

PROJECT REF: - BS 2022

DATE: - JULY 2022

TENDER ISSUE – T2

HEVERCOURT RESIDENTIAL HOME, GOODWOOD CRESCENT,
GRAVESEND, KENT, DA12 5EY

REFURBISHMENT WORKS

ELECTRICAL ENGINEERING SERVICES
SPECIFICATION PARTS A, B, C AND D

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CONTENTS

PROJECT REVISION SHEET

PART A	–	GENERAL CONDITIONS AND PRELIMINARIES
PART B	–	GENERAL TECHNICAL CLAUSES RELATING TO THE ENGINEERING SERVICES
PART C	–	SECTION C41 – COMMON SERVICES ELECTRICAL LOW AND EXTRA LOW VOLTAGE SECTION C46 – FIRE DETECTION AND ALARM SYSTEMS SECTION C49 – NURSE CALL SYSTEM
PART D	–	PARTICULAR SPECIFICATION FOR ELECTRICAL ENGINEERING SERVICES
APPENDIX ‘A’	–	DISTRIBUTION BOARD SCHEDULES
APPENDIX ‘B’	–	SUMMARY OF TENDER

PROJECT REVISION SHEET

<u>Revision No.</u>	<u>Date</u>	<u>Details</u>	<u>Changes</u>	<u>Author</u>	<u>Approved</u>
P1	May 2022	Preliminary Issue		MD	MR
T1	July 2022	Tender Issue		MD	MR
T2	August 2022	Tender Issue	Changes highlighted in yellow.	MD	CD

PART A

GENERAL CONDITIONS AND PRELIMINARIES

Refer to General Conditions of Contract included in the Main Contract Document.

GENERAL CLAUSES COMMON TO BUILDING SERVICES, PLANT AND EQUIPMENT**INDEX****INTRODUCTION**

Scope of Part B
Names of Parties
Definitions
Quality Assurance

01

01
02
03
04

STATUTORY REQUIREMENTS AND STANDARDS**02**

General
Statutory Instruments Regulations and By Laws
British Standards

01
02
03

GENERAL NON TECHNICAL**03**

Specialist Installations and Supplies
Ordering of Material and Equipment
Material and Workmanship
Inspection and Measurement of Work
Building in Occupation
Existing Engineering Materials
Dimensions
Protection and Storage
Positions of Plant and Equipment and Installation to Drawing
Positions of Outlet Points
Alternatives
Clean and Tidy Working
Samples for Approval
Working in Confined Spaces

01
02
03
04
05
06
07
08
09
10
11
12
13
14

GENERAL TECHNICAL**04**

Connections to Existing Services
Connections to Appliances
Painting
Labelling and Notices
Tools and Accessories
Electrical Interference and Suppression
Noise Attenuation
Guards
Plant Drives, Pulleys and Keys
Design Interchangeability
Fixing Building Services, Plant Etc, to the Building Fabric
Plant Bases and Anti-vibration Mountings
Lubrication
Bonding and Earthing
Spare Parts
Colours of Indicator Lights, Push Buttons, Annunciators and Digital Readouts

01
02
03
04
05
06
07
08
09
10
11
12
13
14
15
16

TESTING, COMMISSIONING, CLIENT INSTRUCTION AND HANDOVER**05**

General
Testing
Commissioning
Commissioning Procedures

01
02
03
04

Instruction Period		05
Handover Procedures		06
Record Drawings		07
Valve Charts and Schematic Diagrams		08
<u>LABELLING AND FIXING</u>	06	
Labelling		01
Fixing Building Services Plant to the Building Fabric		02
End of Index		

<u>PART B</u> <u>GENERAL CLAUSES COMMON TO BUILDING SERVICES, PLANT AND EQUIPMENT</u> <u>INTRODUCTION</u> <u>Scope of Part B</u> Shall :- comprise integrated parts of the Specification covering the general requirements relating to the Works, as detailed in Parts C and D and on the accompanying drawings. Be integrated together with Part A (where included) and read as a complete contract requirement. Form a single entity, together with drawings. Be complementary to each other (except in the case of Engineering Bills of Quantities) and include within the tender sum for the provision of all items shown or described in either or both. Provide for any information contained in Part B which may not apply to all contracts to be ignored and only that relevant to the work being carried out to be acted upon. <u>Names of Parties</u> Shall :- in this part of the documentation provide for the Clause requirements for the specified work shall be the responsibility of the 'Engineering Contractor or Sub-Contractor' depending on whether the engineering installation is to form the Contract Work or Sub-Contract Work for the project, unless otherwise directed in Part C. <u>Definitions</u> Shall :- Comprise the following works and associated meanings :- 'Shall' is mandatory. 'Will' is informative. 'Should' is advisory 'Provide' means supply and fix or install. <u>Quality Assurance</u> Shall :- be in accordance with the BSI Buyers Guide to ensure that products that are manufactured, or stocked, under the following schemes are always given priority :- BSI KITEMARK Scheme BSI SAFETY MARK Scheme Firms of Assessed Capability Stockists of Assessed Capability include for the Client to be notified of any instance where these schemes could be, but are not, used. End of Element	01	01
		02
		03
		04

BS EN ISO 7010:2012 +A6:2016	Graphical symbols, safety colours and safety signs –Registered safety signs (ISO 7010:2011)		
BS EN ISO 14713-1:2017	Zinc coatings – Guidelines and recommendations for the protection against corrosion of iron and steel in structures.		
BS 6150 : 2006 +A1:2014	Painting of buildings – Code of Practice		
BS 8313 : 1997	Code of Practice for Accommodation of building services in ducts		
<u>Health Technical Memorandum</u>			
Building Engineering in the Health Sector (HTM 00) NHS Estates Guidance for Medical Gas Pipeline Systems (HTM 02-01) Heating and Ventilation of Health Sector Buildings (HTM 03-01) Safe Water in Healthcare Premises (HTM 04-01) Management of Pseudomonas Aeruginosa in Health Sector (HTM 04-01) Managing Healthcare Fire Safety (HTM 05-01) Fire Safety in the Design of Healthcare Premises (HTM 05-02) Fire Safety Measures for Health Sector Buildings (HTM 05-03) Electrical Services Supply and Distribution (HTM 06-01) Electrical Safety Guidance for Low Voltage Systems (HTM 06-02) Electrical Safety Guidance for High Voltage Systems in Healthcare Premises (HTM 06-03) Water Management and Water Efficiency (HTM 07-04) Health Sector Buildings : Acoustic Design Requirements (HTM 08-01) Design and Maintenance of Lifts in the Health Sector (HTM 08-02) Management of Bedhead Services in the Health Sector (HTM 08-03)			
		End of Element	

<u>GENERAL NON-TECHNICAL</u> <u>Specialist Installations and Supplies</u> Shall :- where specialist installations and supplies are specified for particular plant or equipment, be completed in accordance with the specification and integrated with all other Works. Comply with all contractual obligations incorporated in this specification. Submit maintenance and call out details with the tender, and as requested by the Engineer. Call out periods shall be appropriate for the system/item supplied and its usage as determined by the Engineer. Submit full commissioning details which shall clearly indicate when support services are to be available and shall agree with the Building Services Contractor time periods in accordance with the main programme. Agree all terms, conditions and contractual duties with the Building Services Contractors. No such terms, etc, imposed by specialist suppliers may be used on the basis of a claim for delay, variations or enhanced valuations. Include for demonstration of correct operation to the Building Services Contractor, Engineer and, following acceptance, to the Client, which may involve separate site visits, at no additional cost to the contract. <u>Ordering of Materials and Equipment</u> Shall :- Require every effort to be made to obtain materials and delivery to accord with the work programme and avoid delays by the early placing of orders following instructions to proceed. Include for submission of alternatives for the Engineers consideration if the possibility of delay exists. Include for reference to manufacturer's/supplier's quotation is for technical clarification only. Cost, availability and other conditions are to be ascertained for tender purposes. <u>Materials and Workmanship</u> Shall :- allow for all plant and material shall be new, undamaged, free from corrosion, not sub-standard and conform to the requirements of the specification. Where quality or standard of materials are not specified, they shall be of adequate quality and equivalent standard to specified items. Allow for all work to be carried out by competent staff in an expeditious and workmanlike manner under skilled supervision. <u>Inspection and Measurement of Work</u> Shall :- include all assistance necessary to enable the Engineer to examine or measure the Works with no section of the Works covered, concealed or insulated prior to completion of a witnessed satisfactory test.	03	01 02 03 04
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Require due notice to be given when Works which are to be covered or concealed are ready for examination and/or measurement.		
<u>Building in Occupation</u> Shall require the Contractor :- to comply with any 'permit to work' system in operation on the premises. To include in the Tender for carrying out work in existing buildings shown on the relevant drawings whilst the buildings are occupied by staff and/or patients unless otherwise specified in Part C. to take all reasonable steps to keep noise to a minimum particularly in the proximity of staff.		05
<u>Existing Engineering Materials</u> Shall require the Contractor :- to include in the Tender for stripping-out scrap and redundant material and removing from the site and make allowance in the tender for the value of such material unless otherwise specified in Part C. to comply with all of the requirements of the Environmental Protection Act 1990 and associated regulations. The Contractor shall comply with the guidance given in 'Waste Management – The Duty of Care – A Code of Practice' (HMSO 1991 – 1996 Revision). The Contractor shall provide a 'controlled transfer note' for each load removed from site. A top copy of the Local Authority Certificate of registration is required.		06
<u>Dimensions</u> Shall :- require full advantage to be taken of the facilities available to visit the site prior to tendering to ascertain and check :- all drawings related to the site locality and means of access. Buildings and structures involved in the Works. Dimensions where plant or equipment is to be installed within or close to existing buildings or structures. These dimensions shall take precedence over dimensions shown on the Contract Drawings or supplied under the Contract, with any discrepancy found drawn immediately to the attention of the Engineer.		07
<u>Protection and Storage</u> Shall include :- adequate and safe storage for all material plant and equipment necessary in respect of own Works. Purpose made racks for storage of conduits, pipes and similar materials to prevent bending and distortion. Purpose made end caps to protect threads, nozzles etc. protection by means of paint, tallow or grease for bright and machined surfaces and cleaning and polishing immediately before handover. Protection against frost, building works, or operations by others.		08

Suitable racks and storage for plant, equipment and materials unable to be stored in huts or buildings. Protection for electrical cables and seal cable ends using methods and materials recommended by cable manufacturers. For leaving plant and equipment in a condition ready for painting where specified as part of the work or by others. For painting parts liable to corrosion immediately after removal of temporary protection. Replacement material, plant or equipment where deterioration or damage has occurred prior to handover.		
<u>Position of Plant and Equipment and Installation to Drawings</u> Shall :- be in accordance with drawings scheduled in the specification which show the layout arrangement and equipment but may not detail the whole work involved and are diagrammatic in certain particulars. Notwithstanding the provision of the drawings take dimensions and particulars from site for the work specified. Include for submission of installation drawings based on the latest available information for the engineers consideration at a reasonable time before work is commenced. Give due consideration to all services detailed on co-ordination and zoning drawings where provided with the specification. Provide for contractual distribution all information and drawings necessary to achieve complete co-ordination. Give due regard to the needs of inspection, efficient maintenance and replacement.		09
<u>Positions of Outlet Points</u> Shall :- where detailed integrated layout drawings have not been issued with the tender, shall allow for fixings outlet points up to 1 metre from the positions specified or shown on the drawings at no extra cost.		10
<u>Alternatives</u> shall :- where a particular manufacturer is specified in Part C, include for the manufacturer called for in the specification. Where considered appropriate provide for equivalent standard alternatives to be offered for consideration detailed with cost and technical comparisons, including references to British Standard where appropriate, on the schedule of alternatives submitted with the Tender. Conform to the same intent, design, the same details of co-ordination and shall be compatible with other elements of work (Services or other trades). The cost of such an exercise and/or any subsequent cost arising due to the same purpose directly or indirectly, or due to the changes induced to other equipment and/or work of other trades shall be borne by the Contractor and under no circumstances form any claim.		11

<u>Clean and Tidy Working</u> Shall :- in respect of own Works require the site to be kept clean, tidy, free from waste and superfluous material and take all necessary precautions to avoid damage to the building structure or its contents.		12
<u>Samples for Approval</u> Shall :- be submitted for the Engineer's consideration and comprise such samples of workmanship, materials and equipment intended for execution of the Works as the Engineer considers necessary. Samples will remain the possession of the Engineer until the contract completion or be embodied in the installation.		13
<u>Working in confined Spaces</u> Shall :- be defined and detailed, and risk assessments/method statements carried out within the requirements of the CDM regulations, and incorporated into the Health and Safety Plans. Be governed by a 'Safe System of Work' be undertaken in accordance with an appropriate 'Permit to Work' procedure where such procedure is in operation on the site. Where no 'Permit to Work' system is in operation, be undertaken only after fully investigation and resolution of the following matters has been completed and the Engineer informed in writing of the proposals :- (a) Assessment of the task to be undertaken (b) Identification of the hazards of the task (c) Decision on methods of working to avoid hazards (d) Implementation of a system of work to incorporate these methods (e) Monitoring of the operation of the system of work before commencing work and before personnel enter the space, be demonstrated to be safe by testing that no toxic or asphyxiate gases are present and the adequate oxygen levels are present. Before commencing work, include assessment of the likelihood of the conditions remaining as found, the impact of any materials or equipment to be taken into the confined space or found there (deposits, sludge, residues etc) and the possibility of any hazardous gases or vapours being able to enter the space. Be restricted to trained personnel. Be undertaken after consideration of the following :- (a) the provision of safe means of access and egress; (b) the presence of personnel to keep watch outside; (c) the provision of effective communications between personnel inside and outside;		14

- (d) the provision of suitable protective equipment, including harnesses if possible and self-rescuing breathing apparatus if appropriate;
- (e) the availability of gas detection equipment and staff trained in its use;
- (f) a means of effecting a rescue in the event of an emergency.

Method Statements

Shall :-

include for preparing detailed method statements and risk assessments prior to undertaking major work packages or work to existing services.

Prepare a detailed method statement for the overall project to address the problems of programming, completion to suit specific contractual requirements.

Address the following issues with regard to each activity :-

- i) Health and Safety
- ii) Method of working
- iii) Programme
- iv) Enabling Works
- v) Specialist attendance's/tools/materials
- vi) Work required by third parties eg. Hospital engineer, microbiologist or pharmacist
- vii) Quality assurance
- viii) Contingency measures (i.e. failure of break-in or ability to bring existing service back on line in accordance with programme)
- ix) Permit to work system
- x) The Construction (Design and Management) Regulations 2015

submit the method statements/risk assessments to the Engineer and site representative within a reasonable time prior to undertaking such work for comment, where applicable. Copies shall be forwarded to client's representative. Where requested, the method statements/risk assessments shall be prepared and submitted to the Principal Contractor when required for incorporation into the Health and Safety Plan.

End of Element

18

<u>Labelling and Notices</u> Shall :- include for providing identification labels etc, (to BS ISO 3864-4 and BS ISO 7010 where appropriate) to the schedule of items in Part C together with statutory and warning notices relating to the safe use of the equipment. The sizes type to be as specified in Element 06.01 Labelling.		04
<u>Tools and Accessories</u> Shall :- include for the provision of two complete new sets of any special tools and accessories required for correct running and maintenance of the plant each set being contained in a steel box fitted with a padlock and two keys.		05
<u>Electrical Interference and Suppression</u> Shall :- be provided on all equipment supplied or use for own Works to the requirement of BS EN 55014-1:2006 to eliminate interference with Hospital medical electrical, radio and television equipment include for locating and rectifying faults.		06
<u>Noise Attenuation</u> Shall :- include sound attenuation equipment and materials to prevent transmission of sound through ducts, pipework and structures as specified in Parts C and D.		07
<u>Guards</u> Shall :- be provided to all moving parts of machinery in accordance with the requirements of the Health and Safety at Work Act. Comply with BS 5304 and provide easy access for maintenance together with access to shaft ends for tachometer attachment.		08
<u>Plant Drives, Pulleys and Keys</u> Shall :- include flexible couplings for flange and vee belt drives for pulleys. Flange or pulley drives on motors, fans and pumps to be truly balanced and secured in position by shaft keys or patent or patent locks readily accessible for withdrawal or adjustment.		09
<u>Design Interchangeability</u> Shall :- ensure that items of plant to be interchangeable where this will not affect the efficiency or safe operation of the works involved.		10

<u>Fixing Building Services, Plant, Etc to the Building Fabric</u> Shall :- be carried out as specified in Element 06.02.		11
<u>Plant Bases and Anti-Vibration Mountings</u> Shall :- ensure that all concrete bases for plant and machinery have a minimum perimeter clearance of 150mm with each item of plant adequately fixed, supported and aligned, in accordance with the manufacture's recommendations. Include provision of holding down bolts, for all items of plant, including anti-vibration materials and mounting for units having rotation or moving machinery. Anti-vibration material which is to be cast into plinths shall have a weatherproof membrane on both bearing surfaces and be handed to the Building Contractor before casting commences.		12
<u>Lubrication</u> Shall :- comprise the supply and servicing of plant and machinery with lubricants to the manufacture's recommendations before attempting to operate, ensuring lubricant levels are correct and providing a list of the manufacture's recommended lubricants. Include the supply lubricant dispensers for each pattern of nipple and cup fitted. Where necessary for purposes of servicing, include extension pipes with lubricant nipples.		13
<u>Bonding and Earthing</u> Shall :- include all necessary materials and make connections as specified in Part C to ensure that all installations and equipment are efficiently and continuously bonded to an earthing system at all times in accordance with IEE Wiring Regulations (BS 7671 Requirements for Electrical Installations).		14
<u>Spare Parts</u> Shall :- comprise the spare parts listed in the Schedule of Spares included in Part C, and show the costs as a separate item within the Tender. Include for ordering the spares at the same time as orders are placed for the plant and equipment and raise for consideration any spare items which should be added to the Schedule of Spares. Comply with the plant specification and be interchangeable with the corresponding parts on the plant. Be numbered and described for identification and prepared for storage by protective enclosures and/or greasing or painting. Produce delivery notes and ensure that these are signed by the clients representative for all spares and tools handed over. Posting or delivery to site of any items without obtaining evidence that they have been received by the Clients representative may result in further spares being required at no additional cost to the contract.		15

Colours of Indicator Lights, Push Buttons, Annunciators and Digital Readouts

16

Shall :-

conform with the conventions of BS EN 60073 or as specified in Part C.

End of Element

the first test. Require the completion of all tests before any paint, cladding or similar materials are applied or before services are concealed. The Engineer will :- give twenty four hours written notice of his intention to be represented at the test. If he decides after inspection or testing, that such plant or any part thereof is defective, or not conforming with the specification, reject such defective parts by written notice within a reasonable time indicating the area of dispute. If he considers the tests are being unduly delayed, arrange for instructions to carry out the tests within 10 days.		
<u>Commissioning</u> Shall :- following satisfactory completion of the foregoing tests and when the installation is in a safe and satisfactory condition, set it to work and proceed to regulate and adjust as necessary to the design requirements. In general terms include the following procedures in accordance with information in specification Parts C and D :- (a) setting to work all systems as specified and ensuring that the performance requirements have been achieved. (b) balancing and regulating all systems to meet specified performance requirements. (c) making final adjustments and before practical completion, demonstrate by commissioning procedures detailed elsewhere in this specification, that the provisions of the contract have been met in total by completing the previous testing and setting to work procedures and by showing that the completely integrated installation will function in accordance with the specified performance requirements. Include records of all test results on the sheet provided, completing all commissioning documents and at all stages ensure that the Engineer has certified the documents and/or arranged for instructions for any remedial work.		03
<u>Commissioning Procedures</u> Shall :- ensure that the following requirement shall be observed when commissioning the engineering works :- 1. Progressive static testing will be witnessed by the Site Engineer(s) when the work is presented as ready for testing. This will include Insulation Resistance Tests, Earth Continuity Tests, Water, Gas Pipeline and Air ducting Tests. 2. Pre-commissioning examination and testing should ensure that each system or item of equipment is complete, in a safe condition and all notices displayed. Completion for operational purposes implies the bulk of the snagging of work has been offered to the Site Engineer(s) and remedial work completed. All fans, pumps etc., will have been checked for operation and all polarity testing, phase sequence testing, loop impedance testing etc. carried out. 3. The Engineer, Site Engineer, Commissioning Adviser and other members of the contractual team to discuss the Commissioning Programme (previously prepared) take		04

account of any problems arising, availability of related services, agree access required for controls and agree documentation to be used etc. and adjust programme as necessary to a clear understanding of the position. 4. Demonstration of agreed systems and equipment to the programme will be witnessed on behalf of the Employer/client by the commissioning Adviser/Site Engineer/Engineer and results examined and adjust for final acceptance. 5. Instructions to the users staff to be completed by handover. 6. Any outstanding final acceptance testing such as for sterilisers, theatre exflow systems, boilers, refrigeration and generators are to be listed and dates agreed in the defects liability period when reasonable demands for consumer requirements are available.		
<u>Instruction Period</u> Shall :- include, on completion of an installation (or part of) as the programme dictates, the provision by the Engineer of the names of the Client's staff to be involved, in the operation and maintenance, before planning, preparing and formally recording arrangements for the instruction period. Include instructing the Client's staff in the safe operation and maintenance of all systems and items of equipment and where necessary running, maintaining and supervising in each case under normal working conditions, for an adequate and a reasonable period of time based on manufacture's recommendations, or alternatively at the manufacturer's works.		05
<u>Handover procedures</u> Shall :- unless otherwise stated in Part C include for obtaining and/or preparing the following mechanical or electrical documents to be available not less than one month before Practical Completion of any part of the Contract. Include for incorporating the following documents into four or more volumes of durable finish service manuals, with format and contents agreed with the Engineer. Three sets to be provided on completion. 1. Index of Contents 2. Description of Design Intent & Operational Policy 3. Asset list of all M&E components installed. 4. Commissioning Documents and Reports 5. Manufacture's Operation /Service & Maintenance Manuals 6. Manufacturer's Spares List & Ordering Procedure 7. Operational and Maintenance Routines, Procedures for Fault Finding 8. Line Diagrams of Plant Control Systems and Description of Control Operation incorporating all set points 9. Schematic Layouts locating Valves, Switches etc. to Incorporate all Equipment Identification Numbering 10. Schedule of Installed Equipment with Specific Commissioned Duties 11. Descriptive Working Drawings for each main item of plant/equipment, showing safety features etc 12. Emergency Call-Out-Service-Personnel and Telephone Contacts 13. Copies of all charts posted elsewhere in building 14. List of all tools, keys and special requirements for handing over 15. Warrantees, Guarantees, Test Certificate, Commissioning Certificates & Reports 16. Insurance and Inspecting Authority Certificates & Reports* 17. List of Record Drawings (drawings separately available) 18. Health and Safety plan relevant to the fixed operational installation (not construction) in		06

compliance with CDM regulations. 19. Details on maintenance requirements and life cycle expectations as one single document. 20. Fire alarm cause and effect and zone drawings and schedules. * To include documents required under the Pressure Systems Regulations ensure that the operation and maintenance information is specifically relevant to the installed Works, compiled in a logical and instructive manner to ensure a full understanding by the user, of manufacturer's recommendations together with those in connection with Health & Safety and the Prevention of Legionnaires Disease. Diagrams and scheme layout to indicate the individual control features and to be cross-referenced with identification numbers on the installed plant. <u>Record Drawings</u>		07
Shall :- Modify the installation drawings as necessary to record the "as installed" changes which may have occurred and thus form the basis of the final "As Fitted" drawings. Unless otherwise stated in Part 'D', include for obtaining/preparing the record drawings which are to be available not less than one month before practical completion of any part of the Contract. Indicate to a suitable scale agreed by the Engineer (which shall be in any case not less than the tender or installation drawings) the layout, identity, size and position of all services installed together with valves, control items, plant conduit routes, lighting fitting, switches, sockets outlets, distribution boards etc. The drawing shall show the results of all commissioning tests i.e. air flow rates as measured at grilles, measured flow rates through calibrated valves, pumps or orifice plates, controls settings media temperatures etc. The size, type and length of each ELV, LV and HV cable (to the nearest metre) shall also be given together with the measured earth fault loop impedance where applicable. All fuse or breaker current rating shall be shown as well as all trip settings. Inter connections between items of equipment, including those provided by others and terminal numbering and cable core identification of all alarm and control circuits Shall be given. The drawings shall be amplified with schedules and /or diagrammatic presentation. Particular attention shall be paid to the location and depth of buried services including those carried out by Gas, Water or Electrical Authorities etc. Similarly the drawings shall include all Sub letting and specialist works i.e. medical gases and ventilation ductwork etc. together with a schematic diagram of the application of automatic controls and instruments etc. The diagrams and drawing shall whenever possible have the valves etc marked to coincide with marking of valves labels etc, called for in the relevant sections of this specification. <u>Valve charts and schematic diagrams</u> Shall :- produce, as defined in Part C, a chart indicating valve references and identifying valve service and function. Produce for each system, a schematic diagram indicating plant and its references, pipework/ductwork, commissioning settings, control components and their references, normal operating temperatures and pressures, filter dirty settings and other operational conditions. Each diagram and valve chart shall be laminated and framed and permanently mounted in the relevant space in a clearly visible position. End of Element		08

LABELLING AND FIXING**06****01****Labelling**

EQUIPMENT	COLOUR & SIZE OF LABEL	COLOUR & SIZE OF LETTERING	TITLE	FIXING REQUIREMENT	LABEL MATERIAL
VALVES	WHITE 80mm x 25mm	BLACK 4mm high	As specified in Part C	Brass ring fitted around spindle	Brass or ivoryne
CONTROL PANELS	WHITE to suit nomenclature 80mm x 25mm	BLACK 6mm high	As specified in Part C	Brass round head screws	Ivoryne Perspex or laminate
THREE PHASE EQUIPMENT	BLACK ON YELLOW 100mm x 80mm	BLACK ON YELLOW 10mm high	DANGER 415 Volts	Brass round head screws	Ivoryne Perspex or laminate
SWITCHGEAR & DISTRIBUTION BOARDS	WHITE 100mm x 80mm	BLACK 6mm high	Circuits and apparatus controlled cable size	Brass round head screws	Ivoryne Perspex or laminate
DISTRIBUTION BOARDS CIRCUIT CHARTS	-	-	As specified in Part C	Non-flammable transparent pocket sliding into metal channels on inside of cover	Type-written chart indicating outlets controlled circuit No fuse and cable size
BUSBARS	Phase colours	-	-	At all access points	PVC Sleeving
ESSENTIAL SUPPLIES EQUIPMENT	WHITE	RED	As specified in Part C	As specified in Parts C and D	As specified in Parts C and D
GENERAL EQUIPMENT	WHITE	BLACK	As specified in Part C and D	As specified in Parts C and D	Ivoryne, Perspex or laminate

All dimensions shown are minimum sizes

Fixing Building Plant to the Building Fabric

02

EQUIPMENT TO BE FIXED	MATERIAL	ENVIRONMENT	FIXING
Heavyweight equipment or equipment subject to vibration, shock or heavy handling	Normal strength brickwork, masonry and concrete	Dry	Expansion bolts or self drill anchors
		Damp and/or corrosive	Galvanised or cadmium plated expansion bolts
	Normal Strength brickwork, masonry and concrete	Dry	Expansion bolts
		Damp and/or or corrosive	Galvanised or cadmium plated expansion bolts
	Poor brickwork, ,masonry or concrete in which it is difficult to drill neat fixing holes	Dry	Cement-in sockets or bolts
		Wet and/or corrosive	Galvanised or cadmium plated expansion bolts with proprietary caulking anchors
	Any material of low strength per unit area	Any condition	MS brackets and/or plates to spread the load. All brackets to be painted red lead primer and two finishing coats. Bolts to be galvanised, cadmium plated or normal to suit the conditions.
Any fixing and/or clips	Structural steelwork	Any condition	Clamps, finish of clamps and bolts etc to suit the conditions. All brackets to be painted red lead primer and two finishing coats.

EQUIPMENT TO BE FIXED	MATERIAL	ENVIRONMENT	FIXING
Lightweight equipment subject to movement excessive vibration, shock or heavy handling	Good brickwork, masonry and concrete	Clean, dry	Fibre or plastic plugs, steel woodscrews
		Clean, damp	Plastic plugs, brass woodscrews
		Clean, dry, high temperature	White bronze plugs, steel woodscrews
		Corrosive, any temperature	Propriety white bronze plugs, cadmium plated steel woodscrews
	Brickwork and masonry with ragged or irregular holes	Any condition	Propriety plugs compound and woodscrews to suit environment i.e. Dry – Steel Damp – Brass Corrosive – Cadmium Plated Steel
	Good timber blockboard and plywood exceeding 12.5mm thick	Dry	Steel woodscrews
		Damp	Brass woodscrews
	Sheet and cellular material of high strength per unit area e.g. sheet metal, sheet aluminium, hollow concrete blocks, hollow clay blocks, plywood less than 12.5mm thick chipboard	Any condition	Threaded brass/neoprene inserts, plated gravity toggles, plated toggles
	Sheet and cellular material of low strength per unit area e.g. building boards, plaster board, laminated plastic	Any condition	Plated gravity toggles, plated spring toggles

End of Element

End of Section B01

PART C

Section C41 – Common Services Electrical Low And Extra Low Voltage

Section C46 – Fire Detection And Alarm Systems

Section C49 – Nurse Call System

The above are not contained herein but are part of the National Health Model Engineering Specification available from the HMSO, Stationary Office, PO Box 276, London SW8 5DT.

<u>PART D</u>		
<u>PARTICULAR SPECIFICATION OF WORKS FOR ELECTRICAL ENGINEERING SERVICES</u>		
<u>INDEX</u>		
<u>PREAMBLE</u>	01	
Nature of the Works		01
Related Documents		02
Schedule of Contract Drawings		03
Quality Assurance		04
CDM		05
Electricity Supply		06
<u>DESCRIPTION OF THE WORKS</u>	02	
<u>EXISTING INSTALLATION</u>	03	
<u>MAIN DISTRIBUTION</u>	04	
<u>SUB-MAIN DISTRIBUTION</u>	05	
<u>METHOD OF WIRING</u>	06	
<u>CABLE TRAY, TRUNKING AND BASKET INSTALLATION</u>	07	
<u>GENERAL PURPOSE POWER INSTALLATION</u>	08	
<u>LIGHTING INSTALLATION</u>	09	
<u>EMERGENCY LIGHTING</u>	10	
<u>COMMUNICATIONS AND DATA INSTALLATION</u>	11	
Standard of Work and Materials		01
Data / Voice Cabling		02
Installation of Cables		03
Enclosures and Patch Panels		04
Labelling and Documentation		05
Testing		06
Inspection		07
Operation & Maintenance Manuals		08
<u>MECHANICAL SERVICES WIRING</u>	12	
<u>FIRE ALARM SYSTEM</u>	13	
<u>ACCESS CONTROL SYSTEM</u>	14	
<u>NURSE CALL SYSTEM</u>	15	
<u>CCTV INSTALLATION</u>	16	
<u>TV CHANNEL DISTRIBUTION</u>	17	
<u>PHOTOVOLTAICS</u>	18	
<u>CAR CHARGING POINTS</u>	19	

<u>WIRING REGULATIONS AND EARTHING</u>	20	
<u>WORKING DRAWINGS AND DETAIL CO-ORDINATION</u>	21	
<u>'AS FITTED' DRAWINGS AND SERVICE MANUALS</u>	22	
<u>SPECIALIST WORKING DRAWINGS</u>	23	
<u>BUILDERS WORK IN CONNECTION</u>	24	
<u>BUILDERS WORK DRAWINGS</u>	25	
<u>FIXINGS</u>	26	
<u>CONTRACTOR'S SUPERVISION OF THE WORKS</u>	27	
<u>VISITS TO SITE</u>	28	

PART D

PARTICULAR SPECIFICATION OF WORKS FOR ELECTRICAL ENGINEERING SERVICES

PREAMBLE

Nature of Works

The work covered by this Specification is for the supply, installation, testing and commissioning of the Electrical Engineering Services for the extension and refurbishment of Hevercourt Residential Home, Goodwood Crescent, Gravesend, Kent, DA12 5EY.

Hevercourt Residential Home consists of a ground, first and second floor. Only the ground floor is being extended and refurbished as part of the contract works.

The areas of the residential home that are not being refurbished shall be in operation throughout the contract.

The works are split into three phases and the contractor shall ensure all elements of the works are considered and priced in accordance with the phasing strategy.

The Mechanical and Electrical Contractors shall, before submitting their tender, carefully examine all drawings and specifications and should inform the Professional Team of any discrepancy.

In every respect, in the installation of the actual works, the Mechanical and Electrical Contractors shall be deemed to have included for materials to comply with the designated regulations in the Specification and, where not specifically detailed, he should use those materials which are the best of their kind.

The workmanship must at all times be executed to a high standard and comply with the recognised working methods within the industry. The Professional Team reserves the right to reject any work which is not satisfactory, and all such defects must be rectified and the cost borne by the Contractor.

Related Documents

Each of the following documents must be read in conjunction with Part D.

- Part A - Standard General Conditions and Preliminaries
- Part B - General Technical Clauses relating to the Engineering Services
- Part C - Section 41– Common Service Electrical Low and Extra Low Voltage
Section 46 – Fire Detection and Alarm System
Section 49 – Nurse Call Systems

Tender Documents

Where the details given in this Part D of the Specification are at variance with details given in Part A, B or C of this Specification, then Part D details shall apply. In all other respects, the requirements of Parts A, B and C of this Specification shall apply.

No financial or other claim by the Contractor in respect of ignorance of the specific requirements of Part C of this specification, or any other part, shall be considered by the Employer.

Schedule of Contract Drawings

The following drawings will form part of the Contract Documents associated with the Electrical Engineering Services Contract:

01

01

02

03

EBS 2022/1	Ground Floor Plan Proposed Small Power and Ancillary Services Layout Sheet 1 of 2		
EBS 2022/2	Ground Floor Plan Proposed Small Power and Ancillary Services Layout Sheet 2 of 2		
EBS 2022/3	Ground Floor Plan Proposed Lighting and Fire Alarm Services Layout Sheet 1 of 2		
EBS 2022/4	Ground Floor Plan Proposed Lighting and Fire Alarm Services Layout Sheet 2 of 2		
EBS 2022/5	Electrical Distribution Schematic, Roof Layout and Site Plan Electrical Services Layout		
<u>Quality Assurance</u>			04
All tendering parties, Contractors, Sub-Contractors, Supplies and Manufacturers of equipment or materials to be provided/installed, shall operate quality assurance procedures conforming to ISO 9001 EN 29000. Should any parties mentioned above not be certified to ISO 9001 they shall be required to demonstrate that they have quality assurance procedures in line with ISO 9001 requirements or are actively proceeding towards certification to this standard. Quality procedures will be applied throughout the Contract period on all matters.			
<u>CDM</u>			05
CDM Regulations will apply to this Contract and the Contractor shall fully comply with the regulations and shall supply all such information as required.			
<u>Electricity Supply</u>			06
The main electrical supply to the Residential Home is derived from UK Power Networks standard low voltage network of 400V, 3 Phase, 4 Wire at a frequency of 50 Hertz. The existing incoming electrical supply terminates in the main electrical cupboard on the ground floor accessed via the back of house corridor. A provisional sum has been included for the electricity supply shall be upgraded as part of these works. The new UK Power Networks cut-out and metering shall terminate in the main intake cupboard at ground floor level. A kWh meter shall be provided with the Contractor liaising with the meter supplier to agree the siting of the meters and a date for the installation. The installations shall be complete with CT chambers, CT's, connections and all meters. The method of installation and arrangement shall comply with the supply authorities installation requirements. The electrical supplies to the areas that are not being refurbished shall be maintained throughout the works.			

DESCRIPTION OF THE WORKS

02

The Contractor shall include for the supply, installation, testing and commissioning of the complete electrical installation items as follows :-

- a) Removal of redundant electrical engineering services and the provision of all temporary connections required to maintain supplies to the occupied areas of the residential home.
- b) Survey and validate existing services that run externally where 'The Street' extension is being built to establish whether any diversions or modifications are required as part of the contract works.
- c) Modifications to existing cable containment systems and provision of new to allow installation of cabling to new and refurbished areas.
- d) Supply and installation of wall mounted moulded case circuit breaker panel boards to the main switchroom.
- e) Supply and installation of the miniature circuit breaker (MCB/RCBO) distribution boards.
- f) Provision of the lighting and emergency lighting installations consisting of recessed and surface mounted luminaires as indicated on the drawings.
- g) Supply and installation of new external lighting installations.
- h) General purpose power and ancillary power installations including the supplies to the various fixed appliances.
- a) Communications systems wiring route network consisting of data outlet positions for the provision of wireless access points. All data wiring shall be provided by Specialist Contractors as part of this Contract.
- b) Modifications and Extensions to the existing analogue / addressable fire detection and alarm installations.
- c) Modifications and Extensions to Existing Nurse Call System
- d) Provision of new access control systems.
- e) Provision of new CCTV systems.
- f) Modifications and Extensions to the existing TV system.
- g) Mechanical services wiring and provision of local isolation facilities.
- h) Provision of Photovoltaic Installation.
- i) Provision of Electric Vehicle Charging Point and cable route/containment for the provision of future electrical vehicle charging points.
- j) Provision of the complete main equipotential earth bonding conductors and the supply and installation of the local earth bonding and cross bonding requirement.
- k) Supply of comprehensive technical information including distribution board schedules, schematic distribution diagrams, manufacturer's data, test sheets etc., Information to be provided in the form of a loose leaf bound comprehensive maintenance manual.
- l) The complete testing and commissioning of the installations together with the provision of all relevant data within the maintenance manuals.

All the above installation works to be in accordance with the 18th Edition of the IEE Regulations for Electrical Installations (BS 7671) all applicable British Standards/Codes of Practice.

EXISTING INSTALLATION

03

The Contractor shall allow for removing the redundant existing electrical service installation items from the areas to be refurbished/extended.

There are various existing services, including cabling, TV equipment etc, that run externally where 'The Street' extension is being built. The contractor shall include for surveying and validating these services to establish whether any diversions or modifications are required as part of the contract works.

The existing services to be removed from the site shall include switchgear, distribution boards, distribution wiring, wiring accessories, luminaires, conduit, communications cabling, fire alarm equipment, nurse call equipment and access control equipment.

The Contractor shall offer all electrical materials to the client (Mr and Mrs Gilmour) for their inspection and retention if required. The Contractor shall then allow for disposal of all such items from site that are not required to be retained by the Client.

The main switchgear and distribution boards that serve the area to be refurbished also serve other areas that shall remain operational throughout the Contract. The Contractor shall therefore allow for tracing out each circuit to identify equipment served before disconnection and removal to ensure they do not disrupt supplies to outlets and equipment outside the specific phased area to be refurbished.

Temporary cabling and connections to be provided as required. Communication services, fire alarms and nurse call shall also be maintained to all areas.

The Contractor shall allow for giving 10 days' notice in writing to the Engineer prior to any shutdown that shall affect the Residential Homes existing services. These shut downs shall be at a date and time convenient to the Home and the Contractor shall at this stage allow for assuming all 'out of normal hours working' so that no additional costs will be incurred.

The written notice shall detail the following :-

- a] Existing services to be affected
- b] Date and time of shutdown
- c] Duration of shutdown
- d] The Exact Date and Time shall be agreed with the client

MAIN DISTRIBUTION

04

The Contractor shall supply, install, connect, test and commission the main distribution as detailed on the drawings. The Contractor shall be responsible for the off-loading, positioning and secure fixing of the panelboard and switchgear and to ensure that all site conditions design parameters and specification test requirements are complied with.

The UK Power Networks cut-out and metering equipment are located in the same cupboard as the new panelboard as indicated on the drawings. The contractor shall allow for the associated shutdowns and cabling from the existing service head/meter to the new panelboard. An application has been made to UK Power Networks for a new incoming electrical supply and a provisional sum has been included in the specification for the cost of this.

The new panelboard to the main switchroom shall be of the sheet steel wall mounting cubicle pattern incorporating moulded case circuit breaker protective devices to BS 4752 Part 1 1977. Padlocking facilities to lock the circuit breaker in the open or closed position shall be provided.

The panelboard assembly shall be complete with the following accessories:

- i] Door Kit
- ii] Blanking Pieces
- iii] Terminal Shield Kit for all terminals
- iv] Brass Drilling Plate
- v] The panelboards shall incorporate kilowatt hour meters to outgoing ways as follows:
 - a] All lighting distribution boards
 - b] All power distribution boards
 - c] Mechanical control panels

The kWh meters shall be of the microprocessor 'intelligent' type suitable for integration with a building energy management system to provide a remote monitoring system for the measurement of kWh, KVA and power factor. The meter shall indicate kWh, KVA and power factor on an LCD display on the front of the unit. The meters shall include for pulsed outputs for connection to the BMS.

The metering compartment shall be fully segregated from the main circuits and incorporate all fuses etc., The metering installation shall be complete with CT's and all interconnecting wiring.

The panelboard shall be as MEM Ltd. their Series G Panel board range or Schneider Electric their PowerPact 4 panel board range or equal and approved. There is approximately 850mm width between the existing service head/trunking to the side wall for the panelboard to be installed. This is large enough for the new panelboard however the outgoing meters may need to be installed remote from the panelboard. The contractor shall allow for surveying and making any necessary modifications to existing electrical switchgear and sub main cables to be reconnected to the new panelboard.

A Type 1 Surge Protection unit shall be installed at the panelboard within a separate enclosure.

All outgoing ways shall be designated to indicate equipment served.

The Contractor shall in addition, supply and install to the switch cupboard the following items:

- a] Wall mounted schematic wiring diagram within a glazed aluminium frame.
- b] Electric shock notice.
- c] Any special tools recommended by the switchboard manufacturer.
- d] Full width 1000mm wide rubber mat to BS921.

Adjacent to the panelboard the Contractor shall supply and install a copper earth bar within a Sarel or equivalent lockable enclosure. The equipotential bonding conductors and supplementary conductors to extraneous metalwork shall terminate at this earth bar position as indicated on the drawing. The enclosure shall be clearly labelled 'Earth Reference Terminal'. Each conductor within the enclosure shall be clearly identified by means of a white laminate label with black lettering. The Contractor shall allow for main equipotential bonds to all new and existing incoming supplies.

SUB-MAIN DISTRIBUTION

The Contractor shall supply, install, connect, test and commission the sub-main distribution requirements as detailed on the drawings. The Contractor shall be responsible for offloading, securing and positioning switchgear and the distribution components and for securely fixing these items to the structure. The Contractor shall also ensure that all site conditions, design parameters and specification test requirements are complied with.

05

The new lighting and power distribution boards shall incorporate Type C 10kA rated miniature circuit breakers, to comply with BS EN 60898 with thermal and magnetic trip protection against overload and short circuit conditions. The MCB's serving all circuits shall be of the combined MCB/RCD type with a sensitivity of 30mA for all circuits. The MCB's shall be incorporated within a surface mounted sheet steel enclosure fitted with lockable cover and 100 Amp. main switch. The units shall be complete with all internal solid copper connections and busbars and shall be generally as designed and manufactured by Eaton, their Memshield 3 range.

Arc Fault Detection Devices (AFDD's) shall be installed to all new or modified final circuits that serve socket outlets. The distribution boards manufacturer and range shall be selected to accommodate AFDD's.

Selected distribution boards, as indicated on the drawing, shall incorporate kilowatt hour meters of the micro-processor 'intelligent' type suitable for integration with a building energy management system to provide a remote monitoring system for the measurement of kWh, KVA and power factor. The meter shall indicate kWh, KVA and power factor on an LCD display on the front of the unit. The meters shall include for pulsed outputs for connection to the BMS.

Where existing circuits are to be reconnected to new distribution boards the Contractor shall determine the MCB/RCBO rating based on the existing rating and cable sizes.

A Surge Protection unit shall be installed at each of the distribution boards within a separate enclosure or integral to the distribution board.

Each distribution board shall have a minimum of 25% spare ways for future circuits.

The Contractor shall allow for the distribution boards and switchgear components to be designated with screw fixed engraved formica labels detailing the following :-

- a] Circuit Origination Point
- b] Size Of Incoming Cable
- c] Board Type and Size
- d] Board Reference Number
- e] Phase Identification, if appropriate
- f] Equipment Served, if appropriate

The Contractor shall include for re-wiring all lighting and power circuits associated with the contract works and as identified on the layout drawings.

The new distribution boards shall also be provided with fully detailed circuit charts clearly stating:-

- a] Circuit number
- b] MCB size
- c] Cable size
- d] Circuit description
- e] Phase designation
- f] Circuit loadings
- g] Final circuit earth loop impedance values

The circuit chart shall be wall mounted in an anodised aluminium frame and protected by a sheet of clear polycarbonate material.

METHOD OF WIRING

The Contractor shall supply, install, connect, test and commission the following wiring requirements associated with the various electrical engineering services:

06

a] Sub-Main Wiring and Mechanical Services Wiring to External Plant

XLPE/SWA/LSF multicore cables with stranded copper conductors and securely fixed with the manufacturer's recommended LSF cleats and complete with outer sealing type glands.

All glands shall be provided with LSF shrouds (black) and shall incorporate an integral earth tag for bonding purposes.

The cables shall be supported by means of LSF polypropylene or nylon cleats fixed to the building structure where appropriate. Spacing of cable fixings shall be as defined in the 18th Edition of the IEE Wiring Regulations.

Multiple-cable runs to be fixed to cable tray.

The Contractor shall allow for identifying the cables at termination points stating :-

- i] Cable Size
- ii] Controlling fuse and location
- iii] Switchgear served

b] Lighting and Power Distribution Cables

Low smoke and fume (LSF) insulated, single core cables with copper conductors enclosed in new sheet steel trunking and/or heavy gauge, screwed seam welded steel conduit. Every lighting and power circuit shall be complete with its own separate earth continuity conductor.

Cable markers indicating the circuit number shall be fixed to the live, neutral and earth conductors at the cable termination point within the distribution board.

Wiring must not be buried in floor screeds. All cables in walls to run vertically and be physically protected from damage in accordance with the Statutory Regulations. No diagonal wiring will be allowed.

All electrical wiring serving the heating systems shall be installed by the electrician. All wiring near hot pipes and into heating equipment shall be heat resistant to BS 6500, Table 14.

Cable markers indicating the circuit number shall be fixed to the live, neutral and earth conductors at the cable termination point within the distribution board.

c] Fire Detection and Alarm Cables

Multicore FP200 enhanced grade (Red) cable having a red OHLS outer sheath covering securely fixed to the structure with the manufacturer's recommended OHLS copper coated 'P' clips or fastened to cable tray with fire resistant cable ties.

Note: - Fire alarm cables shall be run within conduits for vertical drops serving flush mounted call points / sounders etc.

d] Voice / Data Cabling Network

Cat 6 cabling shall be supplied and installed by specialist contractors as part of the contract and shall be securely fixed with the manufacturer's recommended tinned wiring clips or purpose made plastic cable cleats. All wiring drops shall be concealed in conduit and protected where below wall plaster or in stud walls with high impact uPVC conduit. Conduits shall be chased into the wall surface to ensure at least 5mm of plaster cover.

e] TV, Door Access, Nurse Call and CCTV Systems

The wiring shall be supplied and installed by specialist contractors as part of the contract and shall be securely fixed with the manufacturer's recommended tinned wiring clips or purpose made plastic cable cleats. All wiring drops shall be concealed in conduit and protected where below wall plaster or in stud walls with high impact uPVC conduit. Conduits shall be chased into the wall surface to ensure at least 5mm of plaster cover.

f] General

The exact method of installation for mechanical and electrical services cabling shall be agreed with the Architect and Structural Engineer prior to installation. The notching of joists and zones of installation shall comply fully with the Structural Engineers requirements to ensure the integrity of the structure is maintained.

All wiring in escape routes shall have fire-resisting supports in accordance with BS 7671 – 18th Edition, including all latest Amendments.

The conduit and cable installation and associated boxes shall be concealed wherever possible either within ceiling voids or services ducts.

Ceiling voids and other service routes will have extensive runs of mechanical services pipework and ductwork, the electrical specialist shall liaise with the mechanical services specialist to ensure clashes or services do not occur.

All necessary fixing brackets shall be installed as required for the Electrical Services Installation. These brackets shall include all steelwork required to span ductwork or other services. Fixing of Electrical Services to ductwork brackets or other services shall not be permitted.

Conduit installations to plantrooms or where routed externally to be HGSW galvanised type.

Separate conduits shall be installed for each of the following categories and wiring systems :-

- Extra Low Voltage AC
- Emergency Lighting
- Computer Wiring
- Mechanical Services Wiring
- TV Systems
- Alarm Systems – Separate conduits for each system specified
- CCTV Systems

Conduits installed for each of the above shall be reserved for the relevant system and shall not contain wiring forming part of other circuits.

CABLE TRAY, TRUNKING AND BASKET INSTALLATION

07

The Contractor shall utilise and modify the existing containment installation as necessary.

Due to the ceiling construction there is not a great deal of opportunity to install cable tray / basket containment systems. However where possible, and where agreed with the architect and structural engineer the contractor shall supply, install, test and commission the galvanised steel cable tray / basket installations to allow for a re-wireable installation.

Where containment systems are installed the contractor shall ensure access panels are provided in the ceilings. The size and locations of the access panels shall be agreed with the Client and Architect prior to installation.

Cable trays shall be of the galvanised steel perforated or wire basket type and shall be complete with the Manufacturer's gusset type bends and accessories. The tray shall be fixed to the structure via purpose made galvanised steel brackets to provide a minimum "stand-off"

distance of 25mm from the building fabric. The Contractor shall allow for fixing the cables to the tray with the cable Manufacturer's recommended one piece nylon cleats. Due allowance shall be made for off-setting the route of the tray to accommodate mechanical services ductwork and pipework.

The cable tray/basket shall be supplied and installed in accordance with the manufacturer's installation instructions.

The cable basket shall be provided with cable barriers.

GENERAL PURPOSE POWER INSTALLATION

08

The Contractor shall supply, install, connect, test and commission the general purpose power and ancillary power installations as detailed on the drawings.

The flush mounted wiring accessories shall be of the MK Electric Limited, manufacture, their Logic Plus range complete with plastic fascia plates and mounted in the appropriate flush mounted boxes.

All 13 Amp switch socket outlets shall be provided with a dual earth facility.

The contractor shall include for the final connections to all items of fixed equipment.

With regard to the fused connection units and double pole switches, the Contractor shall allow for carrying out all final wiring connections between unit and fixed appliance, and for engraving the fascia plate with the appropriate designation. Where possible, this final connection wiring shall be concealed in the conduit network. The fused connection units and double pole switches shall be complete with controlling switch and neon indicator and flexible cable exit aperture, if applicable. These wiring accessories shall also be as manufactured by M.K. Electric Ltd. as detailed above and mounted in the appropriate sheet steel box.

The fascia plates shall be white however the final colour to be agreed with the Client, Architect and agreed with Building Control with regards Part M compliance.

External socket outlets shall be a minimum IP66 rated and of the MK Electric Ltd Masterseal range.

Mounting heights for socket outlets should generally be as indicated on the Architects 1:50 layouts, however, these should be confirmed with the Engineer prior to first fix installation.

A sample board of all proposed accessories shall be provided for the architect / client's review and approval prior to ordering.

The final location of socket outlets shall be confirmed by the Client prior to installation.

The Contractor shall allow for engraving all accessories to indicate the circuit number to correspond with the distribution board schedule.

Extract fan isolating switches shall be mounted above the doors external to the relevant en-suites / WC / Bathroom accommodation as detailed on the drawings.

The Contractor shall include for all necessary power supplies associated with the specialist systems, including nurse call, access control and CCTV systems.

LIGHTING INSTALLATION

09

The Contractor shall supply, install, connect, test and commission the complete lighting installation. The installation shall be complete with all lamps and be of the manufacturer's range and selection as detailed on the drawings.

Luminaires shall generally incorporate LED lamps. The luminaires selection is detailed on the

drawings. The specified luminaires and controls are of the Thorlux Lighting and Orlight manufacture.

The lighting manufacturer shall submit fully detailed lighting calculations prior to ordering the luminaires for the Engineers approval.

The LED luminaires provided are to have a guaranteed operation of 5 years.

Lighting control switches shall be of the MK Electric Ltd. Manufacture, their Logic Plus Gridswitch pattern and 20 A SP switches.

The switches and accessory plates shall be white however the final colour to be agreed with the Client, Architect and agreed with Building Control with regards Part M compliance.

A sample board of all proposed accessories shall be provided for the architect / client's review and approval prior to ordering.

The Contractor shall allow for providing samples of all luminaires for approval by the Client prior to order.

The setting out of all accessory plates, switches and luminaires shall be co-ordinated with the furniture/ceiling layout and agreed with the Client prior to installation.

Generally, the lighting shall be controlled via manual 2 way and intermediate switching however switching to communal toilets and stores shall be controlled via occupancy (presence) PIR sensors.

The final switching arrangement shall be agreed with the Client prior to installation.

The exact location of PIR's shall be agreed with the PIR manufacturer to ensure that luminaires are on at all times when rooms are occupied and there is no nuisance tripping.

The Contractor shall confirm the exact ceiling types and heights with the Architect before ordering any luminaires. No costs shall be considered due to non-compatibility of luminaires and ceilings. The Contractor shall ensure that the luminaire trim detail is compatible with the ceiling grid where fittings are of the recessed type.

Where suspended ceilings are provided the Contractor shall allow for the appropriate Unistrut and conduit support to be provided so that the weight of the luminaire is transmitted to the structural element not the supporting grid.

The final connection to luminaires recessed into ceilings shall be via plug-in ceiling roses. Connection wiring from the ceiling rose to the luminaire shall be 3 core multi-sheathed 1.5mm² butyl rubber insulated flexible cable concealed within the ceiling void.

The Contractor shall allow for labelling all light switches to indicate the circuit number to correspond with the distribution board schedule.

The external lighting circuits to the buildings shall be contactor controlled and wired to perform the following functions:

- a] The photoelectric cell shall bring all selected luminaires "On" if the natural light falls to a pre-determined low level and will turn all luminaires "Off" when a suitable natural lighting level returns.
- b] The time switch shall turn all luminaires "Off" at the desired present time.
- c] A suitably labelled switch located adjacent to the time switch shall override both the photoelectric cell and time switch circuits.

The photoelectric cell shall be of the Thorn Lighting Ltd., manufacture, their QPK range, or

equal and approved. The Contactor and digital quartz fully programmable time switch shall be of the MEM Ltd manufacture their Memshield Command Device range mounted in the appropriate surface mounted moulded enclosure with transparent lid, DIN rail and earth bar. The Contractor shall allow for a contactor and all associated cables and local override switches to enable control as detailed above. At the commencement of commissioning for the M & E services installations, the Contractor shall clean all lighting fittings and diffusers and fit the diffusers ensuring that the installation is left in full working order.		
<u>EMERGENCY LIGHTING</u> The Contractor shall supply, install, connect, test and commission the complete emergency lighting requirement as detailed on the drawings. The emergency lighting equipment shall be as manufactured by Thorlux Lighting and the system shall provide auto-testing of the emergency luminaires. The emergency luminaires shall generally be from the downlight flush or surface range of corridor or open area distribution type as detailed on the drawings. The emergency luminaires shall be provided with integral battery pack to provide 3 hour emergency operation. Each luminaire shall be fitted with a bi-coloured LED indicating charge / fault status. The Contractor shall carry out the necessary completion tests on the emergency lighting installation, together with the relevant certificate issue, all to comply with BS 5266. The Contractor shall include for recording lighting levels for the emergency lighting installation with the results being marked onto reduced scale plans which shall be attached to the Test Certificate. The measuring of the emergency lighting levels shall be carried out during the hours of darkness. The Contractor shall carry out the necessary completion tests on the emergency lighting installation, together with the relevant certificate issue, all to comply with BS 5266. The Contractor shall also submit at practical completion stage, an Emergency Lighting Log Book to comply with the maintenance and regular testing procedure requirements of BS 5266. The existing emergency lighting system to the Residential home is life expired and not fit for purpose. As a cost option, the contractor shall provide a price for supply, install, connect, test and commission the complete emergency lighting requirement to all areas outside of the contract work areas.	10	
<u>COMMUNICATIONS AND DATA INSTALLATION</u> The Contractor shall supply, install, connect, test and commission the containment for the communications and data installations to the extended and refurbished areas as indicated on the drawing. The Contractor shall supply, install and test the conduit and containment installations as previously detailed in the specification to enable the IT and telephone wiring and equipment to be sited to the various areas as detailed on the drawings. The Contractor shall allow for installing PVC covered draw wires to the conduit installation and for the necessary attendance to the computer engineers during their wiring and connection work periods on site, so that when their installation is complete the Contractor will be responsible for re-instating any conduit to ensure that the whole system is finished to the Engineer's satisfaction.	11	

The Contractor shall directly employ Mr and Mrs Gilmour's preferred Specialist Installer to supply, install, connect, test and commission the cabling, outlets and patch panels: Company Details: TBC Email: TBC Contact Number: TBC The installation is to comprise: - i] Communications Cabinet - ii] Patch Panels - iii] Connections - iv] Wall Outlets - v] WiFi Access Points (Contractor to carry out a Wireless Data Survey to establish locations of data points) - vi] Cables and Terminators - vii] Installations, Testing and Certification of the infrastructure - viii] Documentation and Labelling <u>Standard of Work and Materials</u> The Data/Voice Cabling installation shall fully comply with the Electronic Industries Association (EIA)/ Telecommunications Industry Association (TIA) document ref EIA/TIA 2840, Commercial Building Telecommunications Cabling Standard. All materials shall be new and shall conform to the appropriate British Standard. <u>Data / Voice Cabling</u> All cables must be four pair Category Level 6 unshielded twisted pair which shall conform to the guidelines set out in the EIA/TIA Telecommunications Bulletin 36. Final confirmation of category of cable to be confirmed prior to ordering and installation. The horizontal cabling shall be a star topology. The maximum lengths of installed UTP cable shall not exceed 90 metres, giving allowance within the 10 base T standard for a patch lead of 3 metres and a fly of 7 metres. All terminations shall be RJ45 type connections and shall conform to the EIA/TIA Category Level 6 specification as manufactured by Siemens, or similar and approved manufacturer. <u>Installation of Cables</u> Pulling of cables shall be executed in such a manner as to avoid any damage to the cable or distribution system. Conduits shall not be filled above 75% full after installation in completed areas except where specifically agreed in writing by the Employer. Cable shall not be compressed, stretched or kinked during installation. Minor chaffing of the outer sheath shall be immediately sealed with a suitable tape to prevent ingress of water/moisture. All handling specifications for the cables (shear stress, bend radius etc.) must be complied with by the Contractor. <u>Enclosures and Patch Panels</u> The contractor shall allow for relocating the existing wall mounted data cabinet and associated patch panels/switches to accord with the proposed layout changes. The Contractor shall provide within the communications cabinet all required patch panels,		01 02 03 04
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cable management bar, 9 way power distribution panel and metal cable tray to both sides. All patch panels are to be 24 way unkeyed RJ45 and 19 inch rack mountable. For every 2 patch panels installed an IU cable management bar is required. All outlets and panels shall be of the same type and manufacture; under no circumstances shall components be mixed. <u>Labelling and Documentation</u> The labelling of all cables at each end shall be durable and legible and must not degrade during normal use, within the lifetime of the cabling system. The label markings must be indelible and waterproof. The labels on the data outlet sockets, patch panel, sockets and cable ends must be in the format :- 58 / NN, where : NN is the outlet number. After completion of the installation the Employer shall be provided with :- As installed diagrams. These shall be in the A3 format, one diagram for each level or area; included on the diagram shall be conduit routes. Each outlet shall be shown with its identification. Equipment specification, full specification sheets on all components installed. Test results. A log of all outlets together with a copy of the Engineer's test result, pair configuration, continuity and TDR lengths.		05
<u>Testing</u> All cables, connections and terminations shall be tested on completion. The tests carried out shall be :- Using an industry recognised pair testing device, each cable shall be tested to show end to end continuity, plus termination conformance to EIA/TIA Commercial Building Telecommunications Wiring Standard SP-14078 (AT&T 258A). TDR an industry recognised time domain reflectometer shall be used to test the lobe length of each cable installed.		06
<u>Inspection</u> The Employer reserves the right to inspect the cable during installation and to have replaced any non-conforming cables at no extra charge. The Employer shall have the right to conduct any acceptance tests which it may feel appropriate to confirm that the work has been carried out in accordance with this specification. The Employer shall have the right to the presence of the Contractor's Engineer on the date when equipment is to be connected over the structural cabling. Five working days' notice to the Contractor of this requirement will be given.		07
<u>Operation & Maintenance Manuals</u> Three copies of all documentation are required in both paper and electronic format (* where applicable). Drawing files will be required in DWG format. A complete set of documentation is to comprise of :-		08

- i] BS6701 Certificate
- ii] Warranty Certificate
- iii] Complete set of as Installed Drawings*
- iv] Schematic Diagram*
- v] Cabinet Layouts*
- vi] Cable Schedules*
- vii] CAT6 Test Results*
- viii] Fibre Test Results*

MECHANICAL SERVICES WIRING

12

The Contractor shall supply, install, connect, test and commission the sub-main cable to the mechanical control panels as detailed on the drawings.

All controls wiring requirements associated with the mechanical services installation from the mechanical control panels shall be carried out by the Mechanical Engineering Services Contractor.

The Contractor shall supply, install, connect, test and commission the wiring associated with the various extract fans and underfloor heating manifolds etc., generally as detailed on the drawings.

Exact details to be confirmed with the mechanical specialist.

FIRE ALARM SYSTEM INSTALLATION

13

The Contractor shall design, modify, extend, supply, install, test and commission the fire detection and alarm system as detailed on the drawings.

The Contractor shall supply, install and test the conduit installation as previously detailed in this Specification to enable the fire alarm systems wiring and equipment to be sited to the various areas as detailed on the drawings.

The Contractor shall allow for installing PVC covered wires to the conduit installation and for the necessary attendance to the specialist engineers during their wiring and connection work periods on site, so that when their installation is complete, the Contractor will be responsible for re-instating any conduit to ensure the whole system is finished to the Engineer's satisfaction.

The existing analogue / addressable fire alarm panel of the Morley IAS Fire Systems manufacture, model ZX2Se and is located in the existing entrance lobby. Once the new main entrance has been built the existing fire alarm panel shall be relocated as indicated on the drawings.

The Contractor shall liaise closely with the Specialist Fire Alarm Equipment Specialist to obtain the associated prices, installation components and circuit recommendations.

The Contractor shall ensure that the existing fire alarm system remains operational for the duration of the works and shall confirm all points of connection to the existing system with the Specialist Supplier.

The circuits to the upgraded areas shall be modified / extended in a loop formation utilising multi-core (to accord with manufacturers requirements) fire resistant 1.5mm² Pirelli FP 200 enhanced grade cable (Red).

The Contractor shall include for all temporary connections and commissioning required to satisfy the proposed phasing.

The system shall:

- i] Utilise FP 200 Gold, or similar, cabling throughout.
- ii] Incorporate manual break glass units at all escape routes. All break glass call points shall be provided with protective plastic covers.
- iii] Incorporate automatic detectors in areas as recommended by the District Surveyor/Fire Officer. A type L1 system shall generally be required, as a minimum, with automatic detection to the escape routes, rooms off escape routes and high risk areas.
- iv] Incorporate addressable automatic detectors of the types as defined in BS 5839. These shall be identical to the existing devices installed in the School.
- v] Be zoned to take account of the individual structural fire compartment zones dictated by BS 5839 and the District Surveyor/Fire Officer recommendations.
- vi] Offer audio signal in excess of 65 dBA or 5 dBA above background, whichever is the greater, to all areas.
- vii] Incorporate visual alarm indication to WC's, bathrooms and circulation areas, and other areas as required by the District Surveyor / Fire Officer.

The Contractor shall supply and install addressable outstations located as follows :-

- i] Adjacent to the mechanical control panel in the plantroom to shutdown gas supplies in the event of a fire.
- ii] Adjacent to controllers for access control systems that should release in the event of a fire.
- iii] Adjacent to electromagnetic hold open devices so that doors shut in the event of a fire.

The new detectors, break glass call points and sounders in the extended and refurbished areas shall match the devices in the existing areas of the residential home.

The contractor shall allow for the supply and installation of battery operated Grippa door holders to all bedrooms and corridor doors. Please note that this shall be priced as a separate item with the summary of tender.

The contractor shall allow a provisional sum for providing a Fire Alarm Repeater Panel to the Staff Entrance subject to the fire officers requirements.

The fire alarm system shall be tested and commissioned by the following who currently maintain the system:

Company: iCom Security
Tel: 01622 797600
E-Mail: info@icomtel.com

iCom Security shall confirm that the existing fire alarm panel has enough spare capacity to add the required number of additional devices to the system.

The system shall be wired in strict accordance with the Fire Alarm Specialists recommendations.

All equipment shall be included that is required to complete the installation.

The Contractor shall be responsible for carrying out full commissioning tests to the fire alarm systems to ensure that the system works to the satisfaction of the Engineer. The contractor shall also arrange for the necessary Test Certificate to be compiled, witnessed and issued to comply with the recommendations of BS 5839. The Contractor shall provide all test

instruments and equipment to enable the commissioning tests to be carried out. The instruments shall be in good working order and accurately calibrated.

For testing purposes each detector shall have an identification disc attached which shall be marked with the detector address code. The number should be entered in the log book.

The Contractor shall include for completing the equipment suppliers detection and sounder programming sheets for submission to the Employer's Agent for comment.

The Contractor shall allow for providing new glazed and framed location plans of the building to indicate detectors and zones, mounted adjacent to the relocated main fire alarm panel.

Prior to handover of the building, the Contractor shall ensure that all detector heads remain covered of the duration of the works in order to avoid contamination.

The inspection, initial testing and commissioning shall be carried out in accordance with BS 5839.

The Contractor shall include for the maintenance of the fire alarm system during the 1 year's defects liability period.

ACCESS CONTROL SYSTEM

14

The Contractor shall supply, install, connect, test and commission the door access systems as identified on the drawings.

The Contractor shall supply, install and test the conduit installation as previously detailed in this Specification to enable the door access systems wiring and equipment to be sited to the various areas as detailed on the drawings.

The Contractor shall allow for installing PVC covered wires to the conduit installation and for the necessary attendance to the specialist engineers during their wiring and connection work periods on site, so that when their installation is complete, the Contractor will be responsible for re-instating any conduit to ensure the whole system is finished to the Engineer's satisfaction.

The access control system shall be supplied, installed, tested and commissioned by the following who currently maintain the system:

Company: Kelk Communications System

Tel: 01304 832 332

E-Mail: martin@kelkcomms.co.uk

A new video entry panel as indicated on the drawings shall be located at the main entrance doors and shall incorporate an electronic keypad for staff use and a digital call button / speech facility. The door panel shall have a vandal resistant stainless steel fascia plate and flange box. The panel shall be installed at a height of 1100mm from centre of the panel to finished floor (height to be agreed) to provide a clear view of visitors with the camera angle adjustable.

The internal video door release handset shall be full colour and located within the team leader, managers and administration offices (three locations). The equipment shall be of the BPT Security Systems manufacture or equivalent.

In order to avoid residents escaping through access controlled doors electronic keypads shall be provided on both sides to various doors as indicated on the drawing and network linked with modular controllers selected to suit the specific numbers of doors and locations. Modular controllers shall be linked to a dedicated fused connection unit and data outlet located to suit the Security Specialist's requirements. Local release buttons shall not be provided adjacent to the doors.

The access control system shall be linked to the Kelk Communications Telephone System as

per the existing arrangement within the Residential Home.

On the escape side of the door the electronic keypad shall be wired into the circuit to momentarily break the feed to the electric lock release. An emergency 'Break Glass' release switch coloured green shall also be located adjacent to the doors. In addition the control circuit for the rooms shall be linked into the Fire Alarm System to ensure that in the event of an alarm the doors are automatically released.

The doors provided with access control systems shall each be provided with a heavy duty magna-locks or electric strikes securely fixed to the top of each door. Each magna-lock shall be selected to provide a minimum holding force of 500kg. Magna-locks/electric strikes shall be selected to ensure compatibility between all components including operating voltage and rating of equipment. The contractor shall refer to the door schedule for details of the type of locking system.

All access controlled doors shall be linked into the Fire Alarm System to ensure that in the event of an alarm the doors are automatically released/failed open.

The height of all equipment including the door release switch and break glass shall be agreed with the Architect.

Power supplies, fused connection units and data points shall be provided to the central controllers as required by the specialist.

The data points shall be connected to the dedicated access control patch panel / switch within the data cabinet.

The system shall be tested on completion with appropriate test certificate and necessary operation documents being handed to the Employer. The system shall also be fully demonstrated to ensure compliance.

The Contractor to be responsible for the maintenance of the entrance phone system for 12 months following handover and to provide the Employer with a copy of the maintenance agreement at handover. Provide the employer with a quotation for the continued maintenance cover for the 12 months following the Defects Liability Period, that quotation to be provided at the end of the Defects Liability Period.

The complete system shall be installed and commissioned by the Contractor to accord with the manufacturer's requirements.

NURSE CALL SYSTEM

15

The contractor shall design, supply, modify, extend, install, connect, test and commission the staff call installations to all areas generally as detailed on the drawings. The installation shall be supplied with all components to complete this part of the works.

The nurse call system shall be supplied, installed and commissioned by Medicare, info@medicareystems.co.uk, Tel: 0800 849 5123.

The Resident Bedrooms, Disabled WC's and doors shall be provided with staff emergency call systems to match the existing. Components can be summarised as follows:

- a) (NC1) Wall mounted nurse Call point with orange patient, green attend, red emergency and grey reset call buttons with jack socket and remote patient call handset
- b) (NC2) As NC1 but orange pull cord instead of remote patient handset.
- c) (NC3) Nurse call point attached to door with red emergency, grey reset and fob reader.

Final arrangement and configuration of all handset types to be confirmed with client.

Fob readers to operate the door mounted nurse call points shall be provided free issue by the contractor to the client upon completion of the project. The client has advised that they do not wish to install overdoor indicator lamp units. Additional wireless receivers/HUBs shall be provided as required in order to extend and modify the system. The associated socket outlet and data outlets shall be provided adjacent to the receivers/HUBs. The staff emergency call facilities shall generally be connected to existing and new indicator panel located around the residential home. The new indicator panels (NCP) shall match the existing and be located at high level as indicator on the drawings. Final locations to be confirmed prior to ordering and installation of panels. The associated socket outlet shall be provided adjacent to the panels. The existing wireless system is manufactured by Medicare Systems. All components shall be provided with the appropriate flush mounted box. The Contractor shall be responsible for installing all the wiring requirements to satisfy the staff call requirement. Nurse call system wiring shall conform in all respects with the manufacturers wiring diagram and cable insulation colour coding requirements. The testing and commissioning of the complete staff call systems shall be carried out by the equipment manufacturer / supplier. All wiring shall be carried out in strict accordance with the specialist manufacturer's requirements. The system shall be tested, inspected and commissioned prior to handover. The Contractor shall include provision for demonstrating the system in full to the Consulting Engineer prior to practical completion and later in conjunction with the Client for the induction / training day. The Contractor shall also allow for the submission of all test and completion certificates together with any necessary literature for inclusion within the O&M Manuals. The Contractor shall include for 12 months maintenance and servicing of the system after handover i.e. during the defects liability period. <u>CCTV INSTALLATION</u> The Contractor shall supply, install, test and commission the Security CCTV System as detailed on the drawings. The Contractor shall design, supply, install and test conduit installation as previously detailed in this Specification to enable the CCTV systems wiring and equipment to be sited to the various areas as detailed on the drawings. The Contractor shall allow for installing PVC covered wires to the conduit installation and for the necessary attendance to the specialist engineers during their wiring and connection work periods on site, so that when their installation is complete, the Contractor will be responsible for re-instating any conduit to ensure the whole system is finished to the Engineer's satisfaction. The external CCTV System shall be provided in accordance with BS 4737, BS EN 50132 and BS 7958: 2005. The recorded images shall be suitable for police / court evidence purposes.	16	
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The system shall consist of the following:

- a] Dome type internal analogue high definition CCTV camera as indicated on the drawings.
- b] Fixed external weatherproof CCTV camera as indicated on the drawing.
- c] Split screen colour monitor
- d] Hard disk recorder and review control equipment to be located in the server cabinet.
The digital recording equipment shall be capable of storage for 31 days for all information.

The footage recorded by the cameras shall be monitored by a new CCTV DVR, coloured monitor and associated equipment located in the Manager's Office, as indicated on the drawings.

All CCTV cameras shall be complete colour CCD solid state sensor and have true day / night P iris lens. All cameras shall be suitable for operation at the ambient lighting levels provided.

External cameras shall be provided complete with discrete weatherproof and vandal resistant housing. Generally external cameras shall be wall fixed in a position to provide optimum coverage. Positioning of external cameras shall be located and or shielded to enable full lens clarity.

The internal cameras shall be located at high level as detailed on the drawings.

The Multiplex / DVR shall be located within the Managers office and shall be capable for recording a minimum of 12 cameras at a rate up to 50 frames per second.

Integral storage shall be suitably rated for continuous operation and accommodate a minimum of 31 days of recordings.

The DVR shall be complete with DVD write facility to allow the data to be transferred to CD or DVD and shall come complete with integral connection facility to allow remote monitoring of the system by the Clients monitoring facility should the Client wish.

Internal cameras shall be full colour quality having a minimum of 500 television lines (TVL) and suitable for operation under the following conditions:-

50-500 lux artificial lighting
300-60000 lux daylight

The Contractor shall liaise closely with the CCTV Specialist to obtain exact requirements and associated site supervision.

Exact locations and mounting heights of all equipment to be agreed with the specialist and Employer prior to installation.

Power supplies and data points shall be provided as required by the Specialist.

The system shall be tested on completion with appropriate test certification and necessary operation documents being handed to the Employer. The system shall also be fully demonstrated to ensure compliance.

The maintenance for the system shall be included during the defects liability period.

The CCTV system shall be supplied, installed and commissioned by the Contractors preferred specialist CCTV contractor.

TV CHANNEL DISTRIBUTION

The Contractor shall modify, supply, install, connect, test and commission the existing

17

television channel distribution requirements associated with this project. From the existing TV distribution network the Contractor shall install CT100 co-axial cables to each new TV outlet as indicated on the drawings. Cables shall be identified at amplifiers and splitter according to the plan of the system. On completion of the TV installation the Contractor shall at the outlet record the following tests with a portable TV set and signal strength meter: a] The levels of sound and picture signals of each distribution channel. b] That the minimum vision signal shall not be less than 1.5mV. c] That the sound/picture signal ratios are substantially "as received". Signed test sheets of these readings shall be submitted to the Engineer by the Contractor within 14 days. The exact arrangement shall be agreed before the installation is commenced. The cable network shall be distributed via concealed MT SuperTube conduits. Cables shall be terminated in flush mounted isolated outlets as MK Electric Ltd. manufacture their Logic Plus range. <u>PHOTOVOLTAICS</u> The Contractor shall supply, install, test and commission the complete photovoltaic requirement as detailed on the drawings. The Contractor shall supply, install, and test conduit installation as previously detailed in this Specification to enable the photovoltaic wiring and equipment to be sited. The system shall comprise of photovoltaic panels installed on the roofs to generate 10 kWp. The panels shall be mounted on a south facing pitched roof based on the manufacturer's requirements. Note, this photovoltaic array has been calculated based on a gas heating system in order to satisfy the requirements of Building Regulations Part L2B in terms of annual CO2 savings, kWp and predicted annual energy generation. If Air Source Heat Pumps are installed in lieu of a gas heating system, then photovoltaics are not required. The Specialist Contractor shall allow for all fixings and penetrations prior to installation. All connections details and builders works shall be detailed on the drawings and approved by the full Design and Construction Team. Inverter units shall be selected to suit the photovoltaic requirement and shall be located within the services cupboard or roof space providing access can be provided. The inverters shall be wired from the main panelboard with all outgoing ways installed to comply with the manufacturer's recommended cable arrangement. The Contractor shall allow for a G59 relay and low carbon/kWh meter to enable the system to be interconnected to the grid installation. All necessary equipment shall be installed to ensure compliance with the current regulations and Local Authorities connection details. The complete photovoltaics system shall be designed, supplied, installed, tested and commissioned by Spirit Energy Ltd (Tele No: 0118 951 4490), or equivalent. The Contractor shall provide detailed installation drawings and fully detailed Builderswork in Connection Drawings prior to the manufacture and delivery of the equipment to site.	18	
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CAR CHARGING POINTS

19

The contractor shall supply, install, connect, test and commission the wall mounted car charging outlet to the car park as indicated on the drawing. The final location of the charging point shall be agreed with the client prior to installation.

The final specification of the wall mounted electric vehicle charging unit shall be confirmed however for the purposes of tender the contractor shall base the charger on a 7kW single phase outlet manufactured by Andersen, their A2 type charger.

In order to satisfy the Planning Conditions, future provision through wireways/containment of an additional 2 No vehicle chargers shall be provided from the main electrical cupboard.

The outlet shall be wired from the dedicated distribution board with a RCBO (rating subject to manufacturers requirements) provided for the outlet.

The car charging point, including the earthing arrangement shall strictly comply with BS 7671 - 18th Edition including Section 722 - Electric Vehicle Charging Installations and the other British Standards contained within this specification.

Accessing and using the car charging outlets shall be via the same method as Barton Court Residential Home but shall be agreed with the client prior to installation.

The contractor shall include for the appropriate earthing to the charging points in accordance with the 18th Edition of BS7671. This shall include for surveying and measuring the existing impedance to establish whether the installation can be earthed using a dedicated earth electrode or whether supplementary earthing is required.

We expect a minimum 3 year warranty for the products.

The contractor shall include for making or assisting the client with any government or locally funded grants that may be available to part or totally fund the supply and installation of the charging points.

The Contractor shall be an Approved OLEV Accredited Installer.

The installation shall be complete with all equipment and software required to complete the installations.

The installation shall be carried out in strict accordance with the manufacturer's instructions and shall be complete with all equipment, cabling and software to complete the installation.

WIRING REGULATIONS AND EARTHING

20

The Contractor shall appreciate that the whole of the electrical services installation works shall be carried out in strict accordance with the 18th Edition of the IET Wiring Regulations (BS 7671).

The stringent earthing, bonding and test procedures required by these Regulations will be enforced and an adequate allowance therefore must be included in the tender sum.

The cross bonding requirements shall incorporate connections to the following extraneous conductive parts associated with this building:

Sink Units
Taps and Associated Pipework
Services Distribution Pipework
Mechanical Ventilation Ductwork

The bonding shall be installed at low level, wherever possible and be complete with the

necessary outlet plate and warning label, stating 'Safety Electrical Connection - Do Not Remove' in legible type not less than 4.75mm high and be screw fixed brass R.H. screws adjacent to the outlet position.

The flex outlet plate shall be of the MK Electric Ltd manufacture complete with terminal block, cord grip and white plastic fascia plate. The outlet shall be incorporated within the appropriate recessed steel box.

WORKING DRAWINGS AND DETAIL CO-ORDINATION

21

The drawings issued with this Specification for Tender and Contract purposes are not binding as to detail and are intended to be representative of the work to be carried out by the Contractor.

The Contractor shall make due monetary allowance at tender stage for all works necessary to complete the installations to the satisfaction of the Engineer including any offsets, diversions or other adjustments necessary to circumvent any obstruction caused by building elements, either architectural or structural, or by other engineering services.

Copies of the Architectural, Structural and other engineering services drawings are available for inspection by the Contractor by appointment at the offices of the Engineer prior to submission of the tender and no financial claim will be considered by the Employer for any additional works resulting from the Contractors inability to make sufficient monetary allowance at Tender Stage for co-ordination factors which result in deviation from the tender drawings.

The drawings issued for tender and contract purposes shall not be used by the Contractor for installation purposes.

The Contractor shall prepare Working Drawings for the installation of the engineering services systems. These shall be prepared on the basis of all current Architectural and Structural details issued through the Contract, together with all information available for other engineering services systems. The Contractor shall, in conjunction with the Main Contractor and other Specialist Contractors ensure that all Architectural, Structural and engineering elements are properly co-ordinated and no financial claim for subsequent alterations of any building or engineering element attributable to inadequate co-ordination will be considered by the Employer.

All working drawings shall be prepared to a scale of 1: 50 for all areas other than plant areas and shall include sections as necessary to indicate, particularly cross overs within ceiling voids of mechanical and electrical engineering services voids elements.

All working drawings shall be prepared at an early stage in good time prior to the commencement of the installation works and the period required shall be identified on the main Contractor's programme. Engineering works shall not commence until such time as the working drawings are complete.

All working drawings shall be submitted to the Engineer for commencement at least 3 weeks prior to the scheduled commencement date. Such comment by the Engineer shall not relieve the Main Contractor of responsibility to ensure the proper co-ordination of the engineering services and other elements.

'AS FITTED' DRAWINGS AND SERVICE MANUALS

22

The attention of the Contractor is drawn particularly to the requirement to prepare and supply 'As Fitted' record drawings of the completed installations all generally in accordance with the details in Part 'B' of this Specification.

The drawing shall be the sub-Contractors working drawings as detailed above specifically amended as required to show the works accurately, as installed by the Contractor.

The Contractor shall note that the Contract will not be recommended for Practical Completion

and/or handover to the Employer until such time as the 'As Fitted' record drawings are completed and approved, together with the service manuals also as detailed in Part 'B' of this Specification. In addition to the requirements of Part 'B' of this Specification, the Contractor shall fully include within the tender sum for providing the <u>'As Fitted' drawings on AutoCAD Release 12 to 14 in DWG format. This shall also apply to Specialist Manufacturer's drawings for the Nurse Call and Fire Alarm Systems etc.</u> The "Maintenance Manuals" shall also be provided on CD ROMS. A 'draft' of the Maintenance Manual shall be provided 4 weeks prior to the handover of Phase One, with the complete manuals being issued to the Employer at the Phase 1 handover. The manuals shall be updated to include information for subsequent phased handovers.		
<u>SPECIALIST WORKING DRAWINGS</u> The Contractor shall obtain and provide certified data and working drawings for all specialist plant and equipment including Nurse Call, CCTV, Fire Alarm, electrical controls etc., The Working Drawings prepared by the Contractor shall be based entirely upon certified data obtained from Specialist sub-Contractors and Suppliers and the Contractor shall be entirely responsible for verifying the accuracy of such data.	23	
<u>BUILDERS WORK IN CONNECTION</u> The Contractor shall be responsible for all minor builderswork in connection with the electrical engineering services including the following: i] All holes up to 50mm dia except through reinforced concrete walls / slabs All other builderswork in connection shall be scheduled and agreed with the Main Contractor during the tender period. The Contractor shall produce drawings showing all major builders work required. Builders work drawings shall show all openings larger than 50mm required through structural framework, structural walls and floors, walls and partitions, wall chases and recesses, ducts, trenches, bases for equipment, frame etc., The drawings shall be complete with comprehensive dimensions to enable the position of each item to be located accurately. Three copies of the drawings shall be submitted to the Engineer for approval. In the case of non-structural building fabric, the Contractor will not be required to provide drawings showing positions of small holes and chases for pipework and conduit, i.e. up to approximately 50mm.	24	
<u>BUILDERS WORK DRAWINGS</u> The Contractor shall produce drawings showing all builders work required. Builders work drawings shall show all openings larger than 50mm required through structural framework, structural walls and floors, walls and partitions, wall chases and recesses, ducts, trenches, bases for equipment, frame etc., The drawings shall be complete with comprehensive dimensions to enable the position of each item to be located accurately. Three copies of the drawings shall be submitted to the Engineer for approval at such time as to comply. In the case of non-structural building fabric, the Contractor will not be required to provide drawings showing positions of small holes and chases for pipework and conduit, i.e. up to approximately 50mm, but shall mark out on site for the Main Contractor all such positions for	25	

cutting away and shall give the Main Contractor all the necessary instructions in connection therewith. The Contractor shall ensure that the work by the Main Contractor has been carried out in accordance with the instructions. The Contractor shall be responsible for the accuracy of all builders work information and may have deducted from the Contact Price any remedial work or additional Builders Work caused by inaccurate information or modifications to the Builders Work requirements subsequent to drawing issue.		
<u>FIXINGS</u> The Contractor shall supply and install all fixing devices necessary to secure the engineering services installations. These shall be strictly in accordance with the schedule given in Part B, 06 of this Specification. All fixings shall be rated in accordance with the manufacturers recommendations.	26	
<u>CONTRACTOR'S SUPERVISION OF THE WORKS</u> The Contractor shall provide, for the entire duration of the Contract, a full time Supervisor to control, monitor and co-ordinate the Electrical services works including the works of Specialist Sub-Contractors. The Supervisor will not be expected to deal with queries of a purely technical nature but will be expected to be entirely conversant with all practical aspects of the Contract and capable of exercising effective quality control of the works.	27	
<u>VISITS TO SITE</u> It is recommend that potential Contractors visit the site of the works prior to tender.	28	

APPENDIX “A”

DISTRIBUTION BOARD SCHEDULES

Hevercourt Residential Home Refurbishment
TP&N Panelboard Details
Room Reference Main Intake Cupboard

Date Jul. 22
Rev. 1
Iss. 1

Dist. Board Ref. MP1

Dist. Board Description	Way	Phase	RCBO	Rating	Circuit Description	No. Cores	Cable Size (mm ²)	Cable Type	Cable
12 Way TP&N MCCB Panelboard with 250 Amp Switch Disconnect, Metering Pack, and Surge Protection	1	L1	-	-	Existing Lift	-	-	-	-
		L2	-	-	Existing Lift	-	-	-	-
		L3	-	-	Existing Lift	-	-	-	-
	2	L1	-	-	Existing Sewage Pump	-	-	-	-
		L2	-	-	Existing Sewage Pump	-	-	-	-
		L3	-	-	Existing Sewage Pump	-	-	-	-
	3	L1	-	-	Existing Boiler Room DB	-	-	-	-
		L2	-	-	Existing Boiler Room DB	-	-	-	-
		L3	-	-	Existing Boiler Room DB	-	-	-	-
	4	L1	-	-	Existing DBL2	-	-	-	-
		L2	-	-	Existing DBL7	-	-	-	-
		L3	-	-	Existing DBL5	-	-	-	-
	5	L1	-	-	Existing DBL8	-	-	-	-
		L2	-	-	Existing DBL4	-	-	-	-
		L3	-	-	Existing DBL6	-	-	-	-
	6	L1	-	-	Existing DBL3	-	-	-	-
		L2	-	80	New DBL9	3	16.0	16.0	2
		L3	-	16	New Fire Alarm Panel	3	4.0	4.0	4
	7	L1	-	63	New Photovoltaic Installation	63	16.0	10.0	2
		L2	-	63					
		L3	-	63					
	8	L1	-	63	New Electric Vehicle Charging DB	3	16.0	16.0	2
		L2	-	63	New DBL10	3	16.0	16.0	2
		L3	-	-		-	-	-	-
	9	L1	-	-		-	-	-	-
		L2	-	-		-	-	-	-
		L3	-	-		-	-	-	-
	10	L1	-	-		-	-	-	-
		L2	-	-		-	-	-	-
		L3	-	-		-	-	-	-
	11	L1	-	-		-	-	-	-
		L2	-	-		-	-	-	-
		L3	-	-		-	-	-	-
	12	L1	-	-		-	-	-	-
		L2	-	-		-	-	-	-
		L3	-	-		-	-	-	-

[R] - Denotes RCBO [M] - Denotes motor rated MCB [A] - Denotes cable armour

Continuation Sheet

Cables Types

- Single core LSF insulated cables enclosed in conduit / trunking.
- Multicore armoured cable (XLPE / SWA / LSF)
- Mineral insulated metal sheathed with an overall LSF sleaving.
- FP 400 with an overall LSF sleaving.
- BICC Multi - Plus with overall LSF sleaving.
- Flat Twin & Earth to BS 6004

Sheet 1 Of 1

Hevercourt Residential Home Refurbishment
SP&N Distribution Board Details
Room Reference Electrical Cupboard

Date Jul. 22
Rev. 2
Iss. 2

Dist. Board Ref. L9

Dist. Board Description	Way	RCBO	AFDD	Rating	Circuit Description	No. Cores	Core Size (mm ²)	CPG (mm ²)	Cable Type
10 + 10 Way SP&N Split Metered Distribution Board with 63 Amp Switch Disconnector, Metering Pack, and Surge Protection	1	30	Yes	32	Power Bedrooms 1, 2, 3, 4, 5 & 6	-	2.5	2.5	1
	2	30	Yes	32	Power Bedrooms 7, 8, 9, 10, 11, 12, 13	-	2.5	2.5	1
	3	30	Yes	32	Power Corridor, Cupboards & Cleaners	-	2.5	2.5	1
	4	30	Yes	32	Power Lounge	-	2.5	2.5	1
	5	30	Yes	32	Power Hairdressing Room	-	2.5	2.5	1
	6	30	Yes	20	Power Courtyard	-	2.5	2.5	2
	7	30	Yes	32	Power Bedrooms 18, 19, 20 & 21	-	2.5	2.5	1
	8	30	Yes	32	Power Corridor, Cupboards & Cleaners	-	2.5	2.5	1
	9	-	-	-		-	-	-	-
	10	-	-	-		-	-	-	-
	11	30	No	10	Lighting Bedrooms 1, 2, 3, 4, 5 & 6	-	1.5	1.5	1
	12	30	No	10	Lighting Lounge	-	1.5	1.5	1
	13	30	No	10	External Lighting	-	1.5	1.5	2
	14	30	No	10	Lighting Bedrooms 7, 8, 9, 10, 11, 12, 13	-	1.5	1.5	1
	15	30	No	10	Lighting Corridors, Breakout, Rear Canopy	-	1.5	1.5	1
	16	30	No	10	Lighting Bedrooms 18, 19, 20 & 21	-	1.5	1.5	1
	17	30	No	10	Lighting Corridor, Cupboards & Cleaners	-	1.5	1.5	1
	18	30	No	10	Lighting Corridor, Cupboards & Cleaners	-	1.5	1.5	1
	19	-	-	-		-	-	-	-
	20	-	-	-		-	-	-	-

Date Jul. 22
Rev. 2
Iss. 2

Dist. Board Ref. L10[illegible]

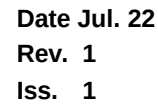
[R] - Denotes RCBO [M] - Denotes motor rated MCB [A] - Denotes cable armour

Continuation Sheet

Cables Types

1. Single core LSF insulated cables enclosed in conduit / trunking.
2. Multicore armoured cable (XLPE / SWA / LSF)
3. Mineral insulated metal sheathed with an overall LSF sleeving.
4. FP 200 with an overall LSF sleeving.
5. BICC Multi - Plus with overall LSF sleeving.
6. Flat Twin & Earth to BS 6004

Sheet 1 Of 1



Sheet 1 Of 1

Hevercourt Residential Home Refurbishment
TP&N Panelboard Details
Room Reference Boiler Room

Date Jul. 22
Rev. 1
Iss. 1

Dist. Board Ref. Boiler

Dist. Board Description	Way	Phase	RCBO	Rating	Circuit Description	No. Cores	Cable Size (mm ²)	Cable Type	CPC (mm ²)
12 Way TP&N MCCB Panelboard with 250 Amp Switch Disconnect, Metering Pack, and Surge Protection	1	L1	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
		L2	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
		L3	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
	2	L1	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
		L2	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
		L3	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
	3	L1	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
		L2	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
		L3	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
	4	L1	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
		L2	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
		L3	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
	5	L1	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
		L2	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
		L3	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
	6	L1	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
		L2	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
		L3	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
	7	L1	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
		L2	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
		L3	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
	8	L1	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
		L2	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
		L3	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
	9	L1	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
		L2	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
		L3	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
	10	L1	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
		L2	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
		L3	-	-	Reconnect Existing Circuit. CPD Size Based on Existing Cable Size	-	-	-	-
	11	L1	-	63	New Boiler Control Panel	4	10	6.0	2
		L2	-						
		L3	-						
	12	L1	-	-		-	-	-	-
		L2	-	-		-	-	-	-
		L3	-	-		-	-	-	-

[R] - Denotes RCBO [M] - Denotes motor rated MCB [A] - Denotes cable armour

Continuation Sheet

Cables Types

- Single core LSF insulated cables enclosed in conduit / trunking.
- Multicore armoured cable (XLPE / SWA / LSF)
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- FP 200 with an overall LSF sleaving.
- BICC Multi - Plus with overall LSF sleaving.
- Flat Twin & Earth to BS 6004

Sheet 1 Of 1

APPENDIX “B”

SUMMARY OF TENDER

Electrical Engineering Services Summary of Tender**ITEM**

1.0	Strip Out of Redundant Electrical Installations	£
1.1	Survey and validate existing services that run externally where 'The Street' extension is being built to establish whether any diversions or modifications are required as part of the contract works.	£
1.2	Main Distribution including new MCCB Panelboard and Metering	£
1.3	Sub-Main Distribution including all Distribution Boards and Sub Main Cabling	£
1.4	Containment Installations	£
1.5	Lighting and Emergency Lighting, excluding the supply of all luminaires and lamps	£
1.6	Supply of all Luminaires and Lamps	£
1.7	Supply of all Luminaires and Lamps not currently Specified (Types BL, C and J)	£
1.8	Supply and Installation of General Purpose Power and Ancillary Power Installations	£
1.9	Modifications and Extensions to existing Fire Detection and Alarm Installations	£
1.10	Supply and Installation of Battery Operated Grippa Door Holders to all Bedrooms and Corridor Doors	£
1.11	Telephone and Data Installations	£
1.12	Mechanical Services Wiring Requirement Installation	£
1.13	Supply and Installation of New Access Control Systems	£
1.14	Modifications and Extensions to Existing Nurse Call System	£
1.15	Supply and Installation of New CCTV System	£
1.16	Modifications and Extension to the existing TV System	£
1.17	Photovoltaic Installation	£
1.18	Vehicle Charging Point Installation	£
1.19	Earthing and Bonding Installation	£
1.20	Provision of Working Drawings, Maintenance Manuals and Record Drawings etc.	£
1.21	Any other items not included in the above:	
	i]	£
	ii]	£
	iii]	£
1.22	Sub-Total	£
1.23	Allow a Provisional Sum for Engineers Contingency	£8,000.00
1.24	Allow a Provisional Sum for new UK Power Networks Incoming Supply	£10,000.00
1.25	Allow a Provisional Sum for providing a Fire Alarm Repeater Panel to the Staff Entrance (fire officer to confirm whether this is required)	£1,000.00
1.26	Cost option to supply, install, connect, test and commission the complete emergency lighting requirement to all areas <u>outside</u> of the contract work areas.	£
GRAND TOTAL TO BE CARRIED FORWARD TO FORM OF TENDER:		£

Value Added Tax

The Tender shall include for any Value Added Tax payable to any part of the works. This amount shall be identified as a separate total item.

Signed

For and on behalf of
.....

Date

Note: The Contractor shall provide a fully quantified Schedule of Rates equating to the tender sum within 30 days from receipt of order.