.

The Contractor shall thoroughly clean out the interior of each item of the installation and plant immediately after the execution of any work on that item, to the satisfaction of the CA.

Immediately prior to Practical Completion of the works, the Contractor shall thoroughly clean down the works in an approved manner, and ensure the installation, including all plant, is free from dust, dirt, moisture and other foreign matter. The necessary Practical Completion Certificate may not be issued until this work has been approved by the CA.

On sites where the building occupier remains during the works, the Contractor shall carry out appropriate protective measures to ensure that no damage occurs to the building or its contents to the detriment of the building occupier. Any damage caused through breach of this condition shall be rectified at the Contractor's expense as shall any other damage caused by the Contractor.

At all stages of the project the Engineering Services Specialist is to clear away all rubbish, dust, etc. from the work site as soon as it occurs. At the end of each working shift the Contractor shall clean and clear all rubbish, tools, materials away from all occupied and access areas. If required to maintain

the use of the building by the occupier, the Contractor shall provide hoardings, temporary services and routes of passage throughout the building to the satisfaction of the CA.

1.31 VALIDATION TESTS

Validation Test Reports shall be prepared by the Contractor for all plant and systems that are considered for re-use and retained. The Tender Return shall include for the complete validation tests and reports including costs.

The Validation Test Reports shall be prepared and issued by the Contractors. These reports shall advise on condition, suitability and remedial work required to put the item into full compliant working order, the report shall be complete with labour and materials costs for each repair or remedial work item.

When the Contractor's validation test reports have been issued to the CA they shall be discussed with the CA and an instruction issued to cover the works described and costed in the validation report or the item shall be replaced if for some reason it is unsuitable.

1.32 EXISTING MAINS/SERVICES

The appropriate positions of existing mains/services in the areas of the works are generally as shown on the drawings but the Contractor shall ascertain the position of all existing services and mains likely to be affected by the execution of the works prior to commencement of work on site. The Contractor shall take all practicable steps to prevent interruption to all live services and shall provide a Health and Safety Method Statement to the Contractor Administrator prior to commencing works on site.

1.33 TEMPORARY DISCONNECTIONS

Any temporary disconnection of the service which shall be necessary on connection with the work shall be carried out at such time as may be directed by the CA and cause minimum disruption to the Employer and Tenants.

1.34 RISKS TO HEALTH AND SAFETY

The nature and condition of the building cannot be ascertained before it is opened up. However, no risks are known at the time of preparing the drawings and Specifications.

The accuracy of and sufficiency of this information is not guaranteed by the Employer or the CA and the Contractor must ascertain for himself any information he may require to ensure the safety of all persons and the works.

1.35 IDENTIFICATION OF PLANT AND EQUIPMENT

The Contractor shall include for and carryout the complete labelling and identification of all services, plant and equipment with white traffolyte labels having black lettering in general or red lettering where indicative of danger or risk. The labels and lettering shall be of a size and position agreed with the CA.

The labels shall be fixed by chrome plated round headed screws where on a flat surface or chrome plated "figure of eight" chain label attachments where secured to uneven objects such as valves etc. Labelling fixed solely by adhesive shall not be used.

All services, plant and equipment whether it is existing and retained or new under this contract shall be labelled, and identified and the costs for the work and materials included in the Tender return.

1.36 TESTING AND COMMISSIONING

The Contractor shall include for all labour, materials, apparatus and properly calibrated and certified instruments for carrying out testing and commissioning.

The Contractor shall in accordance with the testing and commissioning section(s) of the FHP Standard Specifications forward to the CA certified copies of results obtained from testing and commissioning.

The CA, FHP or his nominated representative will require to witness the satisfactory testing and commissioning of all the Engineering Services Specialists installed works whether tested and commissioned in sections or otherwise.

The Works, or sections thereof, should first be tested, commissioned and proved by the Engineering Services Specialist prior to offering to the CA for witness testing. A minimum three days' notice should be provided to the CA of all testing and commissioning requiring witness testing. Testing and commissioning results should be forwarded to the CA for his information and use prior to site witness testing.

Should the Contract Works or sections thereof fail the witness test or not be available for witness testing at the appointed time resulting in abortive visits by the CA, the Contractor shall become liable to a charge for the CA to re attend the re testing or re commissioning and the costs deducted from the Contract Sum.

The Charge shall be deducted from the next or subsequent valuations.

1.37 HANDOVER

The installations shall only be considered complete when the works are officially approved and accepted by the CA, as set out below.

- The completion to the satisfaction of the CA of all testing and commissioning as stipulated hereinafter. Records of tests shall be provided by the Engineering Services Specialist.
- Record drawings, charts, diagrams, etc. have been submitted, approved and supplied.
- A complete demonstration of the works shall be carried out with full functional controls tested and demonstrated to show proper working. Instructions shall be given to the Employer's staff providing sufficient information for correct use and maintenance of the installed systems by the Employers staff or their agents.

1.38 MAINTENANCE ENGINEERING SERVICES SPECIALISTS

The Employer/CA reserves the right to offer the appointed Maintenance Engineering Services Specialist an opportunity to comment on the installation before accepting the works for Practical Completion.

1.39 RECORD DOCUMENTATION

General

The Contractor shall submit to the CA for comments at least TWO WEEKS prior to Practical Completion a fully completed set of Record Documents which must clearly show all details, sizes, types, exact locations of services and equipment, duties and descriptions of all plant, materials, equipment and other elements as installed, provided and executed under the Contract Works.

These will undergo a similar review and comment procedure as for Contractor Coordinated Installation Drawings/Information.

These drawings must be free of any license or ownership and allowing the Employer free use in whatever way he requires.

The record documentation shall form part of the Health and Safety File.

Where any retained services are to be re-utilised the Operating and Maintenance Manuals and Record Drawings shall be prepared and issued by the Contractor so as to describe the whole of the services installation, both new and existing.

The Contractor shall utilize any existing information, where available, and incorporate this into his documentation as appropriate, with amendments and cross referencing to new replacement documentation, so as to describe in full the complete services installation.

Where the new works are not of a significant nature, and full Operating and Maintenance documentation for the existing services is available then the new works shall be described as a supplement to the existing documentation, in the same format as the existing documentation, and incorporated by the Contractor into the existing documentation.

No additional costs shall be considered should the Contractor fail to take full account of the implications and extent of works required to comply with this requirement.

Record drawings of the works as installed shall be prepared to the following minimum standards as applicable:

- Areas of installed plant and the like, risers, shafts and confined spaces etc. to a scale no less than 1:50.
- Floor layouts, at a scale to be agreed but not less than 1:100 incorporating all the Engineering Services.
- Fire Alarm Zonal Schematic Drawings.
- Controls Schematic Drawings.
- Valve charts and schematic drawings of each system or section thereof.
- Wiring Diagrams.
- Plans, Sections, Elevations and Isometric interpretations providing a comprehensive record of the installations.

Record drawings of the electrical installation after final test approving the final installation.

The Contractor shall take, and be responsible for, all particulars and dimensions from site and details on his Record Drawings.

The Contractor's Record Drawings shall incorporate the following:

- All Engineering Services including pipes, ducts, trunkings, conduits, cables, pneumatic lines, circuits, controls, wiring, equipment details, drainage and site services.
- Plant room and equipment room layouts.
- Services and access panel locations.

- Schematics and line diagrams of all systems upon which must be clearly shown all details, sizes, types, locations, duties and references of all plant, materials, equipment and installations as installed, provided and executed under Contract Works.
- Dimensioned positions of manholes, gullies, soil and rainwater pipes etc., and any other drainage fittings or installations.
- Invert levels to all drainage points and their installed gradients.
- Details of any pumping equipment, its location and access and maintenance requirements.
- Connections to sewer and details thereof.
- All external site services indicated on a site plan detailing all diversions and new installations.

Each Operating and maintenance manual shall include:

- A full description of each of the systems installed written to ensure that the Employer's staff fully understand the scope and facilities provided.
- A description of the mode of operation of all systems including safety precautions to be taken during operation.
- Diagrammatic drawings of each system indicating principal items of plant, equipment, valves etc.
- A full set of top quality paper prints of all record drawings together with an index.
- Legend for all colour coded services.
- Schedules (system by system) of plant, equipment, valves etc. stating their locations, duties and performance figures. Each item must have a unique 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.
- Manufacturers' technical literature for all items of plant and equipment, assembled specifically for the project, excluding irrelevant matter and including detailed drawings, electrical circuit details and operating and maintenance instructions.
- A copy of all Test Certificates (including but not limited to electrical circuit tests, emergency lighting test, fire alarm tests, corrosion tests, pressure tests, type tests, works tests start and commissioning tests) for the installations and plant, equipment, valves etc. used in the installations.
- A copy of all manufacturers' guarantees or warranties.
- Starting up, operating and shutting down instructions for all equipment and systems installed.
- Control sequences for all systems installed.
- Recommendations as to the preventative maintenance frequency and procedures to be adopted to ensure the most efficient operation of the systems.
- Lubrication schedules for all lubricated items.

- 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 replacements are required at some future date.
- Procedures for fault finding.
- Emergency procedures, including telephone numbers for emergency services.

At Practical Completion, the Contractor shall provide to the CA Maintenance Manuals as follows:

- Two Sets of Operation and Maintenance Manuals.
- Two sets of top quality paper prints.
- Two CD's or Flash Drives of all Record Drawings based on the AutoCAD System (drawings to be in both .dwg and .pdf formats) i.e. one set for FHP and one set for the Employer.
- Two CD's or Flash Drives of the Operation and Maintenance Manuals including manufacturer's data i.e. one set for FHP ESS and one set for the Employer or as determined by the Contract Preliminaries.

The manuals to be A4 size, in plastic covered, loose leaf, four ring binders with hard covers, each indexed, divided and appropriately cover titled. Drawings larger than A4 to be folded and accommodated in the binders so that they may be unfolded without being detached from the rings.

The Contractor shall retain copies on site of maintenance instructions and Warranties delivered with components and equipment, or if not delivered, the Contractor shall obtain information co-incident with the delivery of equipment, for access by the CA/Employer throughout the Contract and handed over to CA on or before Practical Completion.

All warranties shall be included in the Manual. The Warranty start date shall be the date of Practical Completion. The Warranty completion shall be the End of Defects Liability Period.

Failure to provide the above will cause Practical Completion to be refused and Liquidated Damages Clauses may be invoked.

Notify CA of telephone numbers for emergency services of Engineering Services Specialists, Artists and Tradesmen, Suppliers and Statutory Authorities which may be required by the Employer, after Practical Completion.

1.40 TRAINING OF EMPLOYER'S STAFF

The Contractor shall allow a period or periods which may not be consecutive equating to a minimum of 1 day, or as directed by the CA, to instruct the Employer's staff in operating, maintaining and servicing the entire system. The final period of training of Employer's staff must be carried out when all systems are functional and a hands on operation can be performed. All training must be completed to the satisfaction of the CA.

1.41 BRITISH STANDARDS AND CODES OF PRACTICE

The services shall be designed and installed to the quality and standards as described herein and also the latest editions of the following documents:

- Local Planning Requirements.
- Building Regulations
- Health and Safety at Work Act
- The Management of Health and Safety Regulations
- The Electricity at Work Regulations
- The Electricity Supply Regulations
- The Regulations for Electrical Installations, issued by the institute of Electrical Engineers
- Construction (Design and Management) Regulations (CONDAM)
- Environmental Health Requirements
- Fire Officer Requirements and Precautions Act
- CIBSE Design and Commissioning Codes
- Current Water Supply (Water Fittings) Regulations
- Institute of Plumbing Recommendations
- Local By Laws
- Clients Insurance Requirements (Copies shall be provided upon request)
- FOC Rules
- British Standards Institution Documentation
- Current Codes of Practice
- Control of Pollution Act
- The Construction Regulations Act
- Plumbing Engineering Services Design Guide
- Local Regulatory Authority
- Information Technology - European Committee for Electrotechnical Standardisation (CENELEC)
- Information Electro technical Commission (ISO/IEC)
- HVCA DW 172 Specification for kitchen Ventilation Systems
- HVCA DW143 A Practical Guide to Ductwork Leakage Testing
- HVCA DW 144 Specification for Sheet Metal Ductwork
- HVCA DW 145 Guide to Good Practice for the Installation of Fire and Smoke Dampers
- HVCA TR19 Guide to good practice - Cleanliness of Ventilation Systems
- CIBSE TM26 Hygienic maintenance of office ventilation
- HSE Information Catering Sheet No: 10
- F Gas Regulations
- DEFRA Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems

SECTION 2.00

MECHANICAL SERVICES

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SECTION 2.00

MECHANICAL SERVICES

2.01 GENERAL

The Contractor shall supply, deliver, install, test, set to work, commission and demonstrate the services installation as described within this Project Specification and shown on the Tender Drawings.

Reference shall be made to the associated FHP ESS Specifications, Architects drawings, record drawings and the site.

The scope of works for mechanical services shall generally comprise but not limited to the following:

- Provision of new infrared heaters mounted at high level within the garage area including all associated controls and ancillaries.
- Provision of new wall mounted electric panel heaters within store room and WC.
- Provision of new extract ventilation within the WC and the store area including all associated controls and ancillaries.
- Provision of new point of use, electric water heaters to serve the WC and tea prep area including all associated controls and ancillaries.
- Provision of new cold water services pipework to serve the WC and tea prep areas as required.
- Provision of new drainage services and associated pipework connections to serve the WC and tea prep areas as required.
- Preparing the co-ordination working drawings, installation drawings for all the services.
- Testing and Commissioning of Mechanical Services Systems.
- Production of Operating and Maintenance Manuals for Mechanical Services Systems.

The Contractor shall be fully responsible for the design and provide all necessary supporting calculations, working drawings and installation details as required by the Engineer. The Drawings provided with this Tender are for guidance only and shall be verified by the Contractor as part of his design responsibility.

2.02 HEATING INSTALLATION WORKS

New quartz infrared radiant electric heaters are to be installed at high level within the garage spaces, in the locations shown on the tender drawings. The new heaters are to come complete with all associated controls and ancillaries as detailed on the tender design drawings.

New electric panel heaters are to be wall mounted within the WC and store spaces. The new heaters are to come complete with all associated controls and ancillaries as detailed on the tender design drawings.

2.03 VENTILATION WORKS

New local extract ventilation shall be provided in the new WC via a wall mounted extract fan unit, as shown on the tender drawings. The fan unit shall be controlled via the light switch, with adjustable run on timer.

New local extract ventilation shall be provided in the new store room via a wall mounted extract fan unit, as shown on the tender drawings. The fan unit shall be controlled via the light switch, with adjustable run on timer.

Fans shall manufactured by Vent Axia (equal or approved)

2.04 WATER SERVICES

New mains cold water services are to be provided to the new WC and tea prep area within the building.

A new local electric water heater is to be provided below the WHB in the proposed WC and below the sink in the tea prep area to provide domestic hot water. The water heaters are to be rated as per the tender drawings and be manufactured by Heatrae Sadia (equal or approved). A new cold water service connection will be required to serve the electric water heater.

All appliances shall be provided with lever-turn ball-o-fix isolation valves.

Exact routing and location of the pipework is to be confirmed by the contractor on site however pipework should be concealed as best as possible on site and coordinated with structure.

The water services distribution shall be installed using copper pipework. Any exposed services within occupied zones will be chrome plated. The domestic water pipework distribution will be thermally insulated in accordance with BS5422.

All water services pipework shall be fully insulated using foil faced rigid phenolic foam.

2.05 DRAINAGE SERVICES

New local connections to be taken from the tea prep sanitary ware outlets and fed back to a new drainage stack.

New local connections to be taken from the WC outlets and fed back to a new drainage stack.

The installation of the new foul drainage pipework will comply in full to BS EN 12056, the Plumbing Guide, CIBSE Guide and all current best codes of practice and other relevant regulations pertaining to foul drainage installations.

All drainage pipework will be laid to a constant fall towards the vertical stacks. Rodding eyes shall be provided at the end of all new foul drainage branches and at every change in direction. All exposed drainage pipework which is visible shall be chrome plated.

The final routing and arrangement of all proposed services is to be confirmed on site by the contractor following coordination with other services and the building structure.

2.06 COMMISSIONING, TESTING AND CLIENT DEMONSTRATION

Upon completion of the installation, the mechanical services shall be set up and commissioned in accordance with the relevant BSRIA and CIBSE code of practices. Please refer to FHP Mechanical Standard Specification for detailed requirement and workmanship.

The systems to be tested and commissioned shall comprise:

- The heating system.
- The mechanical ventilation system.
- The public health installations.

All commissioning and testing results shall be submitted to the FHP for comments. Final commissioning and testing results shall be included in the record documents. The CA, FHP and the employer representative reserve the right to witnessing the commissioning results. The Contractor shall notify the CA and FHP at least a week in advance for the witnessing of the commissioning results.

2.07 LABELLING AND IDENTIFICATION

The contractor shall supply and install labelling on all modified and new pipework and ductwork, control wiring system.

Please refer to FHP Standard Mechanical Specification for details.

2.08 OPERATION & MAINTENANCE MANUALS AND RECORD DRAWINGS

The contractor shall prepare and issue operational and maintenance manuals and as installed record drawings for the refurbishment works. Please refer to Section 1 for details.

SECTION 3.00

ELECTRICAL SERVICES

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SECTION 3.00

ELECTRICAL SERVICES

3.01 GENERAL

The Contractor shall supply, deliver, install, test, set to work, commission and demonstrate the new services installations as described within this Project Specification.

Reference shall be made to the associated FHP ESS Specifications, Schedules, Architects drawings and the site record documents.

The Contractor shall carry out all work so that it is complete in every detail and be left in full working order to the satisfaction of the Contract Administrator/Engineer.

All new work shall be totally integrated with the existing systems and the Contractor shall satisfy himself of all existing site conditions and the future requirements prior to the starting works on site.

The services installation shall be designed, installed and commissioned to comply with all statutory instruments and regulations, and industry recommendations, applicable at the time of design and installation including:

- a) Health and Safety at Work Act
- b) Electricity at Work Regulations
- c) Regulations under the Offices, Shops and Railway Premises Act
- d) The Building Regulations including Part L
- e) The requirements of the Local Authority Planning Department, District Surveyor or equivalent
- f) The requirements of the Local Fire Officer
- g) The Regional Electricity Company Regulations
- h) The Fire Precautions Act
- i) BS 7671 - IET regulations 18th edition, including all amendments
- j) CIBSE Guides, Codes and Technical Memoranda
- k) NICEIC Recommendations

All installations and materials used for the works shall be carried out in full compliance with the appropriate British Standard or Code of Practice issued by the British Standards Institution.

Equipment and materials for the works shall only be obtained from manufacturers holding certificates in accordance with European Standards (ISO 9000).

It shall be the Contractor's responsibility to provide assurances as to product quality where suitable approved manufacturers do not exist.

The Contractor shall be required to demonstrate his own Quality Assurance System.

All installations described in this Specification shall be fully commissioned to the minimum standards described in this Project Specification.

All equipment and systems shall be installed fully in accordance with their manufacturer's recommendations and suitable for their intended use.

The design of the installations shall take account of the overall appearance of the building in as much as the colour and location of all external components shall co-ordinate with the external fabric and architectural features.

Services shall be laid out in a neat and logical manner using designated zones and shall be concealed from normal view generally throughout but especially in all Public Areas.

All plant and equipment shall be located for safe, easy and proper maintenance. Access ways and platforms with handrails shall be provided to enable routine maintenance of high level equipment.

Routine maintenance shall be possible without the removal or dismantling of other plant and equipment.

All systems shall be designed, and all equipment selected with a view to minimising energy consumption, cost in use and maintenance.

All systems shall be designed for silent running and minimum noise and vibration transmission.

The Contractor shall make due allowance for future extensions of the building if and as specified in the project brief.

All record drawings shall be for information only and the onus will rest upon the Contractor to verify them.

3.02 SCOPE OF WORKS

The works described herein relate to the proposed refurbishment of the fourth floor of Portland House with the installation of air conditioning, new lighting, new fire alarm system and the rationalisation of the small power supply within the Property.

For the purposes of this Specification reference shall be made to the associated FHP ESS Schedules, FHP ESS specifications, FHP ESS drawings, Architects drawings and the site record documents.

The works generally include:

- Provision of new lighting and emergency lighting to the proposed spaces.
- Provision of external, building mounted floodlighting
- Provide new fire alarm panel and devices to suit the proposed spaces.
- Provide new electrical distribution services and small power distribution to the proposed spaces as per the tender design drawings.
- Provide new data points to the proposed spaces as per the tender design drawings
- Provide new intruder alarm and devices as per the tender design drawings
- Provide power supplies to mechanical equipment.
- Carry out strike risk assessment, and install lightning protection installation if deemed necessary.
- Testing & commissioning of the electrical installation.
- Prepare and issue Operating & Maintenance Manuals and Record Drawings.

3.03 DESIGN CRITERIA

The Contractor shall review the system design criteria with all the relevant schedules and drawings to ensure the design proposal and all materials and components provided are compliant.

The electrical design criteria shall apply and had been designed and installed to cater for the loads calculated for each area. An indicative load summary table is shown below.

The LV distribution was designed for operation on 400/230 volts 50Hz with +/- 10% deviation in voltage and +/- 1% variation in frequency.

All equipment shall be selected to operate in accordance with the supply characteristic and British Standards.

3.04 Lighting Requirements

The lighting installation shall achieve the illumination levels stated in the table below. In addition, all lighting installations shall comply with the requirement of the Building Regulations Section 6.

The lighting will be designed to comply with CIBSE Lighting Guide 3 and 7.

The reflection factors of the various walls, floors and ceilings shall be taken into account as detailed in the finishes specifications.

For all emergency and escape lighting systems, a full risk assessment shall be carried out, in accordance with the requirements of ICEL 1008.

For all emergency and escape lighting systems, a full risk assessment shall be carried out, in accordance with the requirements of ICEL 1008. Emergency lighting is to be designed in accordance to BS 5266 and all relevant standards. Emergency Lighting shall include all areas within the office demise of the fourth floor but not lift lobby and stairwells.

3.05 LV DISTRIBUTION

The Contractor shall allow to supply new utilities, socket outlets and all electrical equipment from the existing distribution boards and for validation of all final circuits to be retained.

New MCBs shall be installed for the supply of new circuits as detailed on the circuit schedule appended to this specifications. Where indicated, RCD protection shall also be provided; this will generally be in the form of RCBO's, as indicated on the circuit schedule.

All RCD/RCBO units shall have a residual tripping current of 30mA. RCD protected circuits shall be agreed with the CA/Engineer prior to wiring/connecting the circuits.

Adequate neutral and earth terminals, individually labelled for circuit identification, shall be provided for all outgoing circuits including those designated as spare.

All labelling, connections, and identification etc. shall be in accordance with the general requirements of this specification.

The Contractor shall neatly dress all outgoing cables connected to the distribution board. The Contractor shall also install permanent cable markers of the Critchley clip on pattern to all line, neutral and earth conductors. These shall all be installed as uniformly as practicably possible.

The distribution boards shall be provided with 'as fitted' circuit charts.

3.06 NEW WIRING SYSTEMS

The contractor shall include in his Tender for the design, supply, installation, connecting, testing and setting to work of complete and fully operational wiring systems in accordance with the details contained in this performance specification.

The Contractor shall employ the following wiring systems in the new works:

Submain cabling – new multi-core XLPE/SWA/LSF

Lighting systems – new multi-core XLPE/T&E/LSF

Small power systems – new multi-core XLPE/SWA/LSF with integral earth conductor

Fire alarm systems – New fire alarm installation to be provided using multi-core FP200 cables with RED sheath.

All new wiring shall be run on new cable trays or in galv. steel trunking.

All new wiring shall be run at right angles or parallel to the walls of the areas they serve, arbitrary routes will not be allowed.

The contractor shall plan all new services, where practicable, that they shall not pass through any other potential future demised space other than that which they serve.

3.07 SMALL POWER SYSTEMS

The Contractor shall include in his Tender for the design development, supply, installation, connecting, testing and setting to work of a complete and fully operational Small Power System in accordance with the details contained in the Specification.

Power supplies for new mechanical equipment shall be derived from the existing distribution board, subject to validations.

The Mechanical and Public Health Services Specialists will supply and install all control panels, plant, space heaters, water heaters and controls. The Electrical services specialist will include for wiring and connecting the main supply to the individual item of equipment.

The Contractor shall supply, install and commission dedicated LV supplies to the proposed mechanical services installation. Generally, this shall comprise of the electrical supplies to the main items of mechanical plant and associated control panels.

All low voltage mechanical services equipment shall be provided with local isolators in accordance with the latest BS 7671 requirements.

The final connection between the local control/isolating device and the equipment will be carried out as part of the Electrical Services works unless otherwise indicated with the Mechanical Services Section of this Specification.

The services Contractor shall liaise with other Contractors to determine the fit-out requirements for the space. The Contractor shall carry out the small power installation in line with the design drawings.

3.08 LIGHTING SYSTEMS

The Contractor shall include in his Tender for the supply, installation, connecting, testing and setting to work of complete and fully operational lighting system, as shown on the tender drawings.

New luminaires shall generally comply with the following requirements:

Colour rendering to be at least $R_a > 80$ for obtaining the best reproduction of natural light

Degree of colour variance i.e. MacAdam's factor between each LED to be as low as possible i.e. < 3 SDCM maximum

CCT 4000K

Integral emergency function as required

L80/50,000 hours minimum lifetime

Contractor to provide a Certificate of Conformity upon request by FHPESS or the Client for the proposed luminaires

ECA Compliant for Tax saving on product and install for end user

Manufacturing of products shall be in accordance with the following EU Directives:

Directive 2006 / 95 / EC Low Voltage directive (LVD)

Directive 2004 / 108 / EC Electromagnetic compatibility (EMC)

Directive 2009 / 125 / EC Ecodesign requirements (ECO)

Directive 2011 / 65 / EU RoHS

Directive 2012 / 19 / EU Weee

New luminaires shall comply with the following standards:

EN 60598-1:2008 Luminaires – (General requirements)

EN 60598-2-XX Luminaires – (Particular requirements)

EN 55015:2006+A1:2007 EMC – (Radio disturbance)

EN 61000-3-2:2006 EMC – (Harmonics)

EN 61000-3-3:2008 EMC – (Voltage change, fluctuation & flicker)

EN 61547:2009 EMC – (Immunity)

EN 61347-1 Lamp control gear – General & safety requirements

EN 62471 Photobiological safety of lamps & lamps systems

EN 62031 LED modules for general lighting – Safety specifications

EN 12665 Basic terms for specifying lighting requirements

EN 13032 Measurement & presentation of photometric data

Lighting system accessories shall be selected to match the small power system accessories specified for each area.

3.09 Emergency Lighting

The Contractor shall supply, install, set to work and test the emergency lighting to meet the requirements of BS 5266, ICEL and CEM/CEMELEC standards, Local authority Building Control and Fire Brigade requirements and CIBSE TM12 recommendations.

Emergency lighting shall be achieved by the use of self-contained maintained luminaires selected to automatically connect the luminaire(s) control gear/lamps to the integral battery in the event of a mains failure and thereby provide emergency/mains failure illumination to a minimum of 1 Lux.

The emergency pack shall be contained within the luminaire. Where this is impractical, the use of a separate housing for the emergency pack will be accepted where this is installed adjacent to the luminaire. This separate emergency housing shall be designed to enable the pack to be easily wired via a flush metallic conduit system, which shall be supplied and installed by the Engineering Services Specialist.

Upon completion of the emergency lighting system, the Engineering Services Specialist shall commission and carry out a discharge test of the entire system to the complete satisfaction of the CA and Local Authority, and he shall issue a commissioning certificate.

The standby unit for all emergency luminaires shall be capable of powering the LED luminaire for 3-hour duration having a maximum recharge time of 24 hours.

The emergency luminaires shall be wired, connected and controlled, when the mains is healthy, in a similar manner to the primary luminaires.

The Contractor shall carry out a full emergency lighting test on completion of the works in accordance with the BS and also record the measured illumination levels at floor level and provide a copy to the project Engineer in charge. A full demonstration shall be given to the EA and Employer.

The contractor shall provide a purpose written emergency lighting logbook as part of the operating and maintenance documentation.

The log book shall comply with the recommendations of BS5266 and shall detail all of the routine maintenance and operational checks that are required to check the emergency lighting system is fully functional.

The log book shall detail all of the emergency luminaires in the project, giving them unique identification references which are cross-referenced to the O&M manuals and the as installed drawings, and recommend routine checking and maintenance regimes for the entire emergency systems.

It should be noted that great importance will be placed on the quality, accuracy and informative nature of the emergency lighting logbook. Accordingly, draft copies shall be forwarded to the Services Engineers comment/perusal at least three weeks before completion of the overall project.

The completed logbook (one number original and two number copies) shall be handed to the Client before practical completion is given.

3.10 FIRE ALARM SYSTEM

The Contractor shall include in their Tender for the design development, supply, installation, connection, testing, setting to work and commission a fully operational fire detection & alarm system in accordance with the details contained in this particular specification, and as shown on the tender drawings.

The whole system shall be tested and commissioned by the fire alarm specialist and demonstrated as fully functional to the Engineer and Fire Officer as necessary.

In addition to the general electrical tests required by Part 7 of the Regulations for Electrical Installations, the following shall be carried out:

- Alarm devices operated to ensure they comply with audibility requirements
- Requirements detailed in the technical sections of the specification
- All trigger devices and alarm point's function correctly
- All monitoring and ancillary equipment operate the correct functions
- All connections to monitoring points operate correctly

When the Engineer is satisfied that the Electrical services specialist (or his specialist) has demonstrated and documented that the installation complies with the Regulations Electrical services specialist shall be requested to issue a Certificate in accordance with Appendix 6 of the Regulations for Electrical Installations together with a Certificate in accordance with BS 5839 Part 1 Appendix B.

The contractor shall provide a purpose written fire alarm logbook, if that is not already in place and in use, as part of the operating and maintenance documentation. The logbook shall comply with the recommendations of BS5839 and shall detail all of the routine maintenance and operational checks that are required to check the fire alarm system is fully functional.

3.11 TESTING AND COMMISSIONING

The Contractor/Electrical Specialist shall include in his Tender for testing and commissioning as described within this specification. The Contractor shall satisfy themselves that all snags and defective works have been rectified prior to inviting the Electrical Service Engineer to witness final testing and inspection.

The Contractor shall ensure that all documentation and tests/commissioning certificates are issued prior to witnessing.

All testing and commissioning shall be in accordance with BS 7671 IET wiring regulations and the relevant IET guidance and the values recorded and forwarded to the Engineer together with a completion certificate as prescribed.

In addition, the actual fault level shall be measured at each main switchgear panel incoming terminals and a label attached to the switchgear stating date and measured fault level in kA and the external earth loop impedance in ohms.

A sample of Earth loop impedance tests and insulation resistance test shall be repeated in front of the Engineer by prior arrangement. All necessary labour, materials, consumables, plant and instruments shall be provided by the Electrical Services Specialist.

The Contractor/Electrical Specialist shall arrange for the commissioning of the emergency lighting system and shall demonstrate its correct functioning to the Engineer. The Contractor/Electrical Specialist shall also supply, initiate and include within the O&MS the pre-requisite logbook for the emergency lighting installation.

The Contractor/Fire Alarm Specialist shall arrange for the commissioning of the Fire Alarm System and shall demonstrate its correct functioning to manufacturer's requirements and BS 5839.

Twelve months after the official hand over, the Contractor/Electrical Specialist shall repeat the various tests and issue a further set of certificates; he shall also attend (if required) the final site inspection by the Engineer.

It shall be a condition of the Contract that the Contractor/Electrical Specialist shall produce a programme of dates to cover the testing and demonstrating of equipment and installation.

The Contractor/Electrical Specialist shall carry out full test on the systems to demonstrate that the works meet the requirements of the Specification.

A method statement shall be provided to the CA for approval not less than 7 days before the tests are scheduled to commence. Upon successful completion of these tests, the Contractor/Electrical Specialist shall carry out a full system demonstration for acceptance purposes.

The Contractor/Electrical Specialist shall allow a minimum of two (eight-hour) days for the acceptance demonstration. The Contractor/Electrical Specialist shall also allow for all necessary employers staff instruction and documentation. Six No. copies of keys for each type of system (Fire alarm/LV distribution panel/distribution boards, etc.) shall be handed over to the Contractor.

3.12 LABELLING AND IDENTIFICATION

The Contractor/Electrical Specialist shall include in his Tender for the supply and installation of labelling and identification in accordance with the details contained in this project specification.

The Contractor/Electrical Specialist shall supply and install all necessary labelling and identification to all equipment, material, components and systems of the electrical services installation.

All signs and labels shall be displayed in accordance with BS 7671, Chapter 51 section 514 conforming to the IET Wiring Regulations and as agreed with the Engineer.

The following principle colour co-ordination of signs/labels shall apply:

Warning -	Yellow background with black lettering
Mandatory -	Blue background with white lettering
General information -	White background with black lettering
Emergency -	Green background with white lettering
Prohibition -	White background with red lettering
Fire Fighting -	Red background with white lettering (except extinguishers which have particular colours)

Warning Notices

All items of equipment or enclosures within which voltages exceeds 250 volts or separate enclosures or items of equipment that allow simultaneous human contact with live parts exceeding 250 volts to be so arranged that before access may be gained, a warning of the maximum voltage present shall be visible i.e. "DANGER 500 VOLTS".

Where switchgear is concerned which forms a unit construction the label to be centrally placed and preferable on the bus bar section. The number of labels to be determined by the size of the switchboard but at least one label every two metres length of switchboard to be provided.

Each switchboard shall have the primary warning triangle sign denoting "Caution, Risk of Electric Shock".

Where an isolator leaves any part of equipment or enclosure "live" when in the off position a warning notice to be used indicating that the equipment is not totally isolated and giving instructions for achieving further isolation.

Warning labels shall be fixed to high voltage cables or their protective covering at 1.5 metres (max) intervals with lettering 10mm. high in red on a white background.

A safety sign shall be fixed to every enclosure associated with a high voltage discharge lamp installation e.g. inductors, resistors, capacitors and transformers.

In addition a supplementary sign to be located below the warning sign which shall be located below the warning sign which shall be 10mm x 50mm yellow background with 5mm. black lettering stating DANGER plus the highest open circuit voltage to earth (i.e. 5000 volts A.C).

All electrical equipment shall be labelled to ensure correct identification and give essential operating functions which relate to each other.

All these labels shall conform to a white background with black lettering.

The main incoming switch to state:

- Main Isolator.
- Rating.
- Phase.
- Voltage.
- Incoming Cable Size in mm² and Cable Type System Earthing.

Individual switch fuse, MCCB, isolator to state:

The circuit which it controls with a general description of type of load.

- Rating.
- Phase.
- Outgoing Cable Size in mm² and Cable Type.

The main bus bar/main panel construction in addition to the warning/safety notices shall state:

- The British Standards to which it complies.
- Fault Rating.
- Classification Reference.
- IP Rating.

All distribution boards shall have external labels which state:

- Voltage.
- Maximum Rating of Protective Devices Uses.
- Type of Load Connected.

All distribution boards shall have internal labels which state:

- Main cable size in mm².
- Phase Colour Indication.
- Circuit Number*
- Description of Circuit*
- Circuit Protective Device Rating*
- Actual Circuit Current*
- Circuit Cable*

This applies to all final circuits and these labels/circuit charts to be completed in clear printing in black ink on a white background.

The individual phases to be identified with its phase colour of L1, L2, and L3 respectively.

Where a distribution arrangement incorporates contactors, time switches, relays, indicator lights and push buttons each of these to be labelled and indicate its function i.e. ON/OFF/AUTO together with what it controls i.e. "LIGHTING", "OVERRIDE SWITCH", and "TIMESWITCH FOR EXTERNAL LIGHTING".

These labels to conform to a white background with black lettering.

Local switchgear/isolators and control gear to have individual labels which shall be black lettering on a white background. These labels to indicate:

- Equipment Title.
- Current Rating, Phase, Voltage.
- Circuit Reference.

The ON/OFF functions to be clearly indicated using an appropriate label where the operating positions are not clearly indicated on the equipment itself.

All junction boxes which form a marshalling point and junction point for fire alarm system, security systems and communication systems to have a label with black lettering and white background.

These labels to indicate:

- The Wiring System Enclosed.
- Voltage.
- Circuit(s) Reference.

Additional Information/Identification Labels

Consideration to be given to the following:

- Particular identification of socket outlets.
- Particular identification of switch/fused spur outlets.
- Particular identification of lighting switches.
- Particular identification of communication systems, special circuits.
- Particular identification of building management system special circuits.

Where an item of equipment and or switchgear is designated for emergency operation the labelling shall be white lettering on a green background.

This labelling to be clearly indicate the item of equipment/ function it performs together with the emergency action required to be undertaken.

Where an item of equipment and/or switchgear is designated for prohibited use i.e.:

"Danger Switch Off When Not in Use".
"Do Not Switch Off".
"Emergency Stop".

This labelling to be red lettering on a white background.

Where a particular item of equipment and/or switchgear is designated for firefighting use i.e. "a fire alarm switch on a main switchgear panel" then this shall be clearly and differently indicated with a label which shall have white lettering on a red background.

The material to be a composite plastic component with three layers of rigid plastic (040" ABS) materials. The letter colour being the centre element of the composite and when engraved the composite to then expose the colour. The method to be as commonly referred to as "TRAFFOLYTE".

All lettering to be upper case in capitals and generally the height of lettering that shall be used to be as follows:

- 6mm. for Identification Labels.
- 12mm. for Warning Notices.
- 12mm. for the Principle Wording of an Emergency Sign.
- 6mm. for the Secondary Working of an Emergency Sign.

The fixing used for all labels to be either bolted with gripping washer or riveted with space washers behind each rivet.

Two fixings to be provided for labels with a height up to 25mm. and where labels have a greater height than this four fixings - one in each corner of the label to be provided.