

Proposed Specification of works  
For  
Proposed Flood Lighting Scheme to Moorends Welfare  
Gound.  
For  
Thorne Moorends Town Council



**John Hill ASSOCIATES LTD**

Architectural & Surveying Consultants  
Chartered Building Surveyors



Section i  
Contract Particulars and Preliminaries

## A10 PROJECT PARTICULARS

### 110 THE PROJECT

- Name: Proposed Lighting Scheme to Football Pitch and Surrounding areas.
- Nature: Groundworks and installation of Lighting Equipment
- Location: Moorends Welfare Ground, Grange Road,
- Anticipated Contract Programme:
  - Tender of project May 2018
  - Tender return date – 8<sup>th</sup> June 2018
  - Tender Analysis – 8<sup>th</sup> June – 15<sup>th</sup> June 2018
  - Target Contract Award and Feedback – 22<sup>nd</sup> June 2018
  - Lead in Period for contractor – TBC
  - Construction Period – TBC

### 120 EMPLOYER (CLIENT)

- Name: Thorne Moorends Town Council (TMTC)
- Address: Assembly Rooms, Field Side, Thorne, DN8 4AE
- Contact: Mr C Geeson
- Telephone: 01405 818015

### 130 PRINCIPAL CONTRACTOR (CDM)

- Name: **TO BE CONFIRMED**
- Address: \_\_\_\_\_ .
- Contact: \_\_\_\_\_ .
- Telephone: \_\_\_\_\_ .
- Email: \_\_\_\_\_ .

### 140 PERSON EMPOWERED BY THE CONTRACT TO ACT ON BEHALF OF THE EMPLOYER

- Title: Contract Administrator / Architectural Consultant / Principal Designer / Employers Agent
- Name: Mr J A O'Neill
- Address: - John Hill Associates Ltd, Unit 6 Shaw Wood Way, Show Wood Business Park, Doncaster, DN2 5TB
- Telephone: 07762057091

### 150 PRINCIPAL DESIGNER

- Name: John Hill Associated Ltd
- Address: Unit 6 Shaw Wood Way, Shaw Wood Business Park, Doncaster, DN2 5TB
- Telephone: 01302 364565

## A11 TENDER AND CONTRACT DOCUMENTS

### 110 TENDER DRAWINGS

- The tender drawings are: As Listed in the Drawing Schedule (Appendix 1)

### 120 CONTRACT DRAWINGS

- The Contract Drawings: The same as the tender drawings.

## 160 PRECONSTRUCTION INFORMATION

- Format: The Preconstruction information is described in these preliminaries in Section A34. It refers to information given elsewhere in the preliminaries and other tender documents.

## A12 THE SITE/ EXISTING BUILDINGS

### 110 THE SITE

- Description: The Site is situated off Grange Road, Moorends. This site currently consists of a series of sports fields / pitches and facilities including a changing facility, football stand, Rugby stand etc. the site is fenced to the full perimeter affording access to pedestrians at all times and Vehicles via a managed locked gate.

### 140 EXISTING UTILITIES AND SERVICES

- Drawings: TMTC do not have up to date service drawings for the site. The PC is responsible for undertaking sufficient survey works and investigation.
- Other information: Consult with Northern Power grid and Coal Authority Information.

### 160 SOILS AND GROUND WATER

- Information: TMTC do not have information relating to Soils and ground water, the PC is to undertake sufficient survey / investigation works.

### 170 SITE INVESTIGATION

- Report: TMTC do not have information relating to site investigation surveys, the PC is to undertake sufficient survey / investigation works.

### 180 HEALTH AND SAFETY FILE

- Availability for inspection: TMTC do not have a current Health and Safety file. – The Principal contractor is to allow for undertaking sufficient survey works and investigations of required. Any information required and not included for within the tender quotation must be brought to the attention of TMTC at tender stage.

### 200 ACCESS TO THE SITE

- Description: Access to the site can be gained from the Grange Road Access.
- Limitations: this Access is managed and arrangements need to be made directly with TMTC

### 210 PARKING

- Restrictions on parking of the Contractor's and employees' vehicles:- to be determined at the Pre Contract meeting. (all at contractors own risk). – Any damaged made to grassed areas must be made good by the Principal Contractor.

## 220 USE OF THE SITE

- General: Do not use the site for any purpose other than carrying out the Works.
- Limitations: No stock piling of materials and spoil onsite without Contractors Security in place (all at the risk of the PC). The site is a functioning recreation area and separation between the PC and public needs to be managed by the PC.

## 230 SURROUNDING LAND/ BUILDING USES

- General: The general area and Surrounding immediate areas are predominantly public recreational spaces. This maybe in the form of, but not limited to, Official organised sports such as Rugby, football, cricket, bowls, tennis. Alternatively, unorganised play from the public, this could take any form and be in any area. Furthermore Dog Walkers and recreational walkers maybe present. Surrounding areas further afield consist of residential properties, redundant coal mine, moors / common land and road networks.

## 240 HEALTH AND SAFETY HAZARDS

- General: The nature and condition of the site/ building cannot be fully and certainly ascertained before it is opened up. However the following hazards are or may be present:
  - Live Services, Damaged equipment, debris from fly tipping, sharps from recreational drug use, Dog foul, etc.
- Information: The accuracy and sufficiency of this information is not guaranteed by the Employer or the Employer's representative. Ascertain if any additional information is required to ensure the safety of all persons and the Works.
- Site staff: Draw to the attention of all personnel working on the site the nature of any possible contamination and the need to take appropriate precautionary measures.

## 250 SITE VISIT

- Assessment: Ascertain the nature of the site, access thereto and all local conditions and restrictions likely to affect the execution of the Works.
- Arrangements for visit: - can be made by contacting TMTC. It is strongly advised that the contractor visits site to ascertain its full nature. .

## A20 JCT DESIGN AND BUILD CONTRACT (DB)

### JCT DESIGN AND BUILD CONTRACT

- The contract: JCT Design and Build Contract (DB), 2016 Edition.
- Requirement: Allow for the obligations, liabilities and services described.

### THE RECITALS

#### First - THE WORKS

Design and Build of a new Floodlighting scheme for the existing football pitch and associated areas: Groundworks and installation of equipment included.

#### Fifth - DIVISION OF THE WORKS INTO SECTIONS

- The Fifth Recital will be deleted.

### ARTICLES

#### 3 - EMPLOYER'S AGENT

- Employer's Agent: See clause A10/140.

#### 5 - PRINCIPAL DESIGNER

- Principal Designer: See clause A10/150.

#### 5 - PRINCIPAL DESIGNER

- Article 5 will be deleted.

#### 6 - PRINCIPAL CONTRACTOR – (TO BE CONFIRMED)

- Principal Contractor: See clause A10/130.

#### 9 - LEGAL PROCEEDINGS

- Amendments: Not Applicable

### CONTRACT PARTICULARS

#### Fourth recital and clause 4.5 - CONSTRUCTION INDUSTRY SCHEME (CIS)

- Employer at the Base Date is not a contractor for the purposes of the CIS.

#### ~~Fifth Recital – DESCRIPTION OF SECTIONS~~

#### Sixth Recital - FRAMEWORK AGREEMENT

- Framework agreement: Does Not Apply

#### Seventh Recital and Part 1 of Schedule 2 - SUPPLEMENTAL PROVISIONS - PART 1

- Named subcontractors: Supplemental Provision 1 – Does Not Apply
- Valuation of changes - Contractor's estimates: Supplemental Provision 2 Does Not Apply

- Loss and expense - Contractor's estimates: Supplemental Provision 3 Does Not Apply

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#### **Seventh Recital and Part 2 of Schedule 2 - SUPPLEMENTAL PROVISIONS - PART 2**

- Acceleration quotation: Supplemental Provision 4 – Does Not Apply
- Collaborative working: Supplemental Provision 5- Applies
- Health and safety: Supplemental Provision 6 –Applies
- Cost savings and value improvements: Supplemental Provision 7 - Applies
- Sustainable developments and environmental considerations: Supplemental Provision 8 - Applies
- Performance indicators and monitoring: Supplemental Provision 9 – Does Not Apply
- Notification and negotiation of disputes: Supplemental Provision 10 – Does Note Apply
- Transparency Supplemental Provision 11 – Applies
- The Public Contracts Regulations 2015 – Does Not Apply

#### **Article 8 - ARBITRATION**

- Article 8 and clauses 9.3 to 9.8 (arbitration) – Applies

#### **Clause 1.1 - BASE DATE**

- Base Date: 2801 May 2018

#### **Clause 1.1 - BIM PROTOCOL**

- BIM Protocol (where applicable): - Not applicable

#### **Clause 1.1 - DATE FOR COMPLETION OF THE WORKS**

- Date for completion of the Works (where completion by sections does not apply): TBC

#### **Clause 1.7 - ADDRESSES FOR SERVICE OF NOTICES**

- Employer:
  - Address: Thorne Moorends Town Council, Assembly Rooms, Field Side, Thorne, DN8 4AE
- Contractor:
  - Address: \_\_\_\_\_.

#### **Clause 2.3 - DATE OF POSSESSION OF THE SITE**

- Date of Possession of the site: TBC

**Clause 2.4 - DEFERMENT OF POSSESSION OF THE SITE**

- Clause 2.4 does not apply.

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**Clause 2.29.2 - LIQUIDATED DAMAGES**

- Damages: At the rate of £500.00 per Week

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**Clause 2.35 - RECTIFICATION PERIOD**

- Period: 12 months from the date of practical completion of the Works.

**Clause 4.2, 4.12 and 4.13 - FLUCTUATIONS PROVISION**

- Fluctuations Provision: No Fluctuation Provision Applies

**Clause 4.6 - ADVANCE PAYMENT AND ADVANCE PAYMENT BOND**

- Advance payment: Clause 4.6 does not apply.

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**Clause 4.7 - METHOD OF PAYMENT - ALTERNATIVE B**

- Payment: Periodically, in accordance with Alternative B – as set out in the Employer's Requirements document

**Clause 4.7.2 - INTERIM PAYMENTS - INTERIM VALUATION DATES**

- The first Interim Valuation Date is: TBC and thereafter the same date in each month or the nearest Business Day in that month.

**Clause 4.15.4 - LISTED ITEMS - UNIQUELY IDENTIFIED**

- Listed items: A bond is not required.

**Clause 4.15.5 - LISTED ITEMS - NOT UNIQUELY IDENTIFIED**

- Listed items: A bond is not required..

**Clause 4.17 - CONTRACTOR'S RETENTION BOND**

- Clause 4.17 does not apply.

**Clause 4.18.1 - RETENTION PERCENTAGE**

- Retention: 5 per cent. (Interim payments)

**Clause 4.18.2 - RETENTION PERCENTAGE**

- Retention: 2.5 per cent. (Final Payment for 12 Months)

**Clause 5.5 - DAYWORK**

- Does not apply

**Clause 6.4.1 - CONTRACTOR'S PUBLIC LIABILITY INSURANCE: INJURY TO PERSONS OR PROPERTY**

- Insurance cover for any one occurrence or series of occurrences arising out of one event: £5,000,000-00

**Clause 6.5.1 - INSURANCE - LIABILITY OF EMPLOYER**

- Does Not Apply

**Clause 6.7 and schedule 3 - WORKS INSURANCE - INSURANCE OPTIONS APPLICABLE**

- Schedule 3:
  - Insurance option 'A' Applies
  - Percentage to cover professional fees: 15 %
- Where Insurance Option A applies, annual renewal date (as supplied by the Contractor): \_\_\_\_\_.

**Clause 6.10 and Schedule 3 - TERRORISM COVER**

- Does not Apply

**Clause 6.15 - PROFESSIONAL INDEMNITY INSURANCE**

- Level of cover: Amount of indemnity required:  
Relates to claims to claims or series of claims arising out of one event.
  - and is £2,500,000-00
- Expiry of required period of Professional Indemnity Insurance: 6 years

**Clause 6.17 - JOINT FIRE CODE**

- The Joint Fire Code: Does Not Apply

**Clause 7.2 - ASSIGNMENT/ GRANT BY EMPLOYER OF RIGHTS UNDER CLAUSE 7.2**

- Clause 7.2 Does Not Apply.
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**Clause 7.3.1 - PERFORMANCE BOND OR GUARANTEE**

- Does Not Apply

**Clause 7.3.2 - GUARANTEE FROM THE CONTRACTOR'S PARENT COMPANY**

- Does Not apply

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**Clause 7.4 - THIRD PARTY RIGHTS AND COLLATERAL WARRANTIES**

- Does Not apply

**Clause 8.9.2 - PERIOD OF SUSPENSION (TERMINATION BY CONTRACTOR)**

- Period of suspension: 2 Months

**Clauses 8.11.1.1 to 8.11.1.6 - PERIOD OF SUSPENSION (TERMINATION BY EITHER PARTY)**

- Period of suspension: 2 Months

**Clause 9.2.1 - ADJUDICATION**

- The Adjudicator is: to be appointed by the nominating body

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Nominating body: Where no Adjudicator is named or where the named Adjudicator is unwilling or unable to act (whenever that is established): RICS

**Clause 9.4.1 - ARBITRATION**

- Appointor of Arbitrator (and of any replacement): President or a Vice President of the Royal Institute of Chartered Surveyors

**THE CONDITIONS**

**SECTION 1: DEFINITIONS AND INTERPRETATION**

**1.11 - APPLICABLE LAW**

- Amendments: Law of England

**SECTION 2: CARRYING OUT THE WORKS**

**SECTION 3: CONTROL OF THE WORKS**

**SECTION 4: PAYMENT**

**SECTION 5: CHANGES**

**SECTION 6: INJURY, DAMAGE AND INSURANCE**

**SECTION 7: ASSIGNMENT, THIRD PARTY RIGHTS AND COLLATERAL WARRANTIES**

**SECTION 8: TERMINATION**

**SECTION 9: SETTLEMENT OF DISPUTES**

**EXECUTION**

- The Contract: Will be executed:- Underhand.

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**A30 TENDERING/ SUBLETTING/ SUPPLY****MAIN CONTRACT TENDERING**

## 110 SCOPE

- General: These conditions are supplementary to those stated in the invitation to tender and on the form of tender.

## 145 TENDERING PROCEDURE

- General: In accordance with the principles of NBS Guide to tendering for construction projects
- Arithmetical errors: Alternative 1 is dominant.

## 160 EXCLUSIONS

- Inability to tender: Immediately inform if any parts of the work as defined in the tender documents cannot be tendered.
- Relevant parts of the work: Define those parts, stating reasons for the inability to tender.

## 170 ACCEPTANCE OF TENDER

- Acceptance: No guarantee is offered that any tender will be recommended for acceptance or be accepted, or that reasons for non-acceptance will be given.
- Costs: No liability is accepted for any cost incurred in the preparation of any tender.

**PRICING/ SUBMISSION OF DOCUMENTS**

## 220 PRICING OF PRELIMINARIES

- Charges: If the Contractor requires interim payments to include fixed and time related charges for specific items in the Preliminaries those charges must be clearly shown against the items.

## 250 PRICED DOCUMENTS

- Alterations: Do not alter or qualify the priced documents without written consent. Tenders containing unauthorised alterations or qualifications may be rejected.
- Measurements: Where not stated, ascertain from the drawings.
- Deemed included: Costs relating to items, which are not priced, will be deemed to have been included elsewhere in the tender.
- Submit: Submit with tender .

## 310 TENDER

- General: Tenders must include for all work shown or described in the tender documents as a whole or clearly apparent as being necessary for the complete and proper execution of the Works.

## 515 ALTERNATIVE TIME TENDERS

- General: In addition to and at the same time as tendering based upon the date or period specified in section A20, an alternative tender based upon a different date for completion or period may be submitted.

- Date for completion: If any such tender is accepted the date for completion inserted in the Contract will be the date stated in the alternative tender or determined from the period stated in the alternative tender.

#### 520 DESIGN DOCUMENTS

- Scope: Include the following in the Contractor's Proposals:
  - Design drawings: As set out in sections 2 and 3
  - Plans Showing Where lighting is to be fitted
  - Light Pollution Drawings for planning purposes
  - Wiring and control positioning drawings

#### 550 HEALTH AND SAFETY INFORMATION

- Content: Describe the organisation and resources to safeguard the health and safety of operatives, including those of subcontractors, and of any person whom the works may affect.
- Include:
  - A copy of the contractor's health and safety policy document, including risk assessment procedures.
  - Accident and sickness records for the past five years.
  - Records of previous Health and Safety Executive enforcement action.
  - Records of training and training policy.
  - The number and type of staff responsible for health and safety on this project with details of their qualifications and duties.
- Submit: With Tender

#### 570 OUTLINE CONSTRUCTION PHASE HEALTH AND SAFETY PLAN

- Content: Submit the following information within one week of request:
  - Method statements on how risks from hazards identified in the pre-construction information and other hazards identified by the contractor will be addressed.
  - Details of the management structure and responsibilities.
  - Arrangements for issuing health and safety directions.
  - Procedures for informing other contractors and employees of health and safety hazards.
  - Selection procedures for ensuring competency of other contractors, the self-employed and designers.
  - Procedures for communications between the project team, other contractors and site operatives.
  - Arrangements for cooperation and coordination between contractors.
  - Procedures for carrying out risk assessment and for managing and controlling the risk.
  - Emergency procedures including those for fire prevention and escape.
  - Arrangements for ensuring that all accidents, illness and dangerous occurrences are recorded.
  - Arrangements for welfare facilities.
  - Procedures for ensuring that all persons on site have received relevant health and safety information and training.
  - Arrangements for consulting with and taking the views of people on site.
  - Arrangements for preparing site rules and drawing them to the attention of those affected and ensuring their compliance.
  - Monitoring procedures to ensure compliance with site rules, selection and management procedures, health and safety standards and statutory requirements.

- Review procedures to obtain feedback.  
Submit: on request

#### 599 FREEDOM OF INFORMATION

- Records: Retain, make available for inspection and supply on request information reasonably required to allow response to requests made under the provisions of the Freedom of Information Act.
- Determination: Submit requests received. Do not supply information to anyone other than the project participants without express written permission.
- Confidentiality: Maintain at all times.

### A31 PROVISION, CONTENT AND USE OF DOCUMENTS

#### DEFINITIONS AND INTERPRETATIONS

#### 110 DEFINITIONS

- Meaning: Terms, derived terms and synonyms used in the preliminaries/ general conditions and specification are as stated therein or in the appropriate British Standard or British Standard glossary.

#### 120 COMMUNICATION

- Definition: Includes advise, inform, submit, give notice, instruct, agree, confirm, seek or obtain information, consent or instructions, or make arrangements.
- Format: In writing to the person named in clause A10/140 unless specified otherwise.
- Response: Do not proceed until response has been received.

#### 130 PRODUCTS

- Definition: Materials, both manufactured and naturally occurring, and goods, including components, equipment and accessories, intended for the permanent incorporation in the Works.
- Includes: Goods, plant, materials, site materials and things for incorporation into the Works.

#### 135 SITE EQUIPMENT

- Definition: All appliances or things of whatsoever nature required in or about the construction for completion of the Works but not materials or other things intended to form or forming part of the Permanent Works.
- Includes: Construction appliances, vehicles, consumables, tools, temporary works, scaffolding, cabins and other site facilities.

#### 140 DRAWINGS

- Definitions: To BSRIA BG 6 A design framework for building services. Design activities and drawing definitions.
- CAD data: In accordance with BS 1192.

#### 145 CONTRACTOR'S CHOICE

- Meaning: Selection delegated to the Contractor, but liability to remain with the specifier.

## 150 CONTRACTOR'S DESIGN

- Meaning: Design to be carried out or completed by the Contractor and supported by appropriate contractual arrangements, to correspond with specified requirements.

## 155 SUBMIT PROPOSALS

- Meaning: Submit information in response to specified requirements.

## 160 TERMS USED IN SPECIFICATION

- Remove: Disconnect, dismantle as necessary and take out the designated products or work and associated accessories, fixings, supports, linings and bedding materials. Dispose of unwanted materials. Excludes taking out and disposing of associated pipework, wiring, ductwork or other services.
- Fix: Receive, unload, handle, store, protect, place and fasten in position and disposal of waste and surplus packaging including all labour, materials and site equipment for that purpose.
- Supply and fix: As above, but including supply or products to be fixed. All products to be supplied and fixed unless stated otherwise.
- Keep for reuse: Do not damage designated products or work. Clean off bedding and jointing materials. Stack neatly, adequately protect and store until required by the Employer/ Purchaser or for use in the Works as instructed.
- Make good: Execute local remedial work to designated work. Make secure, sound and neat. Excludes redecoration and/ or replacement.
- Replace: Supply and fix new products matching those removed. Execute work to match original new state of that removed.
- Repair: Execute remedial work to designated products. Make secure, sound and neat. Excludes redecoration and/ or replacement.
- Refix: Fix removed products.
- Ease: Adjust moving parts of designated products or work to achieve free movement and good fit in open and closed positions.
- Match existing: Provide products and work of the same appearance and features as the original, excluding ageing and weathering. Make joints between existing and new work as inconspicuous as possible.
- System: Equipment, accessories, controls, supports and ancillary items, including installation, necessary for that section of the work to function.

## 200 SUBSTITUTION OF PRODUCTS

- Products: If an alternative product to that specified is proposed, obtain approval before ordering the product.
- Reasons: Submit reasons for the proposed substitution.
- Documentation: Submit relevant information, including:
  - manufacturer and product reference;
  - cost;
  - availability;
  - relevant standards;
  - performance;
  - function;
  - compatibility of accessories;
  - proposed revisions to drawings and specification;
  - compatibility with adjacent work;
  - appearance;
  - copy of warranty/ guarantee.

- Alterations to adjacent work: If needed, advise scope, nature and cost.
- Manufacturers' guarantees: If substitution is accepted, submit before ordering products.

#### 210 CROSS REFERENCES

- Accuracy: Check remainder of the annotation or item description against the terminology used in the section or clause referred to.
- Related terminology: Where a numerical cross-reference is not given the relevant sections and clauses of the specification will apply.
- Relevant clauses: Clauses in the referred to specification section dealing with general matters, ancillary products and execution also apply.
- Discrepancy or ambiguity: Before proceeding, obtain clarification or instructions.

#### 220 REFERENCED DOCUMENTS

- Conflicts: Specification prevails over referenced documents.

#### 230 EQUIVALENT PRODUCTS

- Inadvertent omission: Wherever products are specified by proprietary name the phrase 'or equivalent' is to be deemed included.

#### 250 CURRENCY OF DOCUMENTS AND INFORMATION

- Currency: References to published documents are to the editions, including amendments and revisions, current on the date of the Invitation to Tender.

### **DOCUMENTS PROVIDED ON BEHALF OF EMPLOYER**

#### 410 ADDITIONAL COPIES OF DRAWINGS/ DOCUMENTS

- Copies: Two of each contract drawing and contract document will be issued free of charge (not counting any certified copies).
- Additional copies: Issued on request and charged to the Contractor.

#### 440 DIMENSIONS

- Scaled dimensions: Do not rely on.

#### 460 THE SPECIFICATION

- Coordination: All sections must be read in conjunction with Main Contract Preliminaries/ General conditions.

#### 470 DIVERGENCE FROM THE STATUTORY REQUIREMENTS

- Divergence: Between the drawings or specification and the requirements of the Building Regulations, other Statutes, statutory undertakers and other regulatory authorities.
- Action: Inform immediately.

### **DOCUMENTS PROVIDED BY CONTRACTOR/ SUBCONTRACTORS/ SUPPLIERS**

#### 600 CONTRACTOR'S DESIGN INFORMATION

- General: Complete the design and detailing of parts of the Works as specified.
- Provide:

- Production information based on the drawings, specification and other information.
- Liaison to ensure coordination of the work with related building elements and services.
- Master programme: Make reasonable allowance for completing design/ production information, submission (including information relevant to the CDM Regulations), comment, inspection, amendment, resubmission and reinspection.
- Information required: Full Design of lighting installation, groundworks and associated works as described within section 2 and 3
  - Format: drawings and written specification
  - Number of copies: 2
- Submit: With Tender.

#### 620 AS BUILT DRAWINGS AND INFORMATION

- Contractor designed work: Provide drawings/ information:
- For all elements of the contractors design.
- Submit: At least two weeks before date for completion.

#### 630 TECHNICAL LITERATURE

- Information: Keep on site for reference by all supervisory personnel:
  - Manufacturers' current literature relating to all products to be used in the Works.
  - Relevant British, EN or ISO Standards.

#### 640 MAINTENANCE INSTRUCTIONS AND GUARANTEES

- Components and equipment: Obtain or retain copies, register with manufacturer and hand over on or before completion of the Works.
- Information location: In the Building Manual.
- Emergency call out services: Provide telephone numbers for use after completion. Extent of cover: week days, normal working hours.

### A32 MANAGEMENT OF THE WORKS

#### GENERALLY

#### 118 VEHICLE SAFETY REQUIREMENTS

- Vehicle equipment: Ensure that all vehicles have the following:
  - Audible alert to other road users to the planned movement of the vehicle when the vehicle's indicators are in operation.
  - Prominent signage at the rear of the vehicle to warn cyclists of the dangers of passing the vehicle on the inside.
  - Properly adjusted class VI mirror/s or Fresnel lens to eliminate the nearside blind spot.
  - Side under run guards.
- Driver training:
  - Drivers must be trained on vulnerable road user safety through an approved course and hold a current valid Certificate of Competence.
  - Drivers must have a valid driving licence and be legally able to drive the vehicle.

## 120 INSURANCE

- Documentary evidence: Submit details before starting work on site and/ or policies and receipts for the insurances required by the Conditions of Contract.

## 125 PROFESSIONAL INDEMNITY INSURANCE

- Provide and maintain insurance in respect of Contractor Designed Works:
  - Level of cover: relates to claims or series of claims arising out of one event
  - Period of insurance for these purposes: 1 year
  - Amount of indemnity required: £ 2,500,000
  - Limit of cover for pollution/ contamination claims (If none is stated, the required level of cover shall be the full amount of the indemnity cover stated):
  - Expiry of required period of CDP Professional Indemnity insurance: 6 years.
    - (If no period is selected, the expiry date shall be 6 years from the date of practical completion of the Works).
  - Documentary evidence: Submit details before starting work on site and/ or policies and receipts for the insurances required.
    - Format: Hard copy.

## 130 INSURANCE CLAIMS

- Notice: If any event occurs which may give rise to any claim or proceeding in respect of loss or damage to the Works or injury or damage to persons or property arising out of the Works, immediately give notice to the Employer, the person named in clause A10/140 and the Insurers.
- Failure to notify: Indemnify the Employer against any loss, which may be caused by failure to give such notice.

## 140 CLIMATIC CONDITIONS

- Information: Record accurately and retain:
  - Daily maximum and minimum air temperatures (including overnight).
  - Delays due to adverse weather, including description of the weather, types of work affected and number of hours lost.

## 150 OWNERSHIP

- Alteration/ clearance work: Materials arising become the property of the Contractor except where otherwise stated. Remove from site as work proceeds.

**PROGRAMME/ PROGRESS**

## 210 PROGRAMME

- Master programme: Immediately when requested and before starting work on site submit in an approved form a master programme for the Works, which must include details of:
  - Planning and mobilisation by the Contractor.
  - Subcontractor's work.
  - Running in, adjustment, commissioning and testing of all engineering services and installations.
  - Work resulting from instructions issued in regard to the expenditure of provisional sums.
  - Work by others concurrent with the Contract.
- Submit: With Tender.

**250 MONITORING**

- Progress: Record on a copy of the programme kept on site.
- Avoiding delays: If any circumstances arise which may affect the progress of the Works submit proposals or take other action as appropriate to minimize any delay and to recover any lost time.

**255 NOTIFICATION OF COMPENSATION EVENT**

- Content: Notwithstanding the Contractor's obligations under the Contract, written notice must also be given of all other causes which apply concurrently.

**260 SITE MEETINGS**

- General: Site meetings will be held to review progress and other matters arising from administration of the Contract.
- Frequency: Weekly informal and two weekly formal.
- Location: onsite within site office.
- Accommodation: Ensure availability at the time of such meetings.
- Attendees: Attend meetings and inform subcontractors and suppliers when their presence is required.
- Chairperson (who will also take and distribute minutes): John O'Neill

**290 NOTICE OF COMPLETION**

- Requirement: Give notice of the anticipated dates of completion of the whole or parts of the Works.
- Associated works: Ensure necessary access, services and facilities are complete.
- Period of notice (minimum): 1 week

**310 EXTENSIONS OF TIME**

- Notice: When a notice of the cause of any delay or likely delay in the progress of the Works is given under the contract, written notice must also be given of all other causes which apply concurrently.
- Details: As soon as possible submit:
  - Relevant particulars of the expected effects, if appropriate, related to the concurrent causes.
  - An estimate of the extent, if any, of the expected delay in the completion of the Works beyond the date for completion.
  - All other relevant information required.

**CONTROL OF COST****420 REMOVAL/ REPLACEMENT OF EXISTING WORK**

- Extent and location: Agree before commencement.
- Execution: Carry out in ways that minimize the extent of work.

**430 PROPOSED INSTRUCTIONS**

- Estimates: If a proposed instruction requests an estimate of cost, submit without delay and in any case within seven days.

**460 INTERIM VALUATIONS**

- Applications: Include details of amounts requested under the Contract together with all necessary supporting information.

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- Submission: At least seven days before established dates.

#### 475 PRODUCTS STORED OFF SITE

- Evidence of Title: Submit reasonable proof that the property in items stored off site to be included in valuations is vested in the Contractor.
- Include for products purchased from a supplier:
  - A copy of the contract of sale.
  - a written statement from the supplier that any conditions of the sale relating to the passing of property have been fulfilled and the products are not subject to any encumbrance or charge.
- Include for products purchased from a supplier by a subcontractor or manufactured or assembled by any subcontractor:  
Copies of the subcontract with the subcontractor and a written statement from the subcontractor that any conditions relating to the passing of property have been fulfilled.

### A33 QUALITY STANDARDS/ CONTROL

#### STANDARDS OF PRODUCTS AND EXECUTIONS

#### 120 WORKMANSHIP SKILLS

- Operatives: Appropriately skilled and experienced for the type and quality of work.
- Registration: With Construction Skills Certification Scheme.
- Evidence: Operatives must produce evidence of skills/ qualifications when requested.

#### 130 QUALITY OF PRODUCTS

- Generally: New. (Proposals for recycled products may be considered).
- Supply of each product: From the same source or manufacturer.
- Whole quantity of each product required to complete the Works: Consistent in kind, size, quality and overall appearance.
- Tolerances: Where critical, measure a sufficient quantity to determine compliance.
- Deterioration: Prevent. Order in suitable quantities to a programme and use in appropriate sequence.

#### 135 QUALITY OF EXECUTION

- Generally: Fix, apply, install or lay products securely, accurately, plumb, neatly and in alignment.
- Colour batching: Do not use different colour batches where they can be seen together.
- Dimensions: Check on-site dimensions.
- Finished work: Without defects, e.g. not damaged, disfigured, dirty, faulty, or out of tolerance.
- Location and fixing of products: Adjust joints open to view so they are even and regular.

#### 150 INSPECTIONS

- Products and executions: Inspection or any other action must not be taken as approval unless confirmed in writing referring to:
  - Date of inspection.
  - Part of the work inspected.

- Respects or characteristics which are approved.
- Extent and purpose of the approval.
- Any associated conditions.

170 **MANUFACTURER'S RECOMMENDATIONS/ INSTRUCTIONS**

- General: Comply with manufacturer's printed recommendations and instructions current on the date of the Invitation to tender.
- Changes to recommendations or instructions: Submit details.
- Ancillary products and accessories: Use those supplied or recommended by main product manufacturer.
- Agrément certified products: Comply with limitations, recommendations and requirements of relevant valid certificates.

180 **WATER FOR THE WORKS**

- Mains supply: Clean and uncontaminated.
- Other: Do not use until:
  - Evidence of suitability is provided.
  - Tested to BS EN 1008 if instructed.

**ACCURACY/ SETTING OUT GENERALLY**

330 **APPEARANCE AND FIT**

- Tolerances and dimensions: If likely to be critical to execution or difficult to achieve, as early as possible either:
  - Submit proposals; or
  - Arrange for inspection of appearance of relevant aspects of partially finished work.
- General tolerances (maximum): To BS 5606, tables 1 and 2.

**SUPERVISION/ INSPECTION/ DEFECTIVE WORK**

525 **ACCESS**

- Extent: Provide at all reasonable times access to the Works and to other places of the Contractor or subcontractors where work is being prepared for the Contract.
- Designate: Contract Administrator

530 **OVERTIME WORKING**

- Notice: Prior to overtime being worked, submit details of times, types and locations of work to be done.
  - Minimum period of notice: 1 week.
- Concealed work: If executed during overtime for which notice has not been given, it may be required to be opened up for inspection and reinstated at the Contractor's expense.

540 **DEFECTS IN EXISTING WORK**

- Undocumented defects: When discovered, immediately give notice. Do not proceed with affected related work until response has been received.
- Documented remedial work: Do not execute work which may:
  - Hinder access to defective products or work; or
  - Be rendered abortive by remedial work.

## 560 TESTS AND INSPECTIONS

- Timing: Agree and record dates and times of tests and inspections to enable all affected parties to be represented.
- Confirmation: One working day prior to each such test or inspection. If sample or test is not ready, agree a new date and time.
- Records: Submit a copy of test certificates and retain copies on site.

### WORK AT OR AFTER COMPLETION

## 710 WORK BEFORE COMPLETION

- General: Make good all damage consequent upon the Works.
  - Temporary markings, coverings and protective wrappings: Remove unless otherwise instructed.
- Cleaning: Clean the Works thoroughly inside and out, including all accessible voids. Remove all splashes, deposits, rubbish and surplus materials.
- Cleaning materials and methods: As recommended by manufacturers of products being cleaned, and must not damage or disfigure other materials or construction.
- COSHH dated data sheets: Obtain for all materials used for cleaning and ensure they are used only as recommended by their manufacturers.
- Minor faults: Touch up in newly painted work, carefully matching colour and brushing out edges. Repaint badly marked areas back to suitable breaks or junctions.
- Moving parts of new work: Adjust, ease and lubricate as necessary to ensure easy and efficient operation.

## 720 SECURITY AT COMPLETION

- General: Leave the Works secure with, where appropriate, all accesses closed and locked.
- Keys: Account for and adequately label all keys and hand over to Employer with itemised schedule, retaining duplicate schedule signed by Employer as a receipt.

## 730 MAKING GOOD DEFECTS

- Remedial work: Arrange access with Thorne Moorends Town Council.
- Rectification: Give reasonable notice for access to the various parts of the Works.
- Completion: Notify when remedial works have been completed.

## A34 SECURITY/ SAFETY/ PROTECTION

### SECURITY, HEALTH AND SAFETY

## 110 PRECONSTRUCTION INFORMATION

- Location: Integral with the project Preliminaries, including but not restricted to the following sections:
  - Description of project: Sections A10 and A11.
  - Client's consideration and management requirements: Sections A12, A13 and A36.
  - Environmental restrictions and on-site risks: Section A12, A35 and A34.
  - Significant design and construction hazards: Section A34.
  - The Health and Safety File: Section A37.

- 120 EXECUTION HAZARDS
- Common hazards: Not listed. Control by good management and site practice.
  - Significant hazards: The design of the project includes the following:
    - Hazard: Sharps and unknown debris
    - Precautions assumed: Sharp Sweep prior to commencement
- 140 CONSTRUCTION PHASE HEALTH AND SAFETY PLAN
- Submission: Present to the Employer Client no later than 2 weeks prior to commencement.
  - Confirmation: Do not start construction work until the Employer has confirmed in writing that the Construction Phase Health and Safety Plan includes the procedures and arrangements required by CDM Regulations.
  - Content: Develop the plan from and draw on the Outline Construction Phase Health and Safety Plan, clause A30/570, and the Pre-tender Health and Safety Plan/ Preconstruction information.
- 150 SECURITY
- Protection: Safeguard the site, the Works, products, materials, and any existing buildings affected by the Works from damage and theft.
  - Access: Take all reasonable precautions to prevent unauthorized access to the site, the Works and adjoining property.
- 160 STABILITY
- Responsibility: Maintain the stability and structural integrity of the Works and adjacent structures during the Contract.
- 170 OCCUPIED PREMISES / SITE AREAS
- Extent: Existing buildings / site areas will be occupied and/ or used during the Contract as follows: Welfare Building with sports clubs. Pitches with team sports etc. General areas with public, un organised sports, dog walkers etc.
  - Works: Carry out without undue inconvenience and nuisance and without danger to occupants and users.
  - Overtime: If compliance with this clause requires certain operations to be carried out during overtime, and such overtime is not required for any other reason, the extra cost will be allowed, provided that such overtime is authorized in advance.
- 180 ACCESS CONTROL
- Controlled areas: vehicle access is controlled by locked gates at the entrance to the site
  - Control type: keys will be issued by TMTTC. Contractor to manage access.
- 210 EMPLOYER'S REPRESENTATIVES SITE VISITS
- Safety: Submit details in advance, to the Employer or the person identified in clause A10/140, of safety provisions and procedures (including those relating to materials, which may be deleterious), which will require their compliance when visiting the site.

## PROTECT AGAINST THE FOLLOWING

### 330 NOISE AND VIBRATION

- Standard: Comply with the recommendations of BS 5228-1, in particular clause 7.3, to minimize noise levels during the execution of the Works.
- Equipment: Fit compressors, percussion tools and vehicles with effective silencers of a type recommended by manufacturers of the compressors, tools or vehicles.
- Restrictions: Do not use:
  - Percussion tools and other noisy appliances without consent outside the hours of 0900 and 1800 Monday to Friday,
  - Radios or other audio equipment

### 340 POLLUTION

- Prevention: Protect the site, the Works and the general environment including the atmosphere, and against pollution.
- Contamination: If pollution occurs inform immediately, including to the appropriate Authorities and provide relevant information.

### 350 PESTICIDES

- Use: Not permitted.

### 360 NUISANCE

- Duty: Prevent nuisance from smoke, dust, rubbish, vermin and other causes.
- Surface water: Prevent hazardous build-up on site, in excavations and to surrounding areas and roads.

### 370 ASBESTOS CONTAINING MATERIALS

- Duty: Report immediately any suspected materials discovered during execution of the Works.
  - Do not disturb.
  - Agree methods for safe removal or encapsulation.

### 371 DANGEROUS OR HAZARDOUS SUBSTANCES

- Duty: Report immediately suspected materials discovered during execution of the Works.
  - Do not disturb.
  - Agree methods for safe removal or remediation.

### 375 ANTIQUITIES

- Duty: Report immediately any fossils, antiquities and other objects of interest or value discovered during execution of the works.
- Preservation: Keep objects in the exact position and condition in which they were found.

### 390 SMOKING ON SITE

- Smoking on site: Not permitted.

### 400 BURNING ON SITE

- Burning on site: Not permitted.

## 430 WASTE

- Includes: Rubbish, debris, spoil, surplus material, containers and packaging.
- General: Minimize production. Prevent accumulations. Keep the site and Works clean and tidy.
- Handling: Collect and store in suitable containers. Remove daily and dispose off site in a safe and competent manner:
  - Non-hazardous material: In a manner approved by the Waste Regulation Authority.
  - Hazardous material: As directed by the Waste Regulation Authority and in accordance with relevant regulations.
- Recyclable material: Sort and dispose at a Materials Recycling Facility approved by the Waste Regulation Authority.
- Voids and cavities in the construction: Remove rubbish, dirt and residues before closing in.
- Waste transfer documentation: Retain on site.

**PROTECT THE FOLLOWING**

## 510 EXISTING SERVICES

- Confirmation: Notify all service authorities, statutory undertakers and/ or adjacent owners of proposed works not less than one week before commencing site operations.
- Identification: Before starting work, check and mark positions of utilities/ services. Where positions are not shown on drawings obtain relevant details from service authorities, statutory undertakers or other owners.
- Work adjacent to services:
  - Comply with service authority's/ statutory undertaker's recommendations.
  - Adequately protect, and prevent damage to services: Do not interfere with their operation without consent of service authorities/ statutory undertakers or other owners.
- Identifying services:
  - Below ground: Use signboards, giving type and depth;
  - Overhead: Use headroom markers.
- Damage to services: If any results from execution of the Works:
  - Immediately give notice and notify appropriate service authority/ statutory undertaker.
  - Make arrangements for the work to be made good without delay to the satisfaction of service authority/ statutory undertaker or other owner as appropriate.
  - Any measures taken to deal with an emergency will not affect the extent of the Contractor's liability.
- Marker tapes or protective covers: Replace, if disturbed during site operations to service authority's/ statutory undertakers recommendations.

## 520 ROADS AND FOOTPATHS

- Duty: Maintain roads and footpaths within and adjacent to the site and keep clear of mud and debris.
- Damage caused by site traffic or otherwise consequent upon the Works: Make good to the satisfaction of the Employer, Local Authority or other owner.

- 530 EXISTING TOPSOIL/ SUBSOIL
- Duty: Prevent over compaction of existing topsoil and subsoil in those areas which may be damaged by construction traffic, parking of vehicles, temporary site accommodation or storage of materials and which will require reinstatement prior to completion of the Works.
  - Protection: Before starting work submit proposals for protective measures.
- 540 RETAINED TREES/ SHRUBS/ GRASSED AREAS
- Protection: Preserve and prevent damage, except those not required.
  - Replacement: Mature trees and shrubs if uprooted, destroyed, or damaged beyond reasonable chance of survival in their original shape, as a consequence of the Contractor's negligence, must be replaced with those of a similar type and age at the Contractor's expense.
- 560 EXISTING FEATURES
- Protection: Prevent damage to existing buildings, fences, gates, walls, roads, paved areas and other site features, which are to remain in position during execution of the Works.

### **A36 FACILITIES/ TEMPORARY WORKS/ SERVICES**

#### **GENERALLY**

- 110 SPOIL HEAPS, TEMPORARY WORKS AND SERVICES
- Location: Give notice of intended siting.
  - Maintenance: Alter, adapt and move as necessary. Remove when no longer required and make good.

#### **ACCOMMODATION**

- 230 TEMPORARY ACCOMMODATION
- Accommodation made available by the Employer: None.
- 230 TEMPORARY ACCOMMODATION
- Proposals for temporary accommodation and storage for the Works: Submit two weeks prior to starting on site.
  - Details to be included: Type of accommodation and storage, its siting and the programme for site installation and removal.
- Facilities: General Welfare to be provided by Principal contractor to suit work requirements - Sanitary facilities, office and canteen area

- 280 EXISTING ACCOMMODATION
- Restrictions on use: All, no access provided.

#### **TEMPORARY WORKS**

- 340 NAME BOARDS/ ADVERTISEMENTS
- Name boards/ advertisements: allowed with prior approval.
- Contractor to provide public notice board on fencing illustrating proposals.

**A37 OPERATION/ MAINTENANCE OF THE FINISHED WORKS****GENERALLY****110 THE PROJECT MANUAL**

- Responsibility: The Principal Contractor
- Content: Obtain and Provide comprehensive information for owners and users of the completed Works. Include an overview of the main design principles and describe key components and systems within the finished Works, so affording a complete understanding of the Works to enable efficient and safe operation and maintenance.
- Format: Soft and Hard Copy
- Number of copies: one of each
- Delivery to: John Hill Associates Ltd by (date) 2 week post completion.

**115 THE HEALTH AND SAFETY FILE**

- Responsibility: John Hill Associates Ltd

**155 CONTENT OF THE PROJECT MANUAL**

- General: Details of the property, the parties, fire safety strategy, operational requirements and constraints of a general nature.
- Fabric: Design criteria, maintenance details, product details, and environmental and trafficking conditions.
- Documentation: Guarantees, warranties, maintenance agreements, test certificates and reports.

**160 PRESENTATION OF BUILDING MANUAL**

- Format: A4 size, plastics covered, loose leaf, four ring binders with hard covers, each indexed, divided and appropriately cover titled.
- Selected drawings needed to illustrate or locate items mentioned in the Manual: Where larger than A4, to be folded and accommodated in the binders so that they may be unfolded without being detached from the rings.
- As-built drawings: The main sets may form annexes to the Manual.

**190 MAINTENANCE SERVICE**

- Scope: Provide a comprehensive maintenance service for the items of plant and equipment: Include all planned preventative maintenance, as set out within the maintenance schedule and replacement of all consumable items:

**A40 CONTRACTOR'S GENERAL COST ITEMS: MANAGEMENT AND STAFF****110 MANAGEMENT AND STAFF**

- Cost significant items: \_\_\_\_\_ .

**A41 CONTRACTOR'S GENERAL COST ITEMS: SITE ACCOMMODATION****110 SITE ACCOMMODATION**

- Details: Site accommodation required or made/ not made available by the Employer: See section A36.
- Cost significant items: \_\_\_\_\_ .

£

£

p

**A42 CONTRACTOR'S GENERAL COST ITEMS: SERVICES AND FACILITIES**

110 SERVICES AND FACILITIES

- Details: Services or facilities required or made/ not made available by the Employer: See section A36.
- Cost significant items: \_\_\_\_\_ .

**A43 CONTRACTOR'S GENERAL COST ITEMS: MECHANICAL PLANT**

110 MECHANICAL PLANT

- Cost significant items: \_\_\_\_\_ .

**A44 CONTRACTOR'S GENERAL COST ITEMS: TEMPORARY WORKS**

110 TEMPORARY WORKS

- Details: Temporary works required or made/ not made available by the Employer: See section A36.
- Cost significant items: \_\_\_\_\_ .

£

To Collection

Section ii  
General Requirements  
For  
Electrical Engineering Services



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**GENERAL REQUIREMENTS**

**FOR**

**ELECTRICAL ENGINEERING SERVICES**

**Document Ref: STSES01**

**Date: April 2015 Rev B**



**SECTION 1**  
**GENERAL REQUIREMENTS**



**CONTENTS - GENERAL REQUIREMENTS  
(TO BE READ IN CONJUNCTION WITH RELEVANT WORK SECTIONS) AND  
MAIN CONTRACT PRELIMINARIES**

**Introduction**

**A10 General Particulars**

**A11 Drawings**

**A12 The Site/Existing buildings**

**A13 Description of the Work**

**A30 Tendering/Sub-letting/Supply**

**A31 Provision, Content and use of Documents**

**A32 Management of the Works**

**A33 Quality standards/Control**

**A34 Security/Safety/Protection**

**A37 Operation/Maintenance of the Finished Building**



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**NON-NES CLAUSES**

**Non-NES clauses will be distinguished by the clause number beginning with a non-numeric character.**



## **A10 PROJECT PARTICULARS**

### **1100 THE PROJECT:**

Particulars of the project as a whole are given in Main Contract Preliminaries.  
Reference to these documents must be made via the Main Contractor.

### **1400 DESIGN TEAM:**

Refer to Contract Administrator

### **1600 STATUTORY AUTHORITIES:**

Refer to Contract Administrator

### **1700 SUBCONTRACTOR:**

The term Subcontractor is used throughout this specification and is deemed to be synonymous with the term Sub-trader and the like which may be used elsewhere within the Contract Documentation.

### **1800 CO-ORDINATION**

The Main Contractor will co-ordinate all mechanical and electrical services with the building requirements.

The Sub-contractor will be responsible for checking the position of all equipment relative to other services

and building components prior to installation. Where potential conflicts occur these shall be reported to the

Contract Administrator prior to installation.



## **A11 DRAWINGS**

### **1100 THE TENDER DRAWINGS:**

Refer to the schedule at the end of this Specification.

### **1210 THE SUBCONTRACT DRAWINGS:**

The subcontract drawings required are indicated in Section A31 of this specification and are to be prepared (by the Sub-Contractor / Contractor ) prior to commencement of the works on site.

### **1400 INSPECTION:**

Inspect all drawing and other documents relating to the Contract prior to the submission of tender.

Documents may be viewed by appointment during normal hours as follows:-  
Architectural and Structural documents may be inspected at the Main Contractors Offices.



## **A12 THE SITE**

### **1100 THE SITE**

The site is described in the Main Contract Preliminaries.

### **1300 EXISTING MAINS/SERVICES:**

Existing mains/engineering services are defined in the relevant work sections.

### **1500 SURVEY:**

Ascertain the nature of the site and all local conditions and restrictions likely to affect the execution of the Works.

Before commencing work, carry out a survey and examination of buildings, structure and engineering services affected by the works.

Examine all available drawings of the engineering services and report any discrepancies to the CA.

### **1700 SITE VISIT:**

Site visit may be made by the Subcontractor by arrangement with the Main Contractor.

### **A13 DESCRIPTION OF THE WORK**

#### **1400 THE SUBCONTRACT WORK:**

Supply, install, balance, test and commission the building services installations defined in the following Work Sections.

#### **1500 WORK BY OTHERS AND CO-ORDINATION OF TRADES:**

Allow for co-ordinating the subcontract works with the works of other trades and installations which may be on site during the period of the subcontract.

#### **2100 PLANT OPERATING CONDITIONS:**

Ensure all plant items are suitable for operation in the environment in which they are to be located.

Ensure all plant, motors, starters and ancillary equipment etc. are suitable for operation at full capacity under the following conditions

Height above sea level not exceeding 500m.

Air cooling at an average temperature over 24 hours not exceeding 35°C dry bulb.

Maximum conditions of 40°C dry bulb and 50 per cent relative humidity.

Supply voltage approximately sinusoidal

Provide equipment for operation in the following areas with the environment as specified below

Internal

Temperature 10°C to 30°C

Max. Humidity 90%

External

Temperature (°C) -3 to 40

Humidity (% rh) 70

Protect equipment to BS EN 60529

IP 54 and IP 65

#### **2200 ELECTROMAGNETIC COMPATIBILITY:**

Ensure all equipment and systems are installed to provide electromagnetic compatibility within the system and with any other systems installed in the same area.

Ensure all systems and buildings are assessed for protection to, and that such protection meets the requirements of, BS 6651. Ensure all equipment meets the requirements of the appropriate electromagnetic compatibility standard.

#### **2300 LIFE OF SYSTEMS**

The expected lifespans are based on CIBSE life factors and on good standards of plant maintenance. Where lifespans noted above are below the requirements of 25 years, the Contractor should identify the enhanced maintenance regimes to achieve the requirement.

## 2400 DELETERIOUS MATERIALS

In the design and construction of the Works there will be used none of the materials set out below:-

- 1) Concrete or mortar additives containing calcium chloride.
- 2) Concrete that may be susceptible to alkali/silica chloride attack.
- 3) High alumina cement.
- 4) Wood wool slabs as permanent shuttering.
- 5) Calcium silicate bricks and tiles.
- 6) Asbestos products
- 7) Urea formaldehyde will not be used in cavity wall insulation but may be used in minimum amounts in particle boards as a glue.
- 8) Lightweight or air entrained concrete blocks of less than 7N/mm<sup>2</sup>
- 9) Slipbricks which do not comply with BS5625 Part 3 and BS3291 Part 5.
- 10) Proprietary open web lattice joists or beams unless authorised by the purchaser.
- 11) Timber trussed rafters manufactured with truss plate connectors unless authorised by the Purchaser.
- 12) Montreal listed CFC gasses will not be used on site nor on equipment installed by the developer or his Contractor on site.
- 13) All tropical rain forest timber unless authorised by the Purchaser.
- 14) Aggregates for use in reinforced concrete which do not comply with BSS882: 1983 and aggregates for use in concrete which do not comply with the provisions of BSS8110: 1985.  
Sea dredged aggregates save where those sea dredged aggregates have been treated in accordance with BS812: 1975 and 1976 and conform in all respects to BSS882: 1983.

- 15) Lead, or any materials containing lead, except lead flashing which may be ingested, inhaled or absorbed, except where copper alloy fittings containing lead are specifically required in drinking water pipework by any relevant statutory requirements.
- 16) Materials containing fibres of less than 3 microns diameter except for approved proprietary products such as "Gypglas cavity wall system batts" produced by Gyproc Insulation Limited and "Crown Glass fibre mat" produced by Pilkington Insulation Limited or equivalent materials commercially available. All such products must only contain a very small proportion of fibres less than this size and in any event fibres are to be sealed or otherwise stabilised to ensure that fibre migration is minimised.
- 17) Any other materials or substances not in accordance with British Standards Codes of Practice (or any recognised European Standard which has been adopted in the UK) and/or good building practice current at the time of specification or incorporation into the Works or any part Thereof.
- 18) Any other materials or substances known to be deleterious at the time of specification or incorporation into the Works or any part or parts thereof.

## **A30 TENDERING/SUB-SUBLETTING/SUPPLY**

### **SUBCONTRACT TENDERING**

#### **1100 SCOPE:**

These conditions are supplementary to those stated in the invitation to tender and on the Form of Tender and Agreement.

#### **2700 SUBCONTRACT SPECIFICATION WITHOUT QUANTITIES:**

Where and to the extent that quantities are not included in the specification, tenders must include for all work shown or described in the tender documents as a whole or clearly apparent as being necessary for the complete and proper execution of the Works.

#### **2800 PRICING OF SUBCONTRACT SPECIFICATION:**

Alterations and qualifications to the specification must not be made without the written consent of the CA. Tenders containing such alterations or qualifications may be rejected. Costs relating to items in the specification which are not priced will be deemed to have been included elsewhere in the tender.

#### **2900 SUBMISSION OF PRICED SUBCONTRACT SPECIFICATION:**

The priced subcontract specification must be submitted with the Tender.

#### **3120 A SCHEDULE OF RATES:**

A (quantified) schedule of rates as referred to in the Form of Tender must be submitted within one week of request.

It must include all items and materials included in the tender, together with their rates, extended and totalled. Preliminaries are to be separately priced. Such totals shall agree with the Subcontract Sum and subtotals shall agree with the priced breakdown of the tender.

Correction of errors in the quantification will not lead to adjustment of the Subcontract Sum.

Rates to include Contractor's cash discount.

#### **3500 AGREED PROGRAMME:**

The agreed programme for the Subcontract Works must be submitted with the tender.

Where the tenderer finds it impossible to assess the time implications of Provisional Work/Items and excludes such from his programme, this must be confirmed when submitting his tender.

#### **3600 METHOD STATEMENTS:**

Method statements must be submitted within one week of request.

before the execution of the Subcontract.

describing how and when the subcontractor proposes and undertakes to carry out the following.

Resourcing for design duties and installation of the works.

Testing and commissioning.

The Subcontractor may, at his discretion and at the same time, submit method statements for other parts of the Works.

**3800 ALTERNATIVE MANUFACTURERS/SUPPLIERS:**

In addition to and at the same time as his tender for the Subcontract Works as defined in the tender documents, the Subcontractor may, at his discretion, submit alternative manufacturers or suppliers for consideration. Alternatives which would involve significant changes to other work will not be considered.

Such alternative(s) must include all additional costs arising from necessary changes to the details of the installation, including changes to the design and drawings, as well as any associated ancillary equipment items.

Such alternative(s) is/are deemed to be alternative tender(s) and each must include a complete and precise statement of the effects on cost and programme.

Full technical data for each such alternative must be submitted with the Tender together with details of any consequential amendments to the design and/or construction/installation of other parts of the Works.

**3900 SELECTION OF MANUFACTURERS/SUPPLIERS:**

Where manufacturers, suppliers or installers of products are NOT identified by name select products that comply in all respects with the specification and, as and when requested, demonstrate such compliance.

Where manufacturers, suppliers or installers of products are identified by name, or names, but no reference is made to "Or approved equivalent" use these exclusively.

Where manufacturers, suppliers or installers of products are identified by name, or names, but reference is made to "Or approved equivalent" alternatives may be selected and shall be submitted to the CA for approval.

Check that any proposed alternatives comply with any stated British (or other equivalent recognised International) Standards. Confirm equivalence in quality, operation and space requirements to those items which have been specified by name. If, and when requested demonstrate the proposed alternative is fully equivalent to the specified item and identify any constructional, cost, programme, maintenance or other differences.

**4000 A LIST OF PROPOSED MANUFACTURERS/SUPPLIERS:**

A list of proposed manufacturers/supplies of products, equipment and plant, including all items for which the choice of manufacturer/supplier is at the discretion of the Subcontractor, must be submitted with the Tender.

**4100 TECHNICAL INFORMATION:**

Technical information relating to the Subcontractor's tender must be submitted with the Tender.

**4200 QUALITY CONTROL RESOURCES:**

A statement must be submitted within one week of request before the execution of the Subcontract describing the organisation and resources which the Subcontractor proposes and undertakes to provide to control the quality of the Subcontract Works. The statement must include the number and type of staff responsible for quality control, with details of their qualifications and duties.

**4400 PROPOSALS FOR ANNUAL MAINTENANCE CONTRACT:**

Submit with the Tender a supplementary proposal for an annual maintenance contract for the whole of the works.

The proposal should include for maintaining the installation in efficient working order including routine checks, adjustments, lubrication and replacement of consumable spares, etc.

It should set out the terms of the offer, the work to be carried out, the guarantees of performance and the price of the first 12 months after Practical Completion of the Works or Section thereof.

The proposal will not be considered as part of the tender for the Subcontract Works and the Employer does not undertake to accept it.

**5200 SUB-SUBCONTRACTORS:**

Where the Subcontractor proposes to sublet any portion(s) of the Subcontract Works a list must be submitted with the Tender defining such portion(s) and giving, for each, the name and address of the proposed Sub-subcontractor.

## A31 PROVISION, CONTENT AND USE OF DOCUMENTS

### **1000 DEFINITIONS AND INTERPRETATIONS**

#### **1100 MAIN CONTRACT PRELIMINARIES:**

Definitions and interpretations given in Main Contract Preliminaries apply to the whole of the Works, including this Subcontract.

#### **1200 DEFINITIONS:**

The definitions of technical terms associated with the engineering services installations are those included in

CIBSE, IOP and BSRIA Technical Publications

BS 7671 -Requirements for Electrical Installations (IEE Wiring Regulations).

British Standards, including Codes of Practice.

Associated Statutory Acts.

Where used in the documentation the following definitions shall apply

##### **Plant**

Includes boiler rooms and switch rooms.

##### **Duct**

An enclosed space specifically intended for the distribution of services, with direct access for personnel. Generally of walk-way or crawl-way type.

##### **Trench**

A covered horizontal service space in the floor or ground with access from above.

##### **Cavity**

A space enclosed within the elements of a building within which services are installed, e.g. the space between ceiling and floor above. See Building Regulations.

##### **Occupied**

All occupied areas.

##### **Service Areas**

+Areas within a building with limited finishes such as loading bays, car parks etc.

##### **Concealed Services**

Installations within ducts, trenches or cavities.

##### **Exposed Services**

Installations within plant rooms, outdoors or unprotected within "service" or occupied areas.

#### **1300 SYSTEM:**

System means all equipment, accessories, controls, supports and ancillary items, including supply, installation, connection, testing, commissioning and setting to work necessary for that section of the Works to function.

Include in each system forming part of the Works all necessary offsets, bends, tapers, transformation pieces, additional lengths, etc., whether or not shown explicitly on the drawings. Ensure a satisfactory inter-relationship with other systems, the work of other trades and other building elements.

**1400 SERVICES:**

Services means the inclusion of one or more system.

**1500 TENDER DOCUMENTS:**

Tender documents means tender drawings listed in A11.1100 and specification prepared to enable competitive tenders for the Works to be obtained.

Not all items or matters referred to in the specification are indicated on the drawings nor are all items detailed on the drawings described in the specification.

The tender drawings show the general arrangement of the Engineering Services to be provided and the inter-relationship of the Works with work to be installed by others.

**1600 SKETCH DRAWINGS:**

Sketch drawings means line diagrams and layouts indicating basic proposals, location of main items of plant, routes of main pipes, air ducts and cable runs in such detail as to illustrate the incorporation of the Engineering Services within the Project as a whole.

**1700 DESIGN DRAWINGS:**

Design drawings means drawings prepared, generally at a scale of not less than 1:250, to show the details of the design as they are developed from the Tender Drawings.

**1800 CO-ORDINATION DRAWINGS:**

Co-ordination drawings means drawings, showing the inter-relationship of two or more Engineering Services Systems, and their relation to the structural and architectural details.

Co-ordination drawings shall be prepared at a scale of not less than 1:50.

The drawings demonstrate that each service can be properly separated from each other and that the services can be satisfactorily installed and maintained.

**1900 BUILDER'S WORK, BUILDER'S WORK INFORMATION AND SETTING OUT:**

Builder's work is included in the Subcontract/Main Contract

Builders work information means drawings and/or schedules, prepared at a scale of 1:50, 1:100 or 1:250 as appropriate.

showing requirements for architectural and/or structural provisions necessary to facilitate the Engineering Services Works and allow their integration into the Project. Such information includes the position and sizes of all access covers, panels and doors required in the building fabric for proper access for and to plant for installation, maintenance and inspection.

Provide Builder's Work Information, appropriate to the stage of design development, and include requirements for foundations, bases, and supporting structures for plant and equipment.

Provide fully dimensioned drawings showing both size and position of builder's work.

Mark out on site, all cut holes and chases required, any pockets cast in concrete, any inserts, any built in sleeves or similar items.

Holes may not be cut in steelwork, reinforced or precast concrete without written permission from the CA. Under no circumstances will holes be cut in pre-stressed concrete. Permitted holes in steelwork must be drilled - burning by means of welding equipment is prohibited.

**2000 INSTALLATION DRAWINGS:**

Installation drawings means drawings based on the Tender Drawings showing details of the proposals for the execution of the Works. Ensure such drawings and details relate, where relevant, to Builder's Work information, and to all Architectural, Structural and other drawings.

**2100 SHOP/FABRICATION DRAWINGS:**

Shop/fabrication drawings means drawings detailing how the components of the designed work are to be fabricated and assembled.

**2200 EQUIPMENT DRAWINGS:**

Equipment drawings means drawings detailing principle dimensions, fixings, connections and all other relevant details of an item of equipment.

Such drawings are to be specific to the Works and all references to optional features, other equipment of a range, etc. shall be deleted or the original drawing re-drawn to comply with this requirement.

Ensure each drawing represents accurately the item concerned with correct dimensions and all connections precisely located conforms to the specific description given in the Tender Documents, quoting the relevant reference shows the item in its entirety with no extraneous or alternative parts indicated.

**2300 CONTROLS LOGIC DIAGRAMS:**

Controls logic diagrams means diagrams, drawings and/or schematic details of all control components and instruments showing the layout with each item uniquely identified together with a description of the controls operation and details of the associated interlocking.

**2400 WIRING/CONNECTION DIAGRAMS:**

Wiring/connection diagrams means drawings, diagrams or schedules detailing all power and control wiring and control pipework connections between control panels, motors, control components, instruments and any other items requiring electrical connections.

Indicate the following

Maximum electrical loading for each supply cable.

Cable termination facilities.

Cable identification and all terminal numbers.

**2600 AS-INSTALLED DRAWINGS:**

As installed drawings means drawings/records retained on site to record the progress of and any site modifications to the Works including any changes to software.

**2700 RECORD DRAWINGS AND SCHEDULES:**

Record drawings and schedules means drawings, diagrams and schedules, etc. prepared from as-installed drawings showing the work as finally executed.

**2900 REFERENCES TO BSI DOCUMENTS:**

References to BSI documents are to the versions and amendments listed in the British Standards Catalogue and in subsequent issues of BSI News up to and including that for any subsequent versions and amendments specifically referred to in the project documents.

**3200 CONTRACT DOCUMENTS:**

Contract documents means those documents, including drawings and specifications, on which the contract for the Works is based.

**3300 INTERPRETATION OF DOCUMENTS:**

Drawings provided to a scale of 1:50 or smaller and/or expressed in symbolic terms or which are in diagrammatic format, give indicative locations only and details of components are not to be inferred.

Arrangements shown on Tender Drawings are intended to indicate layout to be generally adhered to, but actual routes of services are to be such as to ensure the neatest possible arrangement.

Notify the CA of any conflict of information arising from the use of the specification or drawings.

**3400 ROOM TERMINAL LOCATIONS:**

The positions of all connection points, accessories, apparatus, equipment and other room terminals shown on the tender drawings are approximate and for guidance in the preparation of the tender.

Include for the determination on site, in collaboration with the CA and Contractor, of the finalised position of all such terminals.

Allow for the movement of all such terminals up to a radius of 2.0m from the positions shown on the drawings.

Mounting heights indicated in tender documents are for tender purposes only. Confirm mounting heights with the CA before commencing work on site.

**3500 EXAMINATION OF DRAWINGS/INFORMATION:**

The CA will examine the drawings / information submitted for compliance, in principle, with the design intent.

Such an examination shall not relieve the originator of such documents of his responsibilities and obligations under the contract. The CA will require 7 working days from receipt of such information to provide comments.

Comments will be graded as follows :-

Category A drawing - deemed to be satisfactory and no further comments will be issued by the CA.

Category B drawing - deemed to be satisfactory subject to incorporation of CA's comments. No further submission required.

Category C drawing - deemed to be unsatisfactory. CA's comments must be incorporated. The drawing must be re-submitted to the CA for checking after modification.

Category D drawing - deemed to be unsatisfactory. The CA is not obliged to give any reason for rejection of the drawing. The drawing must be re-submitted after modification.

**5000 DOCUMENTS TO BE PROVIDED BY SUBCONTRACTOR**

**5110 PRODUCTION INFORMATION:**

Liaise with the CA, Contractor and others as necessary to help ensure co-ordination of the work with related building elements and services.

Provide INSTALLATION / WORKING drawings and other information showing such details of the work as the CA may reasonably require.

Submit to the CA for comment, make any necessary amendments and resubmit for further comment unless the CA confirms that this is not necessary. Prior to submission the Subcontractor shall check and approve all drawings, schedules and any other information provided by manufacturers, nominated suppliers or specialist sub-subcontractors to ensure that all the requirements of the contract documentation have been incorporated. Accompany all documents submitted with a certificate indicating that they have been checked by the Subcontractor.

Submit sufficient copies of final information to the CA for distribution to the Contractor and all affected parties.

Provide performance characteristics of electrical equipment.

Provide Builder's Work Information, appropriate to the stage of design development.

**5300 PREPARATION OF DOCUMENTS:**

Prepare drawings to commonly recognised scales generally on A1 sheets and details and schedules on A4 sheets.

Agree scales, drawing sheet size and format with the CA before preparing any documents.

**5400 SYMBOLS:**

Ensure the notation on documents produced follows the same conventions as the tender documentation. Agree any additional notation to be used with the CA before preparing any documents.

**5600 BUILDER'S WORK INFORMATION:**

Confirm and amplify any builder's work information provided by the CA.

**5700 SUBMISSION OF RECORD DOCUMENTS:**

To satisfy the provisions of the Health and Safety at Work Act the Employer will not accept handover of the installations until full and adequate information concerning the installations is in the possession of his operating and maintenance staff.

Provide Record Documents - being part of the Works - prior, and as a prerequisite, to Practical Completion to the satisfaction of the CA.

Prepare manuals in draft as the Works progress and make suitable arrangements where the Works are subject to Partial Possession or Sectional Completion.

Prepare two temporary Manuals with provisional record drawings and preliminary performance data available at commencement of commissioning to enable Employer's staff to familiarise themselves with the installation.

These should be of the same format as the final Manuals with temporary insertions for items which cannot be finalized until the installations are commissioned and performance tested. Provide the CA with copies of the final Manual not more than 4 weeks prior to Practical Completion.

#### **5800 RECORD DOCUMENTS:**

Provide

Record Drawings and Schedules.

Plant room and switch room drawings, schedules and schematics.

Operating and Maintenance Manuals.

Blank maintenance logs.

Log book

Ensure Record Documents

clearly record the arrangements of the various sections of the Works as actually installed and identify and locate all component parts.

make it possible to comprehend the extent and purpose of the Works and the method of operation thereof.

set out the extent to which maintenance and servicing is required and how, in detail, it should be executed.

Provide sufficient, readily accessible and proper information to enable spares and replacements to be ordered.

Correlate record documents so that the terminology and the references used are consistent with those used in the physical identification of the component parts of the installations.

Demonstrate as required throughout the execution of the Works that complete and accurate records are being maintained and that the record documents are being progressively compiled as the work on site proceeds.

#### **5900 RECORD DRAWINGS AND SCHEDULES:**

Prepare Record Drawings and Schedules to a scale not less than 1:50, 1:100 or 1:250 from the "As Installed Drawings" maintained on site as the Works progress. Endorse all such documents "RECORD DRAWINGS". Where agreed with the CA certain detailed information may be provide in schedule form.

Provide reduced scale copies for inclusion in the operating and maintenance manuals as detailed in clause A31.6100.

Record Drawings and Schedules must include, but are not limited to

Location, including level if buried, of Utility Service connections, including those provided by the appropriate Authority, indicating points of origin and termination, size and material of service, pressure and/or other relevant information.

Disposition and depth of all underground systems.

Schematic drawings of each system indicating principal items of plant, equipment, zoning, means of isolation, etc. in sufficient detail to make it possible to comprehend the system operation and the inter-connections between various systems.

Details of the principles of application of automatic controls and instrumentation.

Diagrammatic dimensioned plans and sections of each system or service showing sizes and locations of all ancillaries, plant, equipment controls, test points, and means of isolation etc. including any items forming an integral part of the engineering systems provided by others (such as plenum ceilings, builders' work shafts, chimneys etc.).

Identification of all terminals/cables etc. by size/type and duty/rating as recorded from the approved commissioning results.

Detailed wiring drawings/diagrams/schedules for all systems, including controls, showing origin, route, cable/conduit size, type, number of conductors, length, termination size and identification, and measured conductor and earth continuity resistance of each circuit. Ensure routes indicate if cable/conduit is surface mounted, concealed in wall chase, in floor screed, cast in-situ, above false ceiling etc.

Details of co-ordination of wiring and connections with cable core identification, notation of fire alarm, security, control and instrumentation and similar systems provided as part of the Works.

Details to show inter-connections between the Works and equipment or systems provided by others to which wiring and connections are carried out as part of the Works.

Location and identity of each room or space housing plant, machinery or apparatus.

Dimensioned plans and sections at a scale of 1:20 of plant rooms, service subways, trenches, ducts and other congested areas where in the opinion of the CA smaller scale drawings cannot provide an adequate record. Indicate the location, identity, size and details of each piece of apparatus.

Manufacturers' drawings of equipment indicating

general arrangement and assembly of component parts which may require servicing.

internal wiring diagrams together with sufficient physical arrangement details to locate and identify component parts.

schedules as required to locate, reference and provide details of ratings and duty of all items incorporated into the Works together with all fixed and variable equipment settings established during commissioning.

## **6100 OPERATING AND MAINTENANCE MANUALS:**

Provide operating and maintenance manuals.

Agree format and contents with the CA.

Operating and maintenance manuals must include, but are not limited to the following

Index of contents.

A full description of each of the systems installed, written to ensure that the Employer's staff fully understand the scope and facilities provided. Description to include data on general design parameters, normal associated operating conditions and manufacturers information concerning correct operation, etc. based on commissioning results.

A description of the mode of operation of all systems.  
Diagrammatic drawings of each system indicating principal items of plant, equipment, valves etc.  
A photo-reduction of all record drawings, together with an index. Size A3  
Legend for all colour-coded services.

Schedules (system by system) of plant, equipment, valves, etc., stating their locations within the building, duties and performance figures. Ensure each item has a unique code number cross-referenced to the record and diagrammatic drawings and schedules.

The name, address and telephone number of the manufacturer of every item of plant and equipment together with catalogue list and order acknowledgement numbers.

Manufacturer's technical literature for all items of plant and equipment, assembled specifically for the project, excluding irrelevant matter and including detailed drawings, electrical circuit details and operating and maintenance instructions.

A copy of all Test Certificates, Inspection and Test Records, Commissioning and Performance Test Records (including, but not limited to, electrical circuit tests, corrosion tests, type tests, start and commissioning tests) for the installations and plant, equipment, valves, etc., used in the installations.

A copy of all manufacturers' guarantees or warranties.

Copies of Insurance & Inspecting Authority Certificates and Reports.

Starting up, operating and shutting down instructions for all equipment and systems installed.

Details of procedures to maintain plant in safe working conditions.

Control sequences for all systems installed.

Documentation of the procedures for updating and/or modifying software operating systems and control programs.

Details of regular tests to be carried out (e.g. water cooling towers etc.)

Copies of relevant HSE/CIBSE/IEE Guidance notes etc.

Procedures for seasonal change-overs and/or precautions necessary for the care of apparatus subject to seasonal disuse.

Recommendations for the preventative maintenance frequency and procedures which should be adopted by the Employer to ensure the most efficient operation of the systems.

Details of lubrication systems and lubrication schedules for all lubricated items.

A list of normal consumable items.

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

A list of any special tools needed for maintenance cross referenced to the particular item for which required.

Procedures for fault finding.

Emergency procedures, including telephone numbers for emergency services.

Copies of all items incorporated in the Plant room and switch room schedules and schematics.

**6200 PRESENTATION OF OPERATING AND MAINTENANCE MANUALS:**

Encase the Manuals in A4 size, plastic-covered, loose leaf, four ring binders with hard covers, each indexed, divided and appropriately cover- titled. Fold drawings larger than A4 and include in the binder so that they may be unfolded without being detached from the rings.

**6400 MAINTENANCE INSTRUCTIONS AND GUARANTEES:**

Retain copies delivered with components and equipment (failing which, obtain), register with manufacturer as necessary and hand over to CA on or before Practical Completion.

Notify CA of telephone numbers for emergency services by Subcontractors after Practical Completion.

**6500 SOFTWARE:**

Obtain on behalf of the end user all appropriate licences, permissions, copyright waivers, rights of use and the like from the owners of the software rights. Ensure that the end user is properly registered with the software supplier for support and appropriate updating. Ensure that application software is written in compliance with BS 7629.

## **A32 MANAGEMENT OF THE WORKS**

### **1200 CO-OPERATE:**

Co-operate with the Main Contractor, other subcontractors, suppliers, local authorities and statutory undertakings in the execution of their work.

### **1300 PROGRAMME/PROGRESS:**

Provide detailed sub-programmes to assist the Contractor in producing a Master Programme for the Contract Works.

Due allowance is to be made in the programme(s) for the Works for, but not limited to, the following.

- Ordering and installation periods.

- The completion of drawing, etc. and the minimum of 14 working days for comment.

- Work resulting from instructions issued in respect to the expenditure of provisional sums.

- Concurrent work by other trades.

- Any temporary works necessary for the completion of the engineering services installations.

- Pre-commissioning, commissioning and performance testing of the engineering services installations.

- Preparation and provision of Record Drawings and Operating and Maintenance Manuals.

Provide programme information as simple bar chart type.

Provide a separate and detailed commissioning programme for agreement with the CA.

Make due allowance for the following.

- Commissioning, demonstration and instruction procedures.

- Provision of written notice not less than 14 days before commencement before each (or series

- of) test, inspection, commissioning or demonstration procedures are to be carried out.

- Demonstration to the CA that test instruments and equipment are accurate.

### **1400 MONITORING:**

Record progress of the Works weekly on a copy of the programme kept on site.

Update or redraft programme without delay if any circumstances arise which affect the progress of the Works.

Mark up "As Installed" details weekly and before any work is hidden from view.

### **1500 INSPECTION AND MEASUREMENT OF WORK:**

Provide all necessary assistance to enable CA to examine or measure the Works.

### **1600 COVERING-UP:**

Ensure no section of the Works are covered, concealed or insulated until completion of a witnessed satisfactory test.

Give not less than 5 working day(s) notice when Works which are to be covered or concealed are ready for examination and/or measurement.  
Give notice to CA.

**1700 STATUTORY AUTHORITIES:**

Orders for the incoming services will be placed by the Main Contractor.

Liaise with the Statutory Authorities and provide any test notices required to ensure final connections are made in accordance with the requirements of the testing and commissioning programme.

**1800 TEST NOTICES:**

Provide all formalities in connection with Test Notices, Agreement and Application for Supply Forms etc.

Ensure all documents requiring the Employer's signature are forwarded to the CA in time to meet the building programme in order for the necessary test and supply arrangements to be made.

No additional payments will be made for expenses incurred due to reconnections, re-visits etc., by Supply Authorities or any other officials.

### **A33 QUALITY STANDARDS/CONTROL**

#### **1200 DELEGATION:**

The CA may delegate certain powers and duties.

The CA will indicate the duties and powers of the following:

Clerk of Works

Consulting Engineers.

#### **1300 SUBCONTRACTOR'S PERSON-IN-CHARGE:**

Appoint a foreman-in charge and/or site agent to ensure constant management and supervision of the Subcontract Works.

Give maximum possible notice to the Contractor and CA before changing the foreman-in-charge or site agent.

#### **1400 DIMENSIONS:**

Where installations are dependent upon site dimensions ensure that these are available before proceeding with the Works.

Do not take dimensions by scaling from the drawings.

Where dimensions are indicated on drawings check these on site, as appropriate, to ensure building construction and manufacturing tolerances can be accommodated.

Do not order or manufacture equipment using dimensions indicated on the Tender drawings, specification or schedules.

#### **1500 SETTING OUT FOR THE SUBCONTRACT WORK:**

Where this is done by the Main Contractor check its accuracy and obtain his approval before proceeding with the work.

#### **1600 SITE MODIFICATIONS:**

Do not make site modifications to assemblies without authorisation.

Where site modifications to assemblies are authorised make in accordance with manufacturer's certified drawings and instructions. Ensure that modifications made comply with any type test certificate obtained for arrangement of components.

#### **1700 STANDARDS AND REGULATIONS:**

Provide all materials and works in accordance with the appropriate British Standard or Code of Practice and where no BS or CP is applicable the Agreement Certificate for the particular item.

Comply with all statutory instruments and regulations, and local byelaws relating to the area of the site current at

the date of tender.

Comply with the requirements of the Local Authority Building Inspector.

Comply with all relevant requirements included in the Main Contract Preliminaries Section

A20 regarding Statutory Obligations.

Notify all authorities in accordance with their regulations and obtain any required approvals for the installation.

Where no specific design, performance or installation standards are quoted the following shall apply.

- C.I.B.S.E Guide Books A, B and C.
- C.I.B.S.E Codes of Practice.
- Institute of Plumbing Data Handbook.
- C.I.B.S.E Code for Interior Lighting.
- C.I.B.S.E Technical Reports.

**C.I.B.S.E Technical Memoranda.**

Ensure all equipment and systems are designed and installed in accordance with the relevant standards and that operational compatibility exists between the systems and any other system installed at the same location.

Supply plant and equipment to achieve the specified design conditions and to provide stable control.

**1710 STANDARDS AND REGULATIONS:**

Provide all materials and works in accordance with the appropriate British Standard or Code of Practice and where no BS or CP is applicable the Agreement Certificate for the particular item. Comply with all statutory instruments and regulations, and local by-laws relating to the area of the site current at the date of tender.

Comply with the requirements of the Local Authority Building Inspector.

Comply with all Statutory Obligations arising from current legislation and regulations, together with other requirements, including, but not limited to, the following:-

**Statutory Obligations**

- Local Authority Bye-Laws, Regulations and Notices.
- Building Regulations 1991 and current amendments.
- Building Standards (Scotland) Regulations 1990 and current amendments.
- London Government Acts.
- Offices, Shops and Railway Premises Act.
- Public Health Acts.
- Electricity Acts.
- Electricity at Work Regulations 1989.
- The Factories Act 1961.
- Clean Air (Arrestment Plant) (exemption) Regulations 1969.
- The Control of Pollution Act 1974.
- Workplace (Health, Safety and Welfare) Regulations 1992.
- The Construction (Design and Management) Regulations, 1994.
- Health and Safety (Display Screen Equipment) Regulations 1992.
- Control of Substances Hazardous to Health (COSHH) Regulations 1988.
- Asbestos Regulations.
- Provision and Use of Work Equipment Regulations 1992.
- Personal Protective Equipment at Work Regulations 1992.
- The Construction (General Provisions) Regulations 1961.
- The Construction (Lifting Operations) Regulations 1961.
- The Construction (Working Places) Regulations 1966.

Other relevant Safety Regulations.

Public Utility Company and/or Statutory Authority regulations, specifications, and requirements.

Loss Prevention Council - Rules for Automatic Sprinklers.

Other Requirements

British Standards and Codes of Practice.

BS 7671 - Requirements for Electrical Installations (IEE Wiring Regulations).

CIBSE Guides to Current Practice and Technical Memoranda.

Insurance Company Requirements.

LDSA Fire Safety Code.

IEC Standards.

Notify all authorities in accordance with their regulations and obtain any required approvals for the installation.

Supply plant and equipment to achieve the specified design conditions and to provide stable control.

**1800 SAFETY:**

Comply with all Safety Regulations and HSE Guidance Notes, including Construction (Design and Management) Regulations, Control of Substances Hazardous to Health (COSHH) Regulations, HSE Guidance Note GS 7 and Electricity at Work Regulations.

**1900 SUITABILITY OF MATERIALS AND PRODUCTS:**

Use materials and products which

are new unless specified otherwise.

are suitable for the services and conditions of use normally expected to apply after the installation is complete.

are able to withstand the testing and commissioning conditions specified.

do not initiate mould growth, support vermin, contain animal hair, contain crocidolite or support bacterial life.

do not involve the use of CFC's at any stage of manufacture, installation or subsequent operation except where specified.

are free from objectionable odours at the maximum or normal working conditions of operation.

do not suffer deterioration at the maximum or specified conditions of operation.

are capable of being applied to a base surface without causing damage or deterioration of the base.

are not a fire hazard, and do not evolve dense or toxic fumes when subjected to excessive heat, such as a fire.

when of similar type, are made by the same manufacturer.

whenever possible ensure products are manufactured and/or stocked under one of the following:

BSI Kitemark Scheme.

BSI Safety Mark Scheme.

from Firms of Assessed Capability to BS EN ISO 9000.

from Stockists of Assessed Capability to BS EN ISO 9000.

No materials generally known to be deleterious are to be used in, or incorporated into, any temporary or permanent part of the Works.

In particular use none of the following:-

Asbestos products.

Urea formaldehyde.

Check with manufacturers and/or suppliers of products and materials that products contain no such deleterious materials. If any specified product contains such material request an alternative specification of product, manufacturer or supplier.

**2000 SAMPLES:**

Submit samples detailed in Work Sections to the CA.

Retain on site until the completion of the contract.

**2100 TYPE TESTS:**

Provide certificates of verification of type tests. Ensure that drawings and other documents forming part of certificate are available prior to any order being placed.

**2200 TEST CERTIFICATES:**

Where testing specific to the project is required, ensure test certificates include

Project title.

Details and date of test.

Instruments used, serial numbers, calibration dates.

Signature of those witnessing test. Contractor's name.

Specific location of the item in the Works.

**2300 INSPECTION AND TESTS - ON OR OFF-SITE:**

Submit schedules showing those parts of the Works for which inspections and tests are required in the specifications, to substantiate conformity with the Specification and for which records are required to be maintained.

Should any alternative item be proposed which does not carry appropriate certification, ensure independent testing is carried out at no expense to the Employer to confirm compliance.

Where required, provide formal method statements supported by risk assessments detailing the procedures for carrying-out on site tests.

Agree in advance with all parties procedures for inspections and tests including periods of notice.

Where a test indicates non-compliance with the Specification submit immediately details of the non-compliance and proposals for corrective action.

Arrange access for personnel who require to be in attendance, to manufacturer's or other off site premises when any inspections and tests carried out.

Attendance or otherwise of the supervisory personnel during specified inspections or tests will not reduce the obligations or restrictions of the Contract.

Carry out all tests required by legislation under the direction of a "competent person".

**2400 INSPECTIONS AND TEST RECORDS:**

Prepare a set of drawings and/or report sheets to record accurately the test and inspection information including the following.

Plant identification, section and installation under test.

Manufacturer's reference number.

Date, time, duration of test, weather conditions.

Test results with itemised readings including records of all other checks and tests.

Maintain records of all specified inspections and tests performed including third party and works test certificates.

Include in records, as appropriate, details of the element, item, batch or lot, the nature, number and date of the inspections and tests, the number and type of deficiencies found, any corrective action taken and other relevant particulars.

Maintain all records on site for inspection. On completion of the Works, include copies in the operating and maintenance manuals.

Submit copies of records within one week of request.

**2500 TESTING AND COMMISSIONING OF SERVICES:**

Agree with the Contractor a programme for precommissioning checks, setting to work, commissioning and performance testing, and allow for all costs incurred.

Where required, provide formal method statements supported by risk assessments detailing all commissioning procedures.

Give not less than fourteen working days notice to the Contractor and CA and state any requirements

for the attendance and co-operation of others.

Provide all necessary facilities to enable tests to be witnessed and inspections carried out either on site or at manufacturer's works.

The CA will only witness test proceedings, confirm recorded results and determine if the specified requirements have been satisfied. If following test or inspection any plant or part thereof is shown to be defective or not conforming to the specification the CA will reject such defective parts by written notice, within reasonable time, indicating area of dispute.

Appoint an "approved" engineer, to supervise the whole of the testing, commissioning, performance testing and instruction of client's staff.

Provide all specialised personnel (including manufacturer's representatives) and co-ordinate their activities.

Test all equipment, material and systems as detailed in Work Sections. If an inspection or test fails, repeat the procedure, until satisfactory results are obtained.

Complete all tests before any paint, cladding or similar materials are applied or before services are concealed.

Ensure all requirements such as cleanliness, protection from harmful external and internal elements etc. are provided prior to commencement of commissioning.

Following satisfactory completion of testing and when the installations are in a safe and satisfactory condition, set to work, regulate and adjust, as necessary, to meet the specified design requirements.

Provide all necessary instruments and recorders to monitor systems during commissioning and performance testing.

Provide test equipment subject to a quality assurance procedure complying with BS 5781.

Do not start performance testing, including system demonstration, system proving or environmental and capacity testing, until commissioning of the system is completed to the satisfaction of the CA.

Maintain on site full records of all commissioning and performance testing, cross referenced to system components and on completion of the Works include a copy in each Operating and Maintenance Manual.

Provide all certification documents for approval by the CA before any system is offered for final acceptance.

Gas, fuel oil, electricity and water for testing and commissioning will be provided by the Main Contractor.

#### **2600 COMMISSIONING PROCEDURES:**

Observe the following requirements when commissioning the Engineering Services.

Progressive static testing will be witnessed by the CA when work is presented for testing.

This will include

- Insulation resistance tests.

- Earth fault loop impedance tests.

- Earth continuity tests.

- Pipeline pressure tests.

- Air Ductline Pressure Tests.

Pre-commissioning examination and testing to ensure that each system or item of equipment is complete, in a safe condition and all notices are displayed. "Completion" for operational purposes implies the bulk of snagging has been offered to the CA and that remedial work has been completed. All fans, pumps etc. tested for operation, polarity, phase sequence and impedance etc.

Finalise commissioning programme, taking into account site progress and availability of related services, with CA and Contractor and agree access required for controls etc.

#### **2700 OPERATIONAL DEMONSTRATION:**

Provide a written statement to the CA confirming that each installation has been correctly tested and commissioned and that the performance requirements can be achieved.

Demonstrate to the CA that all system components are operating correctly, and the completely integrated installation will function in accordance with the specified performance requirements.

- Run each plant for a minimum period of 7 days.

- provide a log book and record all hours run.

- to allow for the full testing of the air conditioning system(s).

#### **2800 OUTSTANDING ACCEPTANCE TESTS:**

Any items which have failed their acceptance tests or where such tests are delayed by the client are to be listed and dates agreed, during the defects liability period when reasonable demands for consumer requirements are available.

**2900 SYSTEMS USED BEFORE PRACTICAL COMPLETION:**

Systems may not, without the prior written approval of the CA be used before Practical Completion.

Systems to be used before practical completion for the benefit of the Contractor and/or Subcontractor must have all defective consumable elements (including lamps and tubes) replaced by new not more than seven days prior to Practical Completion.

No system shall be put into use prior to handover to the employer, except for testing and commissioning, unless in accordance with the following procedure:

Following the receipt of written instructions, the Subcontractor shall operate designated parts of the Subcontract Works, provided that such operation is practicable and does not prejudice the Subcontractor's responsibilities and obligations under the Subcontract.

**3000 OPERATION OF SYSTEMS BEFORE THE PRODUCTION OF RECORD DRAWINGS AND/OR OPERATING AND MAINTENANCE MANUALS:**

Provide attendance, at no expense to the Employer, to put into service, operate 24 hours a day and maintain the systems to the Employer's requirements, including the provision of suitable competent labour, in the event that the Record Drawings and/or Maintenance Manuals are not available when the Works would, in the opinion of the CA, otherwise qualify for Practical Completion.

In the event of the Subcontractor failing to provide this service satisfactorily the Employer shall be entitled to make his own arrangements and recover the full cost through the Contract.

**3100 INSPECTION BY EMPLOYER'S INSURANCE COMPANY:**

Where indicated in the Work Sections items are to be inspected by a "competent person" acting for the Employer's Insurance Company appointed under the provisions of the Factories Act or other relevant legislation. The installations concerned shall satisfy the Insurance Company's requirements in all respects.

Agree a programme for inspection and certification of specified equipment.

Inform the CA when equipment is to be ready for examination.

The Employer will place an order with the Insurance Company. Details and nature of the order will be provided to all interested parties..

Provide all detailed drawings etc. of the equipment to enable the Insurance Company to approve design before manufacture.

Arrange for the attendance of the Insurance Company's Engineer/Surveyor at each stage of manufacture and installation and provide all necessary access and facilities for inspecting and testing as may be required.

No plant which is subject to "inspection" will be accepted on behalf of the employer until a satisfactory certificate has been received by the Employer from the Insurance Company.

All Insurance Company charges for examination and approval of drawing, inspection of works during construction and inspection and certification of the completed work will be paid by

The Subcontractor.

## **A34 SECURITY/SAFETY/PROTECTION**

### **1150 CDM REGULATIONS:**

Comply with the requirements of the CDM Regulations by  
adhering to the rules of the Health and Safety Plan.  
reporting accidents, injuries or dangerous occurrences to the main contractor.  
providing the main contractor with appropriate input to the health and safety plan, including  
risk assessments, and to the health and safety file.  
providing the main contractor with information on the subcontract works which might  
affect the health or safety of any person.

### **1200 DELIVERY:**

Provide adequate and safe protection for all materials and products during transport to site.  
Deliver all tubes, conduit, trunking and associated equipment with open ends effectively  
plugged, capped or sealed.  
Deliver all ductwork, tubes, conduit, trunking and associated equipment with open ends  
effectively plugged, capped or sealed.

### **1300 HANDLING:**

Offload and transport about the Works all materials and products as recommended by  
manufacturers.

### **1400 STORAGE:**

Store all materials and products as recommended by manufacturers.

### **1510 PROTECTION OF SUBCONTRACT WORKS:**

Provide adequate and safe protection for all materials and products after installation.  
Ensure all items are protected against ingress of water and dust, formation of condensation,  
extremes and rapid changes of temperature, building works and operations of others.  
Protect during erection all easily damaged materials with hardboard covers or heavy duty  
polythene sheet. Such items include but are not limited to  
control panels,  
switchboards,  
distribution boards,  
heater batteries,  
finned pipework,  
gauge glasses,  
Protect all finished items from damage and paint splashes. Install items such as grilles,  
diffusers, lighting fittings, switches accessories etc. as near to completion as practicable.  
Cover all plant items with polythene sheeting except when being worked upon.  
Cap all open ends of pipes, ducts, conduit and trunking etc except when being worked upon.  
Leave plant and equipment in a ready to paint condition where specified as part of the Works  
or to be carried out by others.  
Paint parts liable to corrosion immediately after removal of any temporary protection.

Replace material, plant or equipment where deterioration or damage has occurred prior to handover.

**1600 IDENTIFICATION:**

Where appropriate, ensure that materials, plant and equipment bear the brand name, serial/batch number and any other data required to identify their nature in relation to the Works.

**1700 ROTATING PLANT:**

Immediately prior to Practical Completion adjust, ease and lubricate moving parts as necessary to ensure easy and efficient operation.

Ensure that, whenever necessary, temporary supplies are provided to enable motive plant items delivered and/or installed to be run at regular intervals to avoid damage or deterioration.

## **A37 OPERATION/MAINTENANCE OF THE FINISHED BUILDING**

### **1100 RECOMMENDED SPARE PARTS:**

At least 8 weeks before Practical Completion submit to the CA a schedule of spare parts as called for in individual Work Sections and any others that the Subcontractor recommends should be obtained and kept in stock by the Employer for maintenance of the services installations included in the Subcontract.

State against each item the manufacturer's current price, including packaging and delivery to site.

Identify those items which are additional to those specified for inclusion in individual Work Sections.

### **1400 SUPPLY OF TOOLS:**

Provide all tools detailed within individual Work Sections.

Within 2 weeks of request submit to the CA a quotation, priced in detail, for the initial supply to the Employer of the additional tools identified and including for the following.

Checking that each item is suitable for the intended application.

Checking receipt, marking and identifying.

Referencing, where appropriate, to the plant and equipment list in the Operation and Maintenance Manual.

Protecting, greasing, etc. and packing to prevent deterioration.

Providing a suitable means of storing and securing same.

### **1500 TRAINING OF EMPLOYER'S STAFF:**

Before Practical Completion explain and demonstrate to the Employer's maintenance staff the purpose, function and operation of the installations including all items and procedures listed in the Operation and Maintenance Manual.

Provide training for the operation of the controls, monitoring or BMS installations as follows.

Carry out initial training at the controls suppliers works.

Include "hands on" experience of equipment and software similar to the installation.

Include instruction on the procedures for testing and routine inspection of sensors and actuators to enable the operator to assess the nature of faults and extent of remedial action required.

Provide all appropriate reference and training manuals.

Complete initial instruction prior to commissioning the installed system.

Provide site instruction on the installed system.

Include for training operating staff (no) 3

Include for not less than 5 operating days per staff member for this purpose.

**1700 OBLIGATIONS DURING DEFECTS LIABILITY PERIOD:**

Prepare and submit records of failures or malfunctions of any part of the Subcontract Works during the Defects Liability Period, together with details of remedial action taken, subsequent re- testing and the results.

Notify the Main Contractor of damage, failures or malfunctions to the Subcontract Works demonstrably caused by incorrect operation of the installations, vandalism or other actions by a third party.

Inform the CA, via the Main Contractor, in writing when all defects are finally rectified so that an inspection may be carried out prior to the issue of a Final Certificate.

Section iii  
Standard Technical Specification  
For  
Electrical Engineering Services



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**STANDARD TECHNICAL SPECIFICATION  
FOR  
ELECTRICAL ENGINEERING SERVICES**

**Document Ref: STSES03**

**Date: April 2015 Rev B**



**SECTION 3**

**STANDARD TECHNICAL SPECIFICATION**

**FOR**

**ELECTRICAL ENGINEERING SERVICES**



## ELECTRICAL SERVICES SPECIFICATION

### ELECTRICAL SERVICES

- Y60      Conduit and Cable Trunking**
- Y61      HV/LV Cables and Wiring**
- Y63      Support Components-Cables**
- Y71      LV Switchgear and Distribution Boards**
- Y72      Contactors and Starters**
- Y73      Luminaries and Lamps**
- Y74      Accessories for Electrical Services**
- Y80      Earthing and Bonding Components**
- Y81      Testing & Commissioning of Electrical Services**
- Y82      Identification – Electrical**
- Y90      Fixing to Building Fabric**
- Y91      Off Site Painting & Anti-Corrosion Treatment**
- Y92      Motor Drives - Electric**



## **Y60 CONDUIT AND CABLE TRUNKING**

### **1000 GENERAL**

#### **1010 STANDARDS:**

Provide conduit and cable trunking in accordance with the relevant British Standards and in particular the requirements of BS 7671 Requirements for Electrical Installations (The IEE Wiring Regulations).

### **2000 PRODUCTS/MATERIALS**

#### **2010A CONDUIT - METAL RIGID, CLASS 2 BLACK ENAMEL:**

##### Material

Seam welded steel screwed conduit and couplings to BS 4568, Part 1, heavy gauge.

##### Protection

Class 2 - Medium protection both inside and outside. eg. Stoved enamel; air drying paint.

##### Connections

Use couplers to match conduit grade and finish.

Use solid couplers to join lengths of conduit unless inspection couplers are shown on the drawings or schedules.

#### **2010B CONDUIT - METAL RIGID, CLASS 4 GALVANIZED:**

##### Material

Solid drawn steel screwed conduit and couplings to BS 4568, Part 1, heavy gauge.

##### Protection

Class 4 - Heavy protection both inside and outside. eg. hot-dip zinc coating, sherardizing.

##### Connections

Use couplers to match conduit grade and finish.

Use solid couplers to join lengths of conduit unless inspection couplers are shown on the drawings or schedules.

#### **2020A CONDUIT - STEEL FLEXIBLE, LSF SHEATHED:**

Material - Flexible conduit to BS 731 Part 1.

Type of packing - Type A; unpacked.

Type of sheath - Low smoke and fume material.

Fittings material - Brass adaptors to BS 731 Part 1.

##### Connections

Use brass male adaptors to connect flexible conduit to motors and any other equipment having a threaded entry.

Use female adaptors and externally screwed brass bushes to connect flexible conduit to trunking and equipment not having a threaded entry.

#### **2030A CONDUIT - NON-METALLIC RIGID:**

Material - Insulating conduit to BS 4607 Part 1.

##### Connections

Do not use slip joints. Use expansion couplings as required. Use solvent solution.



**2040A CONDUIT - NON-METALLIC FLEXIBLE AND PLIABLE:**

Material.

Insulating conduit to BS 4607 Part 1

Method of connection - Threadable conduit.

Connections

Use plastic adaptors and bushes.

Use male adaptors to connect flexible conduit to motors and any other equipment having a threaded entry.

Use female adaptors and externally screwed bushes to connect flexible conduit to trunking and equipment not having a threaded entry.

**2050A CONDUIT FITTINGS AND ACCESSORIES - METALLIC TO BS 4568:**

Conduit fittings and adaptable boxes

Material - Malleable iron conduit fittings, steel adaptable boxes.

Do not use factory made bends, inspection bends or inspection couplers unless shown on drawings or schedules.

Ensure fittings are same class and finish as associated conduit system.

Supply covers for circular or adaptable boxes in the same material and finish as boxes.

Use steel dome or cheese headed screws to secure covers for Class 2 finish.

Use brass dome or cheese headed screws to secure covers for Class 4 finish.

Limit number of entry holes within loop-in boxes to four.

Adaptable box, minimum size - 100mm x 100mm x 50mm.

Connections

Use couplers and externally screwed brass bushes to connect conduit to loop-in circular conduit boxes, switchgear, distribution boards, and adaptable boxes. Use solid couplers.

Conduit fixing saddles - spacer bar.

Plugs - Hexagonal malleable iron or slotted brass.

Locknuts - Hexagonal steel.

**2060A CONDUIT FITTINGS AND ACCESSORIES - INSULATING TO BS 4607:**

Conduit fittings and adaptable boxes

Do not use factory made bends, inspection bends or inspection couplers.

Use boxes and connections to suit size of conduit and method of jointing.

Use heavy gauge, high impact rigid PVC conduit fittings.

Provide all boxes for supporting luminaries or other heavy devices with metal brackets or insert clips to provide a support independent of the box.

Provide boxes for flexible conduit, accessories and luminaire connection with a brass earthing terminal and/or steel circular earthing ring.

Conduit fixing saddles - Spacer bar or hospital.

Plugs - Spout entry plug.

**2080 CABLE TRUNKING AND FITTINGS:**

Comply with BS 4678. Use trunking of each type from one manufacturer.

**2090A METAL SURFACE TRUNKING - CLASS 2 FINISH:**

Material

Steel trunking to BS 4678 Part 1. Supply partitions and covers same material as trunking.

Gauge of metal - Table 1 BS 4678.

Trunking type, as scheduled or indicated on drawings.

Fixed - Surface or flush as indicated.

#### Style

Use trunking manufactured with inward return edge flanges and fitted with flange couplers which ensure that when the cover is removed a minimum of 80% of the nominal trunking or compartment width is available for access.

#### Protection to BS 4678 Part 1

Class 2 - Electroplated zinc having a minimum thickness of zinc coating of 0.0012mm inside and outside with additional coating of stoved or air drying paint, applied at least to the external surface.

Finish - Manufacturer's standard, all surfaces.

#### Colour

Manufacturer's standard or to BS 4800 Shade as approved.

#### Fixings

Use purpose made brackets to fix to structural steel or suspension rods.

Provide external fixing lugs where specified protection for the installation is IP44 or greater.

#### Fittings

Use bends, tees and angles of similar gauge, type and finish as trunking body and supplied by same manufacturer.

#### Partitions and Covers

Ensure partitions are electrically continuous with the body of the trunking or provide a connector for a circuit protective conductor.

Ensure gap between partitions and lids maintains segregation of circuits.

Material - Same material as trunking.

#### Joints

Use purpose made jointing pieces fixed with screws into captive nuts. Ensure screws do not protrude through the nuts.

Ensure rigidity of trunking is maintained across joint.

Ensure external dimensions of trunking are maintained and not reduced by more than 4% across joints between trunking lengths and/or fittings.

Use purpose made fittings of the same manufacture where trunking connects to switchgear and distribution boards.

Provide flanges for connection of flush floor trunking to vertical trunking to maintain the cross sectional area of compartments with 50 mm minimum radius.

Maintain electrical continuity at each joint by a copper link, (tinned copper for galvanized trunking), fixed on outside of trunking, secured by screws, nuts and shakeproof washers.

Screws must not project through the nut. Make provision for continuity to be achieved without need to remove paint from ferrous metal where trunking has a painted finish.

#### Screws, Nuts, Washers

Do not use self tapping screws. Use cheese or round head screws except where provision is made for the use of counter-sunk heads.

#### Material

Use steel zinc coated (coating to BS 4174).

#### Cable supports

Provide horizontal trunking with removable cable retainers or bridges to retain cables in situ.

Provide vertical trunking with pin racks to support cables at 3000 mm maximum spacing.

Use insulated pins or insulation sleeved pins on pin racks.

#### Lighting Trunking Cover

Provide cover strip to prevent ingress of foreign materials, locate cabling in place and act as closure strips between luminaries. Use trunking cover strip clipped into place in trunking body.



Cover strip material

To match lighting trunking body or high quality colour fast extruded plastic.

**2130A PVC SURFACE TRUNKING - GENERAL PURPOSE:**

Trunking to BS 4678 Part 4

Mechanical properties, trunking for medium mechanical stress.

Temperature tolerances - BS 4678 Part 4, Table 1.

Electrical characteristics

Without electrical insulating characteristics.

Resistance against ingress of solid objects

Protected against solid objects greater than 1.0mm (IP4X).

Resistance to ingress of water

Protected against dripping water (IPX2).

Resistance against corrosive or polluting substances

Medium protection.

Fittings

Use fittings from same manufacturer as trunking. Use 'snap-on' covers. Use trunking fittings and accessories suitable for jointing by solvent welding.

Use proprietary cable retaining clips at 500 mm maximum intervals on trunking that exceeds 1.8 m in length. Where junctions occur ensure first clip is not more than 300 mm from junctions.

**2150A SEPARATE OR MULTI-COMPARTMENT TRUNKING:**

Use separate trunking or multi-compartment trunking for segregation of services. Ensure steel partitions have a provision for connecting a circuit protective conductor.

Provide separation of wiring for circuits as required by BS 7671 and as indicated on the schedules or drawings.

**2170 SUPPORTS AND FIXINGS:**

Provide proprietary suspension systems comprising channel sections with return lips and compatible fixing accessories made of material to BS 2994 or BS 4848 and/or slotted angles to BS 4345.

Ensure support components for Class 4 conduit have the same finishing method as the conduit carried out after manufacture. Ensure components in direct contact with conduit match profile of conduit.

Ensure all steel components such as studding, bolts and steel screws, bolts, nuts and washers are either cadmium plated and passivated or zinc electroplated to BS 3382 after manufacture. Do not use metal fixing components likely to deteriorate and/or cause damage through electrolytic action.

**3010A GENERAL:**

Ensure entire system is electrically and/or mechanically continuous, to BS 7671.

Fire barriers

Comply with the requirements of BS 7671 wherever the conduit or trunking passes through the perimeter of a fire compartment (wall, floor or ceiling).

Appearance

Arrange conduit, trunking and ducting to present neat appearance, parallel with other service runs and lines of building construction, except where in screed or in-situ concrete. Ensure plumb vertical runs.

#### Cable installation

Install cable in conduit, trunking or equipment enclosures only when completely erected throughout its length.

Do not use framework of partitions or similar unless indicated.

#### Building expansion and settlement

Make provision in conduit and trunking at expansion and settlement joints to allow for movement of building structure. Provide circular through or adaptable boxes no more than 300 mm either side of expansion or settlement joints for conduit crossing.

Join boxes with flexible steel conduit type C or conduits arranged to form a telescopic joint and cover overall with PVC sleeve to provide minimum degree of protection of IP44 or purpose made telescopic joint protected by a PVC sleeve to at least IP44.

#### Quality

Cut conduit clean and square with axis. Remove any burrs prior to erection.

Site form 90o in conduit wherever practical or use circular or adaptable boxes.

Construct bends and sets cold with a bending machine. Do not apply heat when forming sets or bends.

Use bending tools complying with British Standards appropriate to conduit material.

Ensure no indentation or reduction in cross sectional area occurs during installation.

Use correct tools to assemble conduit. Ensure no tool marks or damage to components occurs.

### **3020 LAYOUT:**

Ensure the maximum circuit lengths and groupings of cables indicated are not exceeded.

#### Conduit sizing

Where dimensions are not indicated select trunking and conduit sizes in accordance with Appendix A of Guidance Note I Selection and Erection published by the IEE.

### **3030 SPACING:**

Install conduit, trunking and equipment clear of other services. Measure distance from external surface of any thermal insulation. Notify instances where minimum clearance cannot be achieved and bond items concerned.

Minimum general spacings between conduits, trunking and equipment and

:insulated steam services - 300 mm.

:other services excluding steam - 150 mm.

:above central heating radiators - 1000 mm.

: ensure separation is in accordance with Appendix K of Guidance Note I Selection and Erection published by the IEE.

### **3050A PROTECTION AND REPAIR OF STEEL COMPONENTS:**

Paint joints of conduit and minor damages to finish of conduit and trunking immediately after erection or after damage occurs.

Use paint compatible with finish as follows

Galvanized finish, use two coats zinc rich paint.

Black enamelled finish, use two coats of good quality, air drying, black enamel paint.

Remove grease, oil, dirt and rust before applying protective paint.

Notify serious damage and repair or replace as instructed.

### **3060 EQUIPMENT CONNECTIONS:**

Where surface mounted equipment is installed in conjunction with concealed conduit work, terminate concealed conduit at flush mounted conduit or adaptable box. Drill back of equipment, bush for back entry and mount equipment to conceal back box.



Connect to fixed equipment via conduit box located adjacent to termination point, using either solid or flexible conduit as indicated for final connection to equipment terminations.  
Use conduit box as cable change point to facilitate changed wiring locally to adjacent equipment.  
Connect trunking to equipment by specially fabricated connectors or by couplers and externally screwed brass bushes.

**3070 CLEANING BEFORE WIRING:**

Clean inside of conduits and trunking with swabs immediately before wiring.  
Inspect all components and remove any foreign matter, fit temporary plugs to open ends of conduit and trunking to prevent ingress of water and solid material.

**3080A WIRING:**

Comply with BS 7671 when wiring installations. Segregate circuits as indicated.  
Ensure draw wires are left within empty conduits for use of specialist installers. Use draw wires comprising nylon tapes with fitted eyelets.  
For concealed conduit ensure system is installed to enable re-wiring to be carried out from boxes for fittings or accessories only. Draw-in boxes will only be permitted with prior permission in writing.  
Do not use tallow or any other substances to facilitate drawing-in of cables.

**3090 BUILDERSWORK:**

Ensure conduit is not concealed until work has been inspected and approved.  
Obtain permission before horizontally chasing walls.  
Ensure that conduit and fittings buried in concrete or behind plaster are protected against corrosion or electrolytic action prior to rendering.  
Ensure conduit concealed in wall chases is covered by plaster and/or rendering to minimum depth of 12 mm.

**4010 DRAW-IN BOXES:**

Provide draw-in boxes in conduit at maximum intervals of 10 metres or after bends and/or sets totalling 180 degrees.

**4020 INSTALLATION OF CAST IN OR BURIED CONDUIT:**

Ensure cast-in conduits are firmly secured to reinforcing steelwork and that accessory and/or conduit boxes are secured so they do not move during subsequent building operations.  
Ensure there is no blockage immediately shuttering is removed.  
Check there is no mechanical damage to conduit in floor screed prior to screeding. Fix securely before screed is poured. Provide temporary protection to conduits until screeds are laid.  
Ensure minimum amount of cross-overs occur dependent upon screed depth. Do not install draw boxes in floors.  
Do not install conduits  
: in screeds in areas indicated.  
: within site blinding.  
: in main structural slabs unless prior permission in writing is obtained.

**4030 CONDUIT BOXES:**

Ensure that wherever conduit boxes are cast in the face of the box is flush with the face of the concrete or plaster. Fit circular conduit boxes with extension rings to ensure a flush face with plaster or concrete or where terminal blocks are to be accommodated.

Ensure fixing holes are countersunk where material thickness allows or use round head screws to prevent damage to cables and remove burrs before cables are drawn in.

Use a minimum of two screw fixing for standard circular conduit boxes and four screws for large conduit boxes and adaptable boxes up to 150 mm x 100 mm.

Use back outlet boxes where surface conduits pass through walls, to outside accessories or lighting points.

Secure switch boxes and socket boxes using countersunk steel screws where provision is made for them or if not use round head screws. Use plug inserts and finally grout in position prior to plastering or screeding.

#### **4040 FIXING CONDUIT:**

Support conduit in accordance with Appendix I of Guidance Note I Selection and Erection published by the IEE.

Ensure conduit is not under mechanical stress. Fix conduit boxes independently of conduit. Make allowance for any additional mechanical loading supported by conduit boxes.

Where protection is specified as IP44 or greater ensure fixings of conduit boxes are suitable to maintain degree of protection.

Use following methods of fixing conduit:-

LOCATION	TYPE OF FIXING
Floor screeds	Saddles or crampets
Buried in plaster or render	Saddles or crampets
Above false ceilings	Saddles
Surface	Saddles

#### **4050 FLEXIBLE AND PLIABLE CONDUIT:**

Use flexible conduit for final connections to motors, other equipment subject to vibration or adjustment and to thermostats, motorised valves and similar items mounted in pipelines or ducts.

Use sufficient length between equipment and circular through box at end of conduit run (minimum 450 mm) to allow necessary full range of withdrawal, adjustment or movement.

Use solid type adapters to terminate flexible conduit.

Use PVC covered flexible conduit where installed externally, exposed to weather or in any position where ingress of moisture or condensation may occur.

#### **4060 SCREWED STEEL CONDUIT:**

Use materials clean and free from defects, rust, scale and oil. Obtain prior permission in writing for use of materials subject to remedial work before erection.

Repair any damage caused by threading, bending or erection by painting with zinc rich paint before any rust occurs.

Ensure length of thread on conduit matches that in conduit couplers, fittings or equipment with no thread exposed after erection except at running couplers.

Ensure conduits butt inside couplers.

Use lubricant when cutting threads.

Use minimum number of running couplings

For running couplings in Class 2 conduit, use coupler and locknut. Paint exposed thread with zinc rich paint.

For running couplings in Class 4 conduit, use three piece conduit unions.

**4070A NON-METALLIC CONDUIT:**

Comply with manufacturer's instructions for bending, setting and jointing of conduit. Use plastic conduit only where indicated.

Do not install conduit when ambient working temperature is or will be below -5oC or above 60oC.

Use solvents recommended by manufacturer of conduit when using solvent welded joints and ensure spigots enter full depth of sockets. Hold joints rigid and in position until weld sets.

Remove excess solvent before surface damage occurs.

Use slip joints as necessary, but not exceeding 6 metres on straight lengths to allow for expansion and contraction over temperature variation as indicated.

Use semi-mastic adhesive where expansion joints are formed.

Where fittings do not have shaped or smooth conduit entries connect with male bushes and external couplings.

Ensure special care is taken to prevent mechanical damage or warping to conduit where mechanical loads are imposed on conduit system, eg. lighting fittings.

**4080 UNDERGROUND INSTALLATION:**

Where buried below ground, use Class 4 conduit. Do not use any buried conduit boxes unless prior permission in writing has been obtained. Wrap conduit with PVC self-adhesive tape, half lapped. Extend taping 150 mm beyond point where conduit leaves ground.

Install circular through conduit boxes at the end of the tape. Fill conduit boxes after cable installation with inert, permanently plastic compound with high insulation value, and wrap in PVC self adhesive tape.

**5010 MANUFACTURE OF TRUNKING:**

Take measurements on site before producing drawings for manufacture of trunking.

**5020 ACCESS:**

Arrange trunking to allow access to wiring. Locate covers on top or sides of trunking if practicable. Arrange access so covers are on a continuous face and cables can be laid in throughout the length of the trunking. Notify where either condition cannot be achieved.

**5030A FIXING TRUNKING:**

Ensure trunking is independently fixed and supported from building fabric. Obtain approval for proposed fixings/supports.

Support trunking in accordance with the manufacturers requirements and/or Guidance Note 1 Selection and Erection published by the IEE.

Use two fixings minimum per standard length.

**5040A STEEL TRUNKING:**

Install steel trunking in accordance with the manufacturers requirements and those of BS 7671.

Use trunking to avoid multiple parallel conduit runs, subject to approval.

Cut trunking clean and square with axis, prepare ends and remove burrs and sharp edges. Ensure inside of trunking is free from anything liable to damage cables either during installation or after covers are fitted.

When trunking is held in a vice, ensure surfaces remain undamaged and components are not warped. Avoid tool marking or damage to trunking system components.

Do not site fabricate trunking tees, bends, flanges and other accessories. Use only factory made accessories.



Form circular holes over 6 mm diameter in trunking body using correctly sized punch sets. Use twist drill for holes up to 6 mm maximum diameter.

Use only factory formed openings for accessories.

Line unprotected apertures in trunking with PVC or nylon edging strip.

Fit ends of runs with removable blanking plates.

Ensure connections are not made to covers unless indicated or approval obtained.

Provide fixed section of cover projecting 25 mm either side of fabric where trunking passes through wall, floors or ceiling.

Fit cable retaining straps at 500 mm intervals except where cover is on top.

**5060 TRUNKING OF INSULATING MATERIAL:**

Comply with manufacturer's instructions. Do not install trunking where ambient temperature is below minus 5oC or working temperature is above 60oC.

Use solvents recommended by trunking manufacturer when making solvent welded joints.

Remove excess solvent before surface damage occurs. Hold joints rigid and in position until welds set.

Use manufacturer's standard radiused bends, connector tees, off-sets, end plates and component parts of trunking system assembly.

Ensure no type of trunking other than that specified is installed without approval.

Trunking may be substituted for conduit at certain positions subject to approval.



## **Y61 HV/LV CABLES AND WIRING**

### **1000 GENERAL**

#### **1010 CABLE MANUFACTURE:**

Use new cables, delivered to site with seals intact, manufactured not more than one year prior to delivery, labelled with manufacturer's name, size, description, BS number, classification, length, grade and date of manufacture.

#### **1020 CABLE CERTIFICATION MARKING:**

Mark all types of cable with CENELEC cable certification marking or if included in British Approvals Service for Cables (BASEC) in accordance with BASEC regulations.

#### **1030 MEDIUM VOLTAGE CABLE RECORDS:**

Keep records of MV cable drum numbers and supporting information, mark information on record drawings, indicating precise location of each length of cable, and submit copies of manufacturer's cable test certificate.

### **2000 PRODUCTS/MATERIALS**

#### **2010A STANDARD ORDINARY FLEXIBLE WIRES - SINGLE CORE:**

Standard - BS 6004, Table 1(c); BS 6500, Table 19.

#### **2020B STANDARD POWER SUPPLY CABLES, THERMOSETTING INSULATION, SHEATHED AND ARMoured:**

Standard - BS 5467, Tables 10, 12, 14, 16 and 18.  
Mechanical protection - Armour.

#### **2020D STANDARD POWER SUPPLY CABLES, PVC INSULATION, SHEATHED AND ARMoured:**

Standard - BS 7211, Tables 3(a) and 4(a).  
Mechanical protection - Conduit and trunking.

#### **2020K STANDARD POWER SUPPLY CABLES, LSF INSULATION, SHEATHED:**

Standard - BS 7211, Tables 5 and 7.  
Mechanical protection - Unarmoured.

#### **2040A LIGHT DUTY MINERAL INSULATED CABLES, THERMOPLASTIC OUTER COVERING:**

Standard - 500V light duty to BS 6207 Part 1, table 1.  
Outer covering  
Thermoplastic to BS 6207 clause 7.2.; sheath colour, as shown on drawings/schedules.

#### **2040C HEAVY DUTY MINERAL INSULATED CABLES, THERMOPLASTIC OUTER COVERING:**

Standard - 750V heavy duty to BS 6207 Part 1, table 2.  
Outer covering  
Thermoplastic to BS 6207 clause 7.2.; sheath colour, as shown on drawings/schedules.



- 2050A PAIRED UTP UNARMoured CONTROL CABLES:**  
Standard - BS 5308, Part 1, Tables 2, 4 and 8.  
Mechanical protection - Unarmoured, Type 1.
- 2050B PAIRED UTP ARMoured CONTROL CABLES:**  
Standard - BS 5308, Part 1, Tables 2, 4 and 8.  
Mechanical protection - Armour, Type 2.
- 2050C PAIRED STP UNARMoured CONTROL CABLES:**  
Standard - BS 5308, Part 1, Tables 3, 5 and 9.  
Mechanical protection - Unarmoured, Type 1.
- 2050D PAIRED STP ARMoured CONTROL CABLES:**  
Standard - BS 5308, Part 1, Tables 3, 5 and 9.  
Mechanical protection - Armour, Type 2.
- 2050E MULTI-CORE UNARMoured AUXILIARY CABLES:**  
Standard  
BS 5308, Part 2, Tables 2, 3 and 6; BS 6346, Tables 25(a), 25(b), 26(a) and 26(b).  
Mechanical protection - Unarmoured, BS 5308 Type 1.
- 2050F MULTI-CORE ARMoured AUXILIARY CABLES:**  
Standard  
BS 5308, Part 2, Tables 2, 3 and 6; BS 5467, Table 23; BS 6346, Tables 25(a), 25(b), 26(a) and 26(b).  
Mechanical protection - Armour, BS 5308 Type 2.
- 2050G MULTI-CORE UNARMoured LSF, SHEATHED AUXILIARY CABLES:**  
Standard - BS 7211, Table 6  
Mechanical protection - Unarmoured.
- 2050H MULTI-CORE ARMoured LSF, SHEATHED AUXILIARY CABLES:**  
Standard - BS 6724, Table 24.  
Mechanical protection - Armour.
- 2070A STANDARD FILLED COMMUNICATIONS CABLES, FOR OUTDOOR AND UNDERGROUND:**  
Standard - BS 3573, Tables 7, 8, 9, 10 and 11.
- 2070B STANDARD COMMUNICATIONS CABLES, FOR INDOOR USE:**  
Standard  
BT CW 1308; BT CW 1370; BT CW 1700; and BT CW 1750.
- 2080A STANDARD COAXIAL CABLES, FOR BROADCAST RECEIVING:**  
Standard - BS 2316  
URM number as shown on drawings/schedules.
- 2090A OPTICAL FIBRE CABLES:**  
Standard - BS EN 187000 and BS EN 188000.



**3010C CABLE GLANDS - ARMoured CABLES, DRY INDOORS:**

Cable type

Wiring and power; and control and auxiliary.

Standard - BS 6121; Part 1, B; protection, W or Y.

Environment - Dry indoors.

**3020C CABLE SEALS AND GLANDS - HEAVY OR LIGHT DUTY MINERAL INSULATED CABLES - TEMPERATURES UP TO 105°C:**

Use seals and glands for mineral insulated cables in accordance with BS 6207 Part 2, recommended or supplied by cable manufacturer.

Gland Type

Cable grip type, externally threaded with lock washer and nut.

Gland Shroud

Thermoplastic or LSF material to match sheath. Shroud colour, as shown on drawings/schedules.

Seal type

Plain or earth tail and self-threading pot as shown on drawings/schedules.

Pot closure - Plastic stub cap.

Pot sealant - Compound, 105°C

Conductor insulation sleeving - Plain PVC.

Seal maximum temperature rating - 105°C.

**3020D CABLE SEALS AND GLANDS - LIGHT DUTY MINERAL INSULATED CABLES – TEMPERATURES UP TO 105°C:**

Use seals and glands for mineral insulated cables in accordance with BS 6207 Part 2, recommended or supplied by cable manufacturer.

Gland Type

Cable grip type, internally threaded, with bush.

Gland Shroud

Thermoplastic or LSF material to match sheath. Shroud colour, as shown on drawings/schedules.

Seal type

Plain or earth tail and self-threading pot as shown on drawings/schedules.

Pot closure - Plastic stub cap.

Pot sealant - Compound, 105°C

Conductor insulation sleeving - Plain PVC.

Seal maximum temperature rating - 105°C.

**3060A CABLE JOINTS AND TERMINATIONS:**

Use only cable joints as supplied or recommended by cable manufacturer.

Cable type - Power or control and auxiliary.

Joint arrangement - Straight through or tee.

Joint type - BS 6910, cold pour or heat shrink.

Accessories - Armour bonds, BS 7197; filling compounds.

Environment - Underground.

**3080A CONNECTORS FOR COAXIAL CABLES - BROADCAST RECEIVING:  
BS 3041 Part 2 or UHF to BS 3041 Part 12.**



- 3090A OPTICAL FIBRE TERMINATIONS:**  
Style, terminated fibre and termination type, as shown on drawings/schedules.  
Installation characteristics - factory fitted or site made as shown on drawings/schedules.
- 3100A INTERNAL OPTICAL FIBRE CABLE JOINTS:**  
Style - Internal.  
Joint type and installation characteristics as shown on drawings/schedules.
- 3110A CABLE DUCTS:**  
Standard  
BS 65, DN 90; BS 4660; or NJUG 6, provided by Electricity Supply Company.
- 3120A CABLE SLEEVES:**  
Supply and hand to others for installation non ferrous cable sleeves for incorporation into the structure where cables pass through fire compartment floors and walls.  
Packing material  
Weak mix mortar; intumescent, plaster or mastic; solid intumescent material; or intumescent granule filled bags.
- 3130A CABLE COVERS AND MARKERS:**  
Material - Recovered plastic, integral tape.  
Marking - Electricity or telephone as shown on drawings/schedules.  
Plastic marker tape  
Yellow, marked electricity or telephone, as shown on drawings/schedules.
- 4010 CABLE INSTALLATION - GENERAL:**  
Use and install cables only as directed in the appropriate standard or as directed by the manufacturer in writing. Lay cables in one length unless otherwise indicated. Obtain permission from supervising officer for all through joints, and where overall length requirement exceeds practical drum size. Install cables when ambient temperature is 5oC or greater, using cables stored at or above this temperature for not less than 24 hours.  
Use drum stands, drum axles, fair leads, rollers, cable stockings and other equipment as recommended by the cable manufacturer and as appropriate to the method of installation.
- 4020 CABLE INSTALLATION IN LOW TEMPERATURES:**  
Install cables at lower installation temperatures when authorised by manufacturer in a written statement.
- 4040 INSTALLATION OF UNARMoured CABLES:**  
Install and use unarmoured cable to BS 6004, BS 6007, BS 6141, BS 6500, BS 6726 and BS 7211 in accordance with BS 7540 or the manufacturer's written instructions.
- 4050A CABLE TRENCHES:**  
Ensure that trenches for cables and cable ducts are prepared, backfilled and reinstated.  
Supervise all work to cable trenches by others.  
Carry out walk over survey of trench route, dig trial hole in any area considered to be potentially difficult. Establish location of any other underground service adjacent to cable route.  
Re-plan cable routes after survey and trial holes. Submit report of survey and trial holes.  
Carry out any instructed work to adjacent services. Set out cable trenches, excavate trench carefully setting aside any materials required for backfilling or reinstatement.  
Minimum cover in cable trenches

HV cables 800mm; LV cables 500mm; communications cables 500mm; all cables 800mm under roadways.

#### Trench

Common trench for all underground services.

Grade trench bottom to a maximum slope of 1:12. Clear trench bottom of loose stones and place bedding to full width of trench.

#### Bedding

Riddled earth 6mm grid for cables; riddled earth 12mm grid for ducts; imported soft sand; or pea shingle, for ducts.

Bedding thickness - 75mm; or 100mm for ducts.

Install cables or ducts. Haunch cables or ducts in bedding material to a minimum depth of 75mm above highest cable or duct. Install cable or duct identification as indicated. Backfill trench using two layers 100mm thick hand rammed. Complete backfilling in layers as indicated. Reinstate trench as indicated.

Backfill material - as excavated from trench.

### 4060 CABLE INSTALLATION IN TRENCHES:

Lay cables on newly prepared bedding. Ensure multiple layers of cable are separated vertically by a 50mm layer of hard rammed bedding material.

When using a power winch ensure tension on the cable is taken by element of the cable designed for that purpose that is armour or conductor cores as appropriate and not plastic sheath, metal sheath or core insulation.

When hand pulling cable ensure no kinks are formed and that flaking, when used, is done in the correct direction.

Do not allow cable to twist during installation. Use swivels to connect pulling bond to cable stocking or equivalent fitting.

Check drum is suitable for jacking before commencing installation. If drum or reel is unsuitable for jacking, flake cable in correct direction in maximum size turns from drum or reel before commencing installation. Use skilled labour to supervise all unreeling, flaking or running of cable from a drum.

Lay cables in the formation shown, ensure spacing is not reduced below that indicated.

Bind trefoil groups at 1m intervals. Bind any associated earth or protective conductor to its cable or trefoil group at 1m intervals.

Ensure installation radii and permanent bending radii are not less than those recommended by the manufacturer.

Do not lay cables to BS 6004, BS 6007, BS 6141, BS 6500, BS 6726 or BS 7211 direct in the ground.

### 4070A CABLE DUCTS:

#### Duct work

Supervise the laying of ducts by others.

Lay ducts in the formation shown, on to newly prepared bedding. Joint ducts in accordance with the manufacturer's instructions.

Ensure that ducts slope no more than 1:60 vertically or 1:30 horizontally.

Ensure that pre-formed duct bends used at ends of duct routes meet the requirements of the cable manufacturer for bending radii.

Construct manholes, draw pits and jointing chambers, as indicated.

Prove alignment of completed duct run by drawing through a mandrel 7mm diameter less than nominal duct bore for minimum length 250mm. Clean completed duct run by drawing through a circular wire brush 12mm diameter more than nominal duct bore.

Install a draw wire of corrosion resistant material and minimum breaking strength 550N in each empty duct.



Plug and seal all ducts with proprietary duct plugs, on completion.

- 4080 CABLE INSTALLATION INTO DUCTS:**  
Install cables into newly proved and cleaned duct. Use lubricants, recommended by the cable manufacturer in writing, to assist drawing process.  
Flake cable if drums or reels are not suitable for jacking. At intermediate draw pits with exit duct more than 15 degrees off line of entry duct, flake cable before entering or provide comprehensive system of corner plates, roller and blocks. Use maximum practical size of turns when flaking and ensure direction is correct.  
Do not exceed manufacturer's installation tension on cable and ensure the pulling tension is taken on cable elements designed for that purpose, that is armour or conductor cores and not on other elements, such as plastic sheath or conductor insulation.  
Do not allow cables being pulled into ducts to twist. Use appropriate swivel between pulling bond and cable stocking or similar appliance.  
Bind trefoil groups of single core cables installed into a single duct at 1m intervals. Install earth or protective conductors into the same duct as the associated cable where practical, through manholes, draw pits and jointing chambers. Bind the two cables together. Pull all cables in one duct as a group. Ensure group does not twist or cross over. Report any damage to cable sheath during installation and carry out any instructed work to remedy the damage.
- Seal between cable and duct ends after cable installation. Ensure cable ends in jointing chambers are temporarily sealed where required.
- 4090A CABLE INSTALLATION IN CONDUIT AND TRUNKING:**  
Install cables so that they are orderly and capable of being withdrawn.  
Arrange single core wiring generally using the loop-in method.  
Trunking  
In vertical trunking provide pin racks at 3m intervals. Use ties at 2m intervals for all wires of the same circuit reference. Mark ties with circuit reference number at 10m intervals.  
Conduit  
Provide cable clamps in conduit boxes at 10m intervals in vertical conduit.  
Allow for full range of movement at building construction movement joints. Make all joints to wiring at terminal blocks in conduit boxes.
- 4100 CABLE INSTALLATION ON TRAY AND RACK:**  
Place cables side by side or as indicated. Fix using cleats or cable ties so that any cable may be individually removed.
- 4110A CABLE SURFACE INSTALLATION:**  
Dress cables flat, free from twists, kinks and strain, and align parallel to building elements. When glands and clamps are not required, take sheathing of cables into accessory boxes and equipment and protect against abrasion using grommets or similar sharp edge protection.  
Clearance as shown on drawings/schedules.
- 4120A CABLE EMBEDDED INSTALLATION:**  
Dress cables flat, free from twists, kinks and strain, and align parallel to building elements. When glands and clamps are not required, take sheathing of cables into accessory boxes and equipment and protect against abrasion using grommets or similar sharp edge protection.  
Ensure plaster or screed over cable is a minimum of 12mm. Protect embedded cables with metal capping or PVC oval conduit.

**4130A CABLE INSTALLATION - MINERAL INSULATED CABLES:**

Straighten and dress cables using methods and tools recommended by cable manufacturer.  
Use thermoplastic or LSF sheathed cables in location indicated, and where cables may come into direct contact with any material that may be corrosive to copper.  
Do not allow extra length on installed cables to allow for cutting back of moisture affected ends.  
Store mineral insulated cables in the form as supplied by manufacturer.

**4150A CABLE JOINTING AND TERMINATING GENERALLY:**

Ensure all joints and terminations are made by appropriately qualified cable jointers, using jointing materials, components and workmanship recommended by the cable manufacturer and the jointing accessory manufacturer. Install cable glands in accordance with BS 6121 Part 5.

Cold pour resin and heat shrink joints in accordance with BS 6910 Part 2.

Cut all cable ends immediately prior to jointing or terminating. Seal cables left unconnected for more than 24 hours to prevent the ingress of moisture.

Seal plastic sheathed cables using proprietary shrink on end caps. Seal lead sheathed cables by a plumbed dressed lead cap with an air space to allow conductor movement.

Strip cables to bring out the cores and expose conductors, for the minimum length required for connection, to leave no exposed length of conductor after termination. Ensure that strands are not damaged when stripping cable cores. Twist strands together. Do not reduce number of strands. Secure all strands at terminations.

Clean armour thoroughly prior to jointing or terminating.

At connections to equipment and switchgear without integral cable clamping terminals, use compression or solder type lugs for bolted terminal connections, of correct bore.

Form all compression connections to components using tools that can not be released unless the correct degree of compression has been achieved.

Install and inspect compression and mechanical connectors on conductors in accordance with BS 6360 to BS 7609.

Bolt core terminations with lugs to equipment using washers or proprietary shakeproof devices.

Do not bunch more than three cores at clamping terminals or bolted connections.

Mark cable conductor phasing, or other core identification, at each end of all cables, and at all joints, maintaining consistency of marking with any existing system.

Connect all cores, including multicore cable spare cores, at all joints and terminations. Bond any unused cores or multicore cables to earth at both ends, unless otherwise indicated.

**4180A TERMINATING - MINERAL INSULATED CABLES:**

Use terminations in accordance with BS 6207 Part 2 and components and materials recommended or supplied by cable manufacturer.

Use seals with maximum temperature rating indicated, stub caps to the largest size available, and drilled caps and headed sleeves for larger sizes.

Use glands of type indicated. At terminations to accessory boxes within a plaster or render finish, cable clamps fixed to accessory box and firmly gripping cable sheath may be used. Use earth tail seals with sheath grip type accessory boxes.

At equipment not provided with threaded entries secure glands using lock washers and locknuts or brass conduit bush. Use gland shrouds when plastic covered MI cables are used.

Using PVC, PIB or LSF material tape to BS 3924 to match sheath, tape overall gland any bare copper sheath and form seal to cable sheath under all shrouds.

Mark core sleeving with appropriate identification.

Install voltage surge suppressors in accordance with manufacturer's recommendations and surge suppressors as shown on drawings/schedules.

**4190A CABLE JOINTS - MINERAL INSULATED CABLES:**

Joint mineral insulated cables using methods and materials recommended by cable manufacturer. Terminate cables in externally threaded glands using seals with temperature rating indicated. Join conductors using, crimped connectors.  
Insulate connectors using PVC tape to BS 3924, ensuring good seal to conductor sleeving. Make off glands into either end of internally threaded brass sleeve of correct size. Protect brass sleeve using, heat shrink sleeve.

**4200A COMMUNICATIONS COAXIAL, OPTICAL FIBRE AND IT CABLE INSTALLATION, JOINTING AND TERMINATING:**

Use methods approved by cable and accessory manufacturers. Employ labour certified by acceptable body as qualified to install and make joints and terminations in the referenced cable. Obtain in writing approval of cable manufacturer for accessories not supplied by them.  
Identify cables using structured numbering scheme.  
Install unshielded twisted pair cables for Token Ring Data Transmission at 4Mbit/s in accordance with BS ISO/IEC TR 10738.  
Install optical fibre cables in accordance with BS 7718.

**4210 CABLE SLEEVES:**

Pack sleeves with fire resistant material after cable installation.



## **Y63 SUPPORT COMPONENTS-CABLES**

### **1000 GENERAL**

#### **1010 APPLICATION:**

Cables referred to in this section are only those types that can be installed without further mechanical protection.

### **2000 PRODUCTS/MATERIALS**

#### **2010A CABLE SUPPORTS AND FINISHES**

Cable supports

Support all cables throughout their length using conduit; or trunking and enclosures; or cable tray; or cable racking; or special support systems; or cleat or clip fixing direct to building fabric as indicated on the drawings/schedules.

On the drawings/schedules.

Ensure tray, racking and special support systems are continuous and firmly fixed to building fabric,

Allow space for additional cables as indicated on the drawings/schedules

Ensure cable support system allows for spacing in accordance with BS 7671 for the design current of the cable.

Fixings finishes

Ensure finish for all support components, fixings, hangers and accessories are as cable support system or manufacturer's standard.

#### **2010Z CABLE SUPPORTS:**

Support all cables throughout their length using:-  
cable tray.

Ensure tray, racking and special support systems are continuous and firmly fixed to building fabric. Allow space for:-

indicated cables + spare 2

Ensure cable support system allows for spacing in accordance with BS 7671 for the design current of the cable.

Fixings finishes

Ensure finish for all support components, fixings, hangers and accessories is galvanized or sherardized finish.

#### **2020A CABLE SUPPORT SYSTEM - PERFORATED TRAY:**

Type - Flanged or return flanged.

Perforations

Admiralty pattern for light or medium duty; GDCD pattern standard 23; or manufacturer's standard pattern.

Thickness - Manufacturer's standard thickness for type.

Fittings

Use factory made fittings throughout of same material, type, pattern, finish and thickness as cable tray.

Use reducers, inside angles and outside angles as manufacturer's standard.

Use flat bends, equal tees, unequal tees and crosses with corners gusseted.

Join lengths of tray and fittings using manufacturer's standard shouldered ends, fish plates, or couplers, with galvanized or zinc plated slotted domed head 'roofing' bolts, nuts, washers and



shakeproof washers.

Material

Hot rolled steel galvanized after manufacture to BS 729; or bending and profiling quality hot dipped galvanized steel to BS EN 10142 or BS EN 10143 and BS EN 10147.

Finish - Self colour galvanized.

**2020B CABLE SUPPORT SYSTEM – CABLE RACK:**

Proprietary system of channel sections with return lip and compatible joining and fixing accessories

Fittings

Use factory made fittings throughout of same material finish and section as rack for risers, bends, reducers, tees, crosses and drop outs.

Material

Hot rolled steel galvanized after manufacture to BS 729; or bending and profiling quality hot dipped galvanized steel to BS EN 10142 or BS EN 10143 and BS EN 10147.

Finish – Self colour galvanized.

**2020C CABLE SUPPORT SYSTEM – CABLE CLEATS:**

One piece or single way pattern or claw pattern or two bolt pattern.

Material

Die cast Aluminium alloy; moulded black polyethylene; or nylon.

Finish – Self Finish.

**2020D CABLE SUPPORT SYSTEM - PROPRIETARY CABLE TIES:**

Two piece cable tray pattern, on cable tray only. Wrap round self locking non releasable pattern on everything except cable trays.

**2020E CABLE SUPPORT SYSTEM - CABLE CLIPS:**

Polypropylene surface type with pre-fixed hardened steel pin for general use except on mineral insulated cables.

For mineral insulated cables use bright copper one hole `P'clips for unsheathed mineral insulated cables, PVC covered for sheathed mineral insulated cables.

**2020F CABLE SUPPORT SYSTEM – TWO WAY SADDLES:**

Bright copper for unsheathed mineral insulated cables. PVC covered bright copper for sheathed mineral

Insulate cables

**3010 CABLE TRAY INSTALLATION:**

Support from building fabric with minimum clearance behind of 20mm. Install fixings at regular intervals to prevent visible sagging when loaded, with maximum spacing 1.2m and 230mm from fittings.

Keep cutting of cable tray to a minimum. Cut along a line of unperforated metal. Make good finish with zinc rich paint, primer and top coat, or two pack epoxy paste, as appropriate to tray material and finish.

Fit holes cut in tray for passage of cables with grommets, bushes or other lining.

Install all bolts, fixings and hangers with threaded portion away from cables.



**3020A CABLE CLEATS, TIES, SADDLES AND CLIPS INSTALLATION:**

For cables on horizontal tray use ties for each circuit. Use tie manufacturer's special tensioning tool where available. Crop off tie ends.

For cables on vertical tray use cleats bolted to tray for paper, plastic or elastomeric insulated cables and saddles or clips for mineral insulated cables. Use cleats sized to grip cables firmly without undue pressure or strain on cable, but preventing slipping.

For cables on vertical or horizontal rack use proprietary fixings to rack for paper, plastic or elastomeric insulated cables and saddles or clips for mineral insulated cables.

On continuous flat surfaces of wood, plaster, brick etc.

Use polypropylene surface fixing clips with pre-fixed hardened steel pin for PVC insulated and sheathed cables and sheathed or bright mineral insulated cables. Use round or flat or flat twin pattern as appropriate, manufactured specifically for cable being fixed.

Use one hole 'P' clips or two way saddles of bright copper for unsheathed mineral insulated cable. Use PVC covered for sheathed mineral insulated cables.

Space cleats, ties, saddles and clips

As Appendix I of Guidance Notes 'Selection & Erection' published by the IEE.



## **Y71 LV SWITCHGEAR AND DISTRIBUTION BOARDS**

### **1000 GENERAL**

#### **1020A 3 PHASE ELECTRICITY SUPPLY:**

Ensure all electrical equipment supplied and installed is suitable for 3 phase power supply to BS 7697.

### **2000 PRODUCTS/MATERIALS**

#### **2010A LV SWITCHGEAR AND CONTROLGEAR ASSEMBLY:**

Standard - BS EN 60439-1.

##### External design

Cubicle type assembly or multi-box type assembly as shown on drawings/schedules.

##### Usage

Switchboard or control panel as shown on drawings/schedules.

##### Conditions of installation - Indoors.

##### Electrical characteristics

Rated operational voltage 400V +10% -6%

Rated current and rated prospective short-circuit withstand current for indicated seconds as shown on drawing/ schedules.

##### Service conditions

Ambient air temperature and altitude as BS EN 60439.

Provide facilities to allow future extension of switchboard as shown on drawing/schedules.

#### **2020A ASSEMBLY CONSTRUCTION:**

Material of enclosure - Manufacturer's standard.

##### Terminals for external conductors, main power circuits

Accommodate cross-sectional area of copper cables in accordance with BS EN 60439-1.

##### Terminals for external conductor, control and auxiliary circuits

Terminal block. Mounting as manufacturer's standard.

Size of neutrals on three phase supplies - Full sized.

Degree of protection to BS EN 60529, IP31 for assembly.

##### Protection against direct and indirect contact

Manufacturer's standard.

##### Accessibility for inspection

Arrange for following operations to be performed when assembly is in service and under voltage

Visual inspection of switching devices and other apparatus; settings and indicators of relays and releases; conductor connections and markings.

Adjusting and re-setting of relays, releases and electronic devices.

Replacement of fuselinks and indicating lamps.

Fault location by voltage and current measuring.

##### Accessibility for maintenance

Provide space between functional unit or group and adjacent functional units or groups.

Provide retainable fastening means for parts likely to be removed for maintenance.

Removable parts and withdrawable parts as manufacturer's standard.

Internal separation - Form 4.



Input voltage variations for electronic equipment supply - BS EN 60439.

Supply frequency deviation - BS EN 60439.

Mounting

Floor standing or wall mounted as shown on drawings/schedules.

Access for cabling

Front, top, bottom or rear as shown on drawings/ schedules.

**2030A ENCLOSURE FINISH:**

Apply high standard finish to enclosure and supporting metalwork. Degrease metal and remove rust prior to applying finish.

Comply with paint manufacturer's recommendations regarding preparation, stoving times, temperatures, mixing of finishes, application and coat thickness.

Finish - Manufacturer's standard.

Colour - Manufacturer's standard colour.

**2040A TYPE TESTS:**

Provide certificates of verification.

**2090A AIR BREAK CIRCUIT BREAKERS:**

Provide circuit breakers in accordance with BS EN 60947. Ensure that uninterrupted current rating indicated applies when unit is enclosed and in operating environment at rated operational voltage.

Standard - BS EN 60947-2

Details of equipment - Circuit breaker.

Characteristics of circuit breakers

Number of poles, as shown on drawings/schedules.

a.c. Interrupting medium - Air.

Circuit breaker and CBR operating condition.

Method of operation and control as shown on drawings/schedules.

Rated and limiting values for the main circuit.

Rated voltage (Volts) - operational, 400.

Rated operational

Current (Amps) as shown on drawings/schedules.

Rated frequency 50 Hertz.

Short-circuit characteristics

Rated service short-circuit breaking current (Amps) as shown on drawings/schedules.

Circuit breaker Utilisation category.

A or B as shown on drawings/schedules.

Control circuits as shown on drawings/schedules.

Auxiliary circuits as shown on drawings/schedules.

Relays and releases.

Type and characteristics as shown on drawings/ schedules.

Co-ordination with short-circuit protective devices as shown on drawings/schedule.

Enclosure degree of protection IP 31.

Circuit breakers and switches

Provide metal clad withdrawable isolating removable type circuit breakers with provision for safe maintenance; or

Provide manual closing air-break circuit breakers, (MCCB) as shown on drawings/schedules.

Closing mechanism



Independent manual spring operated.  
Provide automatic shutters to cover all live contacts when circuit breaker is isolated, withdrawn or removed from housing.  
Provide a padlock to lock circuit breaker in isolated/withdrawn position, and to lock automatic shutters covering live contacts when removed from housing.  
Provide moulded case circuit breakers with provision for safe maintenance.

#### **2150A INSTRUMENTS AND METERS:**

##### **Standards**

Comply with BS 89 (EN 60051) for voltmeters, ammeters, watt meters, frequency indicators and power factor indicators.

Comply with BS EN 60521 or BS EN 60687 for kWh meters, kVA and kW maximum demand meters and polyphase reactive kVA meters.

Protect wiring to voltmeters by separate fuses. Protect potential coils of watt meters, frequency indicators, power factor indicators and kWh meters, kVA and kW maximum demand meters and polyphase reactive kVA meters by separate fuses.

Supply instruments and meters suitable for flush mounting and type, size and accuracy as indicated.

Ensure that indicating scales for all instruments comply with BS 3693. Supply so that normal indication is 50% to 75% of full scale deflection.

Completely segregate all instruments in instrument compartments. Panel mount meters on front of instrument compartment.

Details as shown on drawings/schedules.

#### **2210A DISTRIBUTION BOARDS:**

Comply with BS EN 60439-1 or BS EN 60439-3 as appropriate. Make internal separation Form 1 unless otherwise indicated. Make fuseboards fully shrouded. Fit each distribution board with an isolating switch.

Install busbars in same position relative to their fuse carriers or miniature circuit-breakers (MCBs) for each pole. In TPN distribution boards supply neutral busbars with one outgoing terminal for each outgoing circuit.

Provide a multi-terminal earthing bar for circuit protective conductors for both insulated and metal-cased boards, with one terminal for each outgoing circuit. Connect directly to earthing terminal without dependence on exposed conductive parts of enclosure.

Identify each fuseway and MCB way by numbering. Identify each terminal on neutral busbar and earthing bar with its respective fuseway or MCB way.

Provide spare ways, as shown on drawings/schedules.

Where specific ratings are indicated incorporate fuses or MCBs, otherwise leave ways blank for future additions.

Enclosures finish

Finish - Manufacturer's standard.

Colour - Manufacturer's standard colour.

#### **2230A MINIATURE CIRCUIT-BREAKERS:**

Standard - BS EN 60898.

Supply miniature circuit-breakers with voltage and current ratings, type according to instantaneous tripping current, category of duty and frequency in accordance with BS EN 60898 as shown on drawings/ schedules.



**2245 COMBINED RESIDUAL CURRENT/OVER CURRENT OPERATED CIRCUIT BREAKERS:**

Supply combined residual current/over current operated circuit breakers (RCBOs) in accordance with BS EN 61009.

**2250 CABLE TERMINATIONS:**

Ensure that switchgear and distribution boards are provided with facilities to terminate size, number and type of cable indicated. Where necessary use fabricated steel extension boxes for glanding large and multiple cables.

Provide non-ferrous metal glanding plates for single core cable terminations.

**2270A AUTOMATICALLY CONTROLLED CAPACITOR BANKS:**

Standard - BS 1650.

Capacitor rating.

Output (VAR), as shown on drawings/schedules.

Voltage rating of capacitor

400V, 3 phase, 50 Hz.

Bank unit

Provide modular bank. Include in each module contactors, line fuses and control circuitry.

Free standing unit or within switchboard as shown on drawings/schedules.

Arrangement

Wall mounting, floor mounting or single cubicle as shown on drawings/schedules.

Switching - Block contactor switching.

Control

Provide automatic control via an automatic multi- stage kVAr sensitive, solid state relay with stage switches to operate the capacitor contactors.

Control relay

Incorporate relay into cubicle.

Fit relay with a loss of voltage no volt release re-setting feature to reset switching sequence to all contacts open position following failure of supply.

Provide visual indication by means of LED's for capacitor stages and capacitor/inductive load.

Provide Hand/Off/Auto selection switch.

Relay stages

As shown on drawings/schedules.

Isolator

Incorporate on load break isolator.

Capacitor unit

Provide assembly housed in sheet steel enclosure complete with main terminals, comprising individual low loss, power capacitor elements and fuses to BS 7631 or BS 7633.

Capacitor unit assembly

Incorporate thermal equalizers within assembly of elements.

Fill enclosure with inorganic, inert and non- flammable granules.

Fit discharge resistors.

Ensure all internal and external connections are adequately rated and fully insulated.

Automatic bank enclosure

Material - Manufacturer's standard.



Finish and colour - Manufacturer's standard.

Access - Front access.

**2300Y SWITCHGEAR AND CONTROLGEAR ACCESSORIES:**

Provide switchgear and controlgear accessories.

Cylinder locks on hinged doors, with 2 keys for each lock.

Insulating mats to BS 921

Along full length of switchboard.

Width 500mm x 4000mm long

Switchgear operating tools

no spare MCB's in for each rating per board

**3010 FIXING:**

Fix all equipment independently of wiring system. Use cadmium or zinc electroplated bolts, nuts, washers and screws.

**3020 MOUNTING HEIGHT:**

Mount single items of equipment in compliance with current building regulations, unless shown otherwise on drawings/schedules.

Arrange groups of equipment, other than floor mounted assemblies, so that all parts of equipment requiring access for operation or maintenance are at least 500mm and no more than 1800mm above finished floor level, unless shown otherwise on drawings/schedules.

**3030 ACCESS:**

Ensure that clearance in front of switchgear and controlgear is not less than 1m, or as indicated.

**3040A MARKING AND DRAWING:**

Number terminals, cables and component parts to correspond with manufacturer's certified drawings.

**3050 CABLE TERMINATIONS:**

Terminate paper-insulated cable by means of switchboard manufacturer's standard compound filled cable boxes.

Terminate PVC SWA PVC and MICS cables inside enclosure by securing cables to switchboard with glanding plates or glanding brackets; and outside enclosure with glanding plates or fabricated steel extension boxes.

**3060A INSTALLATION AND COMMISSIONING:**

Install and commission switchgear and controlgear in accordance with the appropriate standard and the manufacturers recommendations. Include CT Polarity check in commission tests.



## **Y72 CONTACTORS AND STARTERS**

### **1000 GENERAL**

#### **1010A 3 PHASE ELECTRICAL SUPPLY:**

Ensure all electrical equipment supplied and installed is suitable for 3 phase power supply to BS 7697.

#### **1010B SINGLE PHASE ELECTRICAL SUPPLY:**

Ensure all electrical equipment supplied and installed are suitable for single phase power supply to BS 7697.

### **2000 PRODUCTS/MATERIALS**

#### **2070A ISOLATING SWITCHES:**

Standard - BS EN 60947-3.

Provide independent manual operation type isolating switches with rated duty, rated operational current and utilization category compatible with contactor.

Isolation as shown on drawings/schedules.



## **Y73 LUMINAIRES AND LAMPS**

### **1000 GENERAL**

#### **1010 STANDARDS:**

Supply luminaires and lamps to standards as appropriate.

### **2000 PRODUCTS/MATERIALS**

#### **2010A LUMINAIRES - GENERAL PURPOSE:**

##### Standards

Supply luminaires with photometric data in accordance with BS 5225.

Supply luminaires in accordance with BS 4533 (EN 60598).

Classification - To BS 4533 Part 101 (EN 60598-1).

##### Safety Support for Components

Provide secondary support for translucent covers, diffusers and gear trays so they are prevented from falling when their primary fixing is released.

##### Photometric performance

Ensure luminaires of similar type have same photometric performance as published data within the tolerances defined by BS 5225.

#### **2090A CONTROL GEAR AND COMPONENTS**

##### Compatibility

Ensure control gear and components are suitable for lamp type, wattage and starting characteristics.

Obtain from manufacturers written confirmation of compatibility.

#### **2100A FLUORESCENT LAMP BALLASTS AND STARTERS:**

##### Ballasts

BS EN 60920 and BS EN 60921.

BS EN 60924 and BS EN 60925 for d.c. supplied electronic ballasts.

BS EN 60928 and BS EN 60929 for fluorescent lamps to BS EN 60081 and BS EN 60901.

Supply thermal protectors for ballasts for tubular fluorescent lamps to BS EN 60730-2-3.

Starters - BS EN 60926 and BS EN 60927.

Use low distortion type.

#### **2110A DISCHARGE LAMP BALLASTS AND STARTERS:**

Ballasts - BS EN 60922 and BS EN 60923.

Starters - BS EN 60926 and BS EN 60927.

#### **2120A CAPACITORS:**

Use capacitors in accordance with BS EN 61048 and BS EN 61049 in tubular fluorescent, high pressure mercury and low pressure sodium vapour discharge lamp circuits.



- 2130 SUPPLY TERMINALS:**  
Use screw terminals for supply cables and circuit protective conductors, sized to terminate up to three 2.5mm<sup>2</sup> conductors. Provide separate terminal blocks for each incoming circuit, with marking to identify each circuit.
- 2140 FUSE:**  
Include a fuse holder and BS 1362 fuse in each incoming circuit phase connection.
- 2150 INTERFERENCE:**  
Comply with BS EN 55015.
- 2180A FLUORESCENT LAMPS:**  
Internationally specified tubular fluorescent lamps to BS EN 60081.  
UK tubular fluorescent lamps to BS 1853 Part 2.  
Single capped fluorescent lamps to BS EN 60901 and BS EN 61199.  
Self ballasted lamps to BS EN 60969 (BS 7199) and BS 7173 (EN 60968).
- 2200 HIGH PRESSURE SODIUM VAPOUR LAMPS:**  
Comply with BS EN 60662.
- 2230 LAMP MANUFACTURER:**  
Ensure that lamps of each type are from same manufacturer.
- 2240A SUPPORT SYSTEM - CONDUIT:**  
Use not less than 20mm conduit of same type as main conduit system.  
Material - steel.
- 2250A SUPPORT SYSTEM - ROD:**  
Use continuously threaded rods with matching washers and nuts.  
Diameter - 6mm. Material - Cadmium plated steel.
- 2260A SUPPORT SYSTEM - CHAIN:**  
Use cadmium plated steel chain with load carrying capacity of not less than twice weight of complete luminaire.
- 2270A SUPPORT SYSTEM - FLEXIBLE CORD:**  
Use size and type as indicated on the drawings/ schedules.  
Confirm temperature rating is suitable for operating temperature of luminaire or lampholder.  
Confirm that cord is adequate for mass to be supported.
- 2300A COLUMNS AND BOLLARDS:**  
Standards - BS 5649 Parts 2 to 9 and BS EN 40-1.  
Material  
Steel or Aluminium as shown on drawings/schedules.  
Finish on steel columns as shown on drawings/schedules.  
Bracket - Match column.  
Earthing  
Include earthing terminal fixed within service compartment.  
Column base plate - Standard.



**4010 ORIENTATION:**

Install luminaires as indicated on drawings/schedules, and in horizontal plane unless otherwise indicated.

**4020 CLEANLINESS:**

Ensure luminaires are clean and grease free on handover.

**4030 INSTALLATION OF RECESSED FITTINGS:**

Install luminaires flush with finished ceiling level.

**4060 MATERIAL OF SUPPORTING SURFACE:**

Ensure classification of luminaires is appropriate. Do not mount luminaires on readily flammable surfaces.

**4110 SUPPORT**

Ensure support is adequate for weight of luminaires.

Number

Provide the following minimum number of supports for each luminaire longer than 600mm.

Luminaire Width mm	Minimum number of supports
Up to and including 300	2
Over 300	4

**4120 SUPPORT FROM CONDUIT:**

Where luminaire is supported from conduit provide a conduit box forming an integral part of conduit system at each point of suspension. Ensure suspensions are vertical.

Where conduit enters luminaire use back-nuts and washers to secure luminaire body to conduit support. Provide tube with corrosion resistance equal to conduit system.

Do not support luminaires directly from conduit boxes made from non-metal or heat sensitive materials, where the temperature of the material may exceed 60oC or the mass suspended exceeds 3kg.

**4130 SUPPORT FROM TRUNKING:**

Where luminaire is supported from trunking use proprietary clamps or brackets appropriate to the luminaire and trunking.

Do not support luminaires directly from trunking made from non-metal or heat sensitive materials, where the temperature of the material may exceed 60oC or the mass suspended exceeds 3kg.

**4140A SUPPORT BY DIRECT FIXING:**

Refer to fixing methods, use luminaire supporting coupler to BS 7001 or follow manufacturer's recommendations.

**4150A SUPPORT IN SUSPENDED CEILING:**

Support luminaires directly from building fabric.



- 4160 SUSPENSION:**  
Suspend luminaires at height indicated. Ensure suspensions hang vertically unless otherwise indicated.
- 4170 SUSPENSION BY ROD:**  
Use washers, nut and lock-nut at top and bottom of rod. Paint cut ends with calcium plumbate primer or zinc rich paint.
- 4180 SUSPENSION BY CHAIN:**  
Use hook cover for suspension from circular conduit box. For connection to luminaires use luminaire manufacturer's own chain hook, but if not available use hook with standard screw threaded body to be secured to luminaire body with nuts and washers. Where indicated use captive hooks.
- 4190 SUSPENSION BY FLEXIBLE CORD:**  
Suspend cord from ceiling rose.
- 4210A COLUMNS AND BOLLARDS**  
Location - Confirm location before excavation.  
Bases - Install bases as indicated.  
Mounting  
Mount column or bollard on base as recommended by manufacturer.  
Ensure columns and bollards are vertical unless otherwise indicated.
- Earthing  
Install circuit protective conductor to connect luminaire to earthing terminal in service compartment; size circuit protective conductor same as live conductors. Bond accessible metal parts of column or bollard to earthing terminal.
- 4220 CONNECTIONS TO LUMINAIRES**  
Cable Protection  
Use appropriate size of grommet where cables enter through hole in luminaire body.  
Earthing  
Ensure that the earthing terminal of Class 1 luminaires is connected to the conduit protective conductor of the supply circuit.  
Loose Wiring  
Clip or tie back with suitable proprietary devices loose wiring within luminaire, at 300mm intervals.
- 4230A CONNECTIONS TO LUMINAIRES - DIRECT TO CONDUIT - TERMINAL BOX:**  
Terminate circuit wiring in terminal block within supporting conduit box. Use flexible cord from terminal block to luminaire.
- 4260A CONNECTIONS TO LUMINAIRES - RECESSED FITTINGS - PLUG AND SOCKET:**  
Where luminaires are recessed in a suspended ceiling, terminate circuit wiring at plug and socket to BS 546, located not more than 500mm from the access through the ceiling. Use flexible cord from plug of ceiling rose to supply terminals of luminaire.
- 4280 CONNECTIONS TO LUMINAIRES - ROD OR CHAIN SUSPENSION:**  
Terminate circuit wiring in terminal block within supporting conduit box. Use flexible cord from



terminal block to luminaire and clip cable to one of the rods or chains, do not weave cable through links of the chain.

**4300B PHASE BARRIER LIGHTING SWITCHES ON DIFFERENT PHASES:**

When lighting switches on different phases are in a common box, use phase barrier switches.



## Y74 ACCESSORIES FOR ELECTRICAL SERVICES

### **1000 GENERAL**

#### **1010 APPLICATION:**

Supply fixed electrical wiring accessories for use with fixed and portable peripheral equipment using either power or signalling cables.

#### **1020 SAMPLES:**

Where indicated submit samples of proposed materials and equipment for approval before work is started. Label each sample with name, catalogue number and services in connection with item.

### **2000 PRODUCTS/MATERIALS**

#### **2010A ACCESSORIES COMMON REQUIREMENTS - WHITE PLASTIC PLATES, FLUSH INSTALLATION:**

Area of installation - Interior.

Enclosure pattern - Flush.

Accessory mounting

Adjustable steel grid for grid switches or direct to enclosure for all other accessories.

Enclosure material- Pressed steel.

Enclosure finish - Galvanized.

Coverplate finish, all accessories to match

Moulded plastic, colour - white.

Coverplate pattern

Overlapping; with architrave where indicated on drawings/schedules.

Ancillaries

Earthing terminal integral within switch box.

Neon indicator with red lens, illuminated in 'ON' position, for connection units.

Switch rocker bar colour - white.

Operating keys for key operated switches, minimum number 2.

Fuses to BS 1362 as shown on drawings/schedules.

Blank inserts for spare ways on grid switches.

Marking

Method - engraving. Mark front plate to indicate equipment served on connection units.

Conduit and cable entries

Knockouts side, top and rear.

Cable termination - Manufacturer's standard.

#### **2010C ACCESSORIES COMMON REQUIREMENTS - WHITE PLASTIC PLATES, EMBEDDED CABLES, SURFACE INSTALLATION:**

Area of installation - Interior.

Enclosure pattern - Surface.

Accessory mounting - Direct to enclosure.

Enclosure material - White moulded plastic.

Coverplate finish, all accessories to match



Moulded plastic, colour - white.  
Coverplate pattern - Surface type.  
Ancillaries  
  Earthing terminal integral within switch box.  
  Neon indicator with red lens, illuminated in `ON' position, for connection units.  
  Switch rocker bar colour as shown on drawings/ schedules.  
  Operating keys for key operated switches, minimum number 2.  
  Fuses to BS 1362 as shown on drawings/schedules.  
Marking  
  Method - engraving. Mark front plate to indicate equipment served on connection units.  
Conduit and cable entries  
  Knockouts side, top and rear.  
Cable termination - Manufacturer's standard.

**2010D ACCESSORIES COMMON REQUIREMENTS - METAL CLAD PLATES, SURFACE STEEL CONDUIT INSTALLATION:**

Area of installation - Interior.  
Enclosure pattern - Surface.  
Accessory mounting - Direct to enclosure.  
Enclosure material  
  Pressed steel or cast iron.  
Enclosure finish  
  As conduit system or galvanized.  
Coverplate finish, all accessories to match  
  Metal clad.  
Coverplate pattern - Surface type.  
Ancillaries  
  Earthing terminal integral within switch box.  
  Neon indicator with red lens, illuminated in `ON' position, for connection units.  
  Switch rocker bar colour as shown on drawings/ schedules.  
  Operating keys for key operated switches, minimum number 2.  
  Fuses to BS 1362 as shown on drawings/schedules.  
Marking  
  Method - engraving. Mark front plate to indicate equipment served on connection units.  
Conduit and cable entries  
  Threaded entries, top, bottom or side to suit conduit system.  
Cable termination - Manufacturer's standard.

**2010F ACCESSORIES COMMON REQUIREMENTS - SURFACE, PLASTIC, WEATHERPROOF INSTALLATION:**

Area of installation - Exterior.  
Enclosure degree of protection to BS EN 60529, IP 54.  
Enclosure pattern - Surface and weatherproof.  
Accessory mounting - Direct to enclosure.  
Enclosure material - Impact resistant plastic.  
Enclosure finish - Natural or self coloured.  
Coverplate finish, all accessories to match  
  Moulded plastic, colour as shown on drawings/ schedules.  
Coverplate pattern - Surface type.



Ancillaries

- Earthing terminal integral within switch box.
- Neon indicator with red lens, illuminated in 'ON' position, for connection units.
- Protective shrouds to rocker bars.
- Screwed weathering cap and chain for socket outlets.
- Switch rocker bar colour as shown on drawings/ schedules.
- Operating keys for key operated switches, minimum number 2.
- Fuses to BS 1362 as shown on drawings/schedules.

Conduit and cable entries

- Threaded entries to suit cable/conduit system.
- Cable termination - Manufacturer's standard.

**2020B INTERIOR LIGHTING SWITCHES - GRID:**

Standard - BS 3676 Part 1, enclosure box to BS 4662.

Switch type

Rocker bar - moulded plastic or secret key as indicated on drawings/schedules.

Rating - 5A or 15A.

Switch mechanism - Snap action microgap.

Pole configurations

Single pole, 1 way, 2 way or intermediate as indicated on drawings/schedules.

**2050A LUMINAIRE CONNECTORS - GENERAL AND EMERGENCY LIGHTING:**

Rating - 2A.

Connector type

Fixed terminal strip, screw cover and cord grip to BS 67.

Load carrying capacity to match selected luminaire.

**2050B LUMINAIRE CONNECTORS - GENERAL LIGHTING:**

Rating - 2A.

Connector type

3 pin plug/socket to BS 546.

Load carrying capacity to match selected luminaire.

**2060A LAMP HOLDERS - BC TYPE:**

Standard - BS EN 61184.

Lampholder type - Bayonet clip - B22.

Fixing

Bracket - straight or angle, or suspension as indicated on the drawings/schedules.

Finish - Manufacturer's standard.

Material - Heat resistant moulded plastic.

Ancillaries

Cord grip, lampshade ring or protective lampshade ring as indicated on the drawings/schedules.

**2060B LAMP HOLDERS - ES TYPE:**

Standard - BS EN 60238.

Lampholder type - Edison screw - E27.

Fixing



Bracket - straight or angle, or suspension as indicated on the drawings/schedules.

Finish - Manufacturer's standard.

Material - Heat resistant moulded plastic.

Ancillaries

Cord grip, lampshade ring or protective lampshade ring as indicated on the drawings/schedules.

**2070A ISOLATING SWITCHES - BS 3676 PART 1:**

Provide isolating switches for fixed appliances.

Utilization category as indicated on the drawings/ schedules.

Making capacity as indicated on the drawings/schedules.

Standard - BS 3676 Part 1, enclosure box to BS 4662.

Switch type - Rocker bar.

Rating as indicated on the drawings/schedules.

Pole configuration

DP, three pole or TPN as indicated on the drawings/ schedules.

**2070B ISOLATING SWITCHES - BS EN 60947-3:**

Provide isolating switches for fixed appliances.

Utilization category as indicated on the drawings / schedules.

Making capacity as indicated on the drawings/schedules.

Standard - Enclosure box to BS 4662, BS EN 60947-3.

Switch type - Rocker bar.

Rating as indicated on the drawings/schedules.

Pole configuration

DP, three pole or TPN as indicated on the drawings/ schedules.

**2080A FUSE CONNECTION UNITS - SWITCHED:**

Standard

BS 1363 Part 4, enclosure box to BS 4662 and switched.

Unit type - Rocker bar - plastic.

Pole configuration - DP.

Ancillaries

Cord outlet or cord grip and fuse as indicated on the drawings/schedules.

**2080B FUSE CONNECTION UNITS - UNSWITCHED:**

Standard

BS 1363 Part 4, enclosure box to BS 4662 and unswitched.

Pole configuration - DP.

Ancillaries

Cord outlet or cord grip and fuse as indicated on the drawings/schedules. Lockable fuse carrier.

**2090A SOCKET-OUTLETS - SINGLE, SWITCHED:**

Standard

13A socket-outlet to BS 1363, enclosure box to BS 4662.

Switching - Switched.

Switch type - Rocker bar - plastic.

Rating - 13A.



Ancillaries

Plug tops 25% of number of sockets, fused as indicated on drawings/schedules.

Gangs - 1

**2090B SOCKET-OUTLETS - SINGLE WITH INTEGRAL RCD, SWITCHED:**

Standard - Enclosure box to BS 4662, BS 7288.

Switching - Switched

Switch type - Rocker bar - plastic.

Rating - 13A.

Ancillaries

RCD, BS 7288. Mains failure trip, sensitivity as indicated on the drawings/schedules.

Plug tops 25% of number of sockets, fused as indicated on drawings/schedules.

Gangs - 1

**2090C SOCKET-OUTLETS - DOUBLE SWITCHED:**

Standard

13A socket-outlet to BS 1363, enclosure box to BS 4662.

Switching - Switched

Switch type - Rocker bar - plastic.

Rating - 13A.

Ancillaries

Plug tops 25% of number of sockets, fused as indicated on drawings/schedules.

Gangs - 2

**2110A CORD OUTLETS - COOKER CONNECTION UNIT:**

Standard - BS 5733, enclosure box to BS 4662.

Format - Cooker connection.

Rating - 45A

Pole configuration - DP&E.

**2120A CABLE AND APPLIANCE COUPLERS - 16A, 240V SINGLE PHASE, GENERAL PURPOSE:**

Standard - BS EN 60309-2 (BS 4343:1992).

Material - Polycarbonate male and female connectors.

Rating - Voltage 220 - 240V; Current 16A.

Configuration - 2PE.

Colour - 220 - 240V, Blue.

Ancillaries as indicated on the drawings/schedules.

ON/OFF switch; gang combinations 1, 2, 3 and 4; RCD.

**2150A D TYPE MULTIPIN CONNECTORS - GENERAL PURPOSE:**

Circuit configurations

Single or twin as indicated on the drawings/ schedules.

Size - 25 pin.

**3010 EARTHING:**

Ensure metal framework of equipment is bonded to main earth point. Ensure that cable CPC's are connected to earth bar.



Provide earth CPC between earth lug on metal box and accessory casing except where accessory is encased in plastic.

**3020 PROTECTION:**

Ensure there is no physical or electrical damage to accessories when they are removed from their packaging and during installation.

Provide masking covers for surface mounted accessories to protect surface from paint.

Where accessories are flush mounted install front plate after painting is finished.

**3030 FIXING:**

Align accessories horizontally and vertically, as indicated. Where accessories are grouped, mount horizontally in line and parallel to each other and equidistant.

Fix cover plates to boxes with brass fixing screws.

**3040 MEASURING MOUNTING HEIGHTS:**

Take measurement for position of electrical accessories to the centre line of equipment from either finished floor or worktop. Where specified height coincides with top of tiling, leave a clear gap of 50mm above tiling.

Mount equipment below a worktop 100mm below underside of worktop.

**3050 MOUNT ELECTRICAL ACCESSORIES:**

Accessory	Location	Height (mm)
Lighting switch		1100
Socket outlet	General	450
	Kitchen	1100
	Above worktop	200



## **Y80 EARTHING AND BONDING COMPONENTS**

### **1000 GENERAL**

#### **1010 MATERIALS GENERALLY:**

Use materials and installations methods in accordance with BS 6651, BS 7671, BS 7430, Electricity Supply Regulations and Local Electricity Supply Authority Requirements as appropriate.

### **2000 PRODUCTS/MATERIALS**

#### **2010A CONDUCTORS FOR LIGHTNING PROTECTION SYSTEMS - HORIZONTAL AIR TERMINATIONS:**

Use - Horizontal air termination or down conductor.

Minimum dimension - BS 6651 Table 4.

Form - Strip.

Material - Copper, BS 1432 C101 or C102, annealed.

Coverings

None or PVC, colour as indicated on the drawings/ schedules.

Accessories

Ridge Saddle; conductor clips - non-metallic; glazing bar holdfast; slate holdfast; backplate holdfast; all accessories sized to suit conductors.

#### **2010B CONDUCTORS FOR LIGHTNING PROTECTION SYSTEMS - SELF SUPPORTING AIR TERMINATIONS:**

Use - Air termination, vertical.

Minimum dimension - BS 6651 Table 4.

Form - Rod.

Material - Copper, BS 1433 C101 or C102, hard drawn.

Coverings - None.

Accessories

Terminal base; ridge saddle; rod brackets; rod to tape coupling.

#### **2010C CONDUCTORS FOR EARTHING SYSTEMS TO BS 7430:**

Use - Earthing conductor.

Minimum dimension - BS 7430, current density 50A/mm<sup>2</sup>.

Form - Strip.

Material - Copper, BS 1432 C101 or C102, annealed.

Coverings - None.

Accessories - Conductor clips, metallic.

#### **2020A CONDUCTOR JOINTS:**

First Conductor

Form - strip; material - copper.

Dimensions

To BS 6651 table 4 minimum for lightning protection system or for conductor current density 50A/mm<sup>2</sup> for earthing systems.

Second conductor

Form - rod; material - copper.

Dimensions

To BS 6651 table 4 minimum for lightning protection system or for conductor current density



50A/mm<sup>2</sup> for earthing systems.

Solid joint - Brazed or welded, thermic.

Disconnecting test joint

Square clamp, oblong clamp, plate clamp or screw- down clamp.

**2030A TAPE FIXING DEVICES:**

Secure bare copper tape to structure with fixing devices which avoid piercing tape and ensure 3mm (minimum) clearance of tape from structure, at 450mm maximum, centres.

Material for lightning protection systems

Non-conducting.

Material for system earthing

Naval brass to BS 2872 Grade CZ112 or gunmetal conductor to BS 1400 Grade LC2.

**2040A EARTH ELECTRODES FOR LIGHTNING PROTECTION SYSTEMS:**

Standard - BS 6651.

Form

Rod, roll threaded, or building or structural element indicated on the drawings.

Dimensions

Rod Diameter - 15 mm - nominal.

Rod Length - 2.4m (2 x 1.2) minimum.

Earth electrode couplings

Use silicon bronze alloy to BS 2874 Grade CS101 or aluminium bronze alloy to BS 2871 Grade CA102, counter bored to completely enclose rod threads. Ensure rods meet in centres of coupling.

Use high strength driving cap in contact with driven rod and couplings of compatible material fully enclosing the rod threads.

Interconnect electrodes using 25 x 3 mm bare copper tape.

Earth electrodes in drawpits

Provide concrete cover, permanently labelled, for electrodes installed through cable drawpit bases.

Material, minimum size as BS 7430 Table 4

Molecularly bonded copper clad steel rods to BS 7430 or BS 6651.

Accessories - Rod to tape clamp or U-bolt clamp. Accessories sized to suit earth rod and connector.

**2060 EARTH ELECTRODE CLAMPS:**

Connect tape to electrode head using heavy duty purpose made silicon aluminium bronze body connector clamps or leaded gunmetal body connector clamps, and high tensile phosphor bronze bolts to BS 2874 Grade PB102.

**2070A EARTH ELECTRODE INSPECTION FACILITIES:**

Provide enclosure for each connection between earth conductor and associated earth electrode system.

Install so that top is flush with finished ground or floor level. Ensure enclosure provides adequate access for testing purposes. Provide pit details for builders work.

Labelling - Wording, Earth.

**2090A MAIN EQUIPOTENTIAL BONDS:**

Provide main equipotential bonds in accordance with BS 7430 and BS 7671.

Material - Insulated cable, single core to BS 6004.

Use no joints in main equipotential bonds.

**2100A SUPPLEMENTARY EQUIPOTENTIAL BONDS:**

Provide supplementary equipotential bonds to BS 7430 and BS 7671.



Material - Insulated cable, single core to BS 6004.  
Use no joints in supplementary equipotential bonds.

**2110A CIRCUIT PROTECTIVE CONDUCTORS:**

**Material**

Insulated cable, single core to BS 6004 as indicated; metallic screwed conduits (excluding flexible); metallic trunking with tinned copper links; armouring and/or metallic sheathing of armoured cables or integral conductor of multi-core cable.

**Size**

Provide protective conductors sized in accordance with BS 7671 (IEE Regulations) 543-01-03 and Tables 54B, 54C, 54D, 54E and 54F or provide protective conductors sized in accordance with BS 7671 (IEE Regulations) 543-01-04 and Table 54G.

**2120 EARTHING CLAMPS:**

Use clamps complying with BS 951, for bonding pipes and lead sheathed cables.

**2130A EARTH BUSBARS:**

**Material**

Manufacture earth busbars from hard drawn, tinned, high conductivity copper bar.

**Substation Earth busbar**

75 x 13mm cross section 600mm minimum length.

**Main Earth Terminal busbar**

25 x 6 mm minimum for incoming live conductor not exceeding 50mm<sup>2</sup> and 50 x 6 mm minimum for incoming live conductor over 50mm<sup>2</sup>.

**2140 TEST LINKS:**

Provide two test links, in connections between main earth conductors and earth busbar. Fabricate each from two additional sections of earth busbar. Mount one section on stand-off insulators matching earth busbar; use remaining section as removable test link. Secure 12mm high tensile brass studs to fixed sections of busbar and drill corresponding clearance holes in test links and provide brass washers, nuts and locking devices to secure frame/neutral earthing and test links.

**2150 LUGS/TAGS:**

Provide lugs or tags to enable connection of bonding conductors to equipment earth terminals.

**2160 PROTECTIVE CABLE TERMINATIONS:**

For bolted connections use crimp type lugs compressed by automatic tool to achieve correct pressure and crimp depth.

**2170 PROTECTIVE CONDUCTOR WARNING NOTICES/LABELS:**

Provide a permanent label durably marked in letters 4.75mm minimum height "SAFETY ELECTRICAL CONNECTION - DO NOT REMOVE", in visible position, at each bonding conductor connection to extraneous conductive parts.

**2180 MAIN EARTH CONDUCTOR - WARNING TAPES:**

Provide green/yellow PVC tapes labelled "EARTHING CONDUCTOR" over complete external lengths of main earth conductors at 300mm depth below finished ground.



**2190 EARTH BAR LABEL:**

Label earth bar "SAFETY ELECTRICAL CONNECTION - DO NOT REMOVE" with wall mounted laminated plastic tablet engraved in 10mm high red letters on white ground.

**3010 CLEAN EARTH DISTRIBUTION:**

Install clean earth distribution in double insulated cables from earth electrodes to equipment points. Mount all busbars with insulators and separate from other earthing systems.

**3020 DISSIMILAR METALS:**

Ensure, where dissimilar metals are used for system, that purpose made jointing materials are used such that corrosion and deterioration of the electrical connection are not caused. Ensure bonding connections to other metal parts of building are electrolytically compatible with those metal parts. Use the guidance given in BS 7430 Table 8 when bonding dissimilar materials.

**3030A TAPE JOINTS:**

Provide waterproof protection at joints subject to moisture.

Joint copper tapes by brazing, using zinc-free brazing metal with melting point at least 600oC or thermic welding.

**3040 STRANDED CONDUCTOR JOINTS:**

Provide waterproof protection at joints subject to moisture. Joint copper stranded conductors with compression joints to BS 3288 Part 1.

**3050A PROTECTIVE CABLE TERMINATIONS:**

For bolted connections use crimp type lugs compressed by automatic tool to achieve correct pressure and crimp depth.

Make connections between tape and equipment using high tensile grade brass bolts with brass nuts, washers and locking devices. Use phosphor bronze bolts, nuts and washers where connections are liable to corrosion.

**3060A EARTH ELECTRODES:**

**Location**

Locate electrodes not less than 2m distant from building/structure protected, and away from telecommunication and pilot cables and metallic fences.

**Driving**

Drive rods vertically into ground with purpose designed electric hammer. (Where impenetrable strata encountered at shallow depth, drive at 30o to horizontal).

**Depth of rod**

2.4m minimum below finished ground surface.

**Depth of Electrode heads**

Locate electrode heads just below ground level.

**Spacing**

Where electrodes are installed in a group ensure minimum distance between electrodes is twice depth of rods. Where rods for "clean" earth are installed ensure distance from any other system rods is six times depth of "clean" rods.

**Tape Depth**

Install interconnecting or electrode tape 750mm below finished ground level, rising vertically at each electrode.

Connect groups of electrodes to main earth conductor via bolted link in inspection pit as BS 7430 for test purposes.



## **Y81 TESTING AND COMMISSIONING OF ELECTRICAL SERVICES**

### **1000 GENERAL**

#### **1010 INSPECTION AND TEST PROCEDURE:**

Comply with BS 7671 Requirements for Electrical Installations (the IEE Wiring Regulations), IEE Guidance Notes Number 3 Inspection & Testing and other British Standards as appropriate.

#### **1020 SUPPLY CHARACTERISTICS:**

Obtain information called for in BS 7671 about supply characteristics from Supplier, other than where to be measured as part of testing procedure.

#### **1030 DESIGN INFORMATION:**

Obtain all design assumptions, calculations and any other information to enable compliance with BS 7671 to be verified.

### **2000 TESTING**

#### **2030A INITIAL VERIFICATION:**

Carry out detailed inspection to verify the requirements of BS 7671 Section 712 in the order given in clause 712-01-03 for New Installation or Altered or Added Installation as appropriate.

#### **2050A TESTING**

Carry out in the same order as published the tests required by BS 7671 Section 713 for New Installation or Altered or Added Installation as appropriate.

#### **2080 SETTINGS AND ADJUSTMENTS:**

Confirm characteristics and settings of protective devices are within maximum and minimum specified tripping times.

Check correct operation of devices.

Confirm interlocks and sequences operate safely and as indicated.

#### **2130 CALIBRATION:**

Provide current certificates of calibration for all instruments used during test procedures. Record particular instrument identity on record sheets.

#### **2140A CERTIFICATION AND REPORTING**

Complete and hand over to the Client a Completion and Inspection Certificate to BS 7671 Appendix 6 for New Installation or Altered or Added Installation as appropriate.

#### **2150A COMPLETION CERTIFICATES:**

Provide completion certificates for electrical installations in accordance with BS 7671 (IEE Regulations).

Record details of departures from BS 7671 (IEE Wiring Regulations) on certificate.

Provide copies of calculations justifying departure from BS 7671 (IEE Wiring Regulations) and attach to certificates.

#### **2160 RECORDS:**

Record all results and instrument readings on approved Record Sheets and hand over to the client two copies for each inspection and test.



## **Y82 IDENTIFICATION - ELECTRICAL**

### **1000 GENERAL**

### **2000 PRODUCTS/MATERIALS**

#### **2010A LABELS AND NOTICES:**

Apply identification labels and notices in accordance with BS 7671 (IEE Wiring Regulations), Clause 514 to all electrical cables plant and equipment including components of mechanical systems.

Fit labels and notices as shown on the Contract drawings.

BS 7671 Labels and Notices

Identification of protective devices.

Diagrams, charts or tables to comply with Clause 514-09.

Warning notices, voltages in excess of 250 volts.

Periodic inspection and test notices.

Residual current device notices.

Earth electrode safety electrical connection label.

Bonding conductor connector point to extraneous conductive parts label.

Earth free local equipotential bonding areas warning notice.

Electrical separation areas warning notice.

Outdoor equipment socket outlet notice.

#### **2080A PLANT AND EQUIPMENT LABELS:**

Fit labels on all items of plant, equipment, switches, etc., include the following information: service controlled, circuit reference, voltage, type of supply and phase etc., circuit protection type and rating.

#### **2120A ENGRAVED ACCESSORY PLATES:**

Engrave switchplates, spur units, pushes and special plates for bedhead units, call systems, fire alarms, etc. Use 6mm high letters with engraving coloured red.

#### **2190A CABLE IDENTIFICATION:**

Provide all cables, other than final sub-circuit wiring enclosed in conduits or trunking, with labels fixed at each end of cable either side of wall and floor penetrations at approximately 12m intervals at convenient inspection points by means of non-releasable plastic straps, minimum width 4mm. Ensure labels show the reference number of cable.

#### **2200A TERMINAL MARKING AND CONDUCTOR IDENTIFICATION:**

Provide for switchgear and control gear elements whose terminals are marked in accordance with BS 5472 (EN 50005) and BS 6272 (EN 50042). Use a unique reference to identify each element in the switchgear or control gear. Mark on or adjacent to each element its reference. Identify each terminal for connection to external wiring or cabling using a reference system complying with BS 5559 (EN 60445) based on the element reference and the appropriate element terminal reference.

Adjacent to terminals.

Use lettered or numbered ferrules or sleeves to BS 3858 to mark each auxiliary conductor or control cable core with the identity of the terminal to which it is connected and the reference of plant or equipment to which it is connected and the identity of the terminal at the remote end. Ensure that main circuit conductors are identified in accordance with BS 7671 (IEE Wiring Regulations) paragraph 514-06. Ensure that all identification of terminals and conductors is recorded and included on record drawings and in operation and maintenance documentation.



## **Y90 FIXING TO BUILDING FABRIC**

### **1000 GENERAL**

#### **1010 PREPARATION:**

Mark-out, set-out and firmly fix all equipment, components and necessary brackets and supports.

#### **1020 MANUFACTURER'S DRAWINGS:**

Use manufacturer's drawings and templates for purposes of marking and setting out.

#### **1030 FIXINGS:**

Ensure structure and fixings are suitable for items to be fixed.

#### **1040 LOADING DETAILS:**

Provide loading details for all fixing types.

#### **1050 BUILDING-IN BY OTHERS:**

Provide all necessary assistance to enable any item of building-in type to be built in by others.

#### **1060 SIZE OF FIXING:**

Use largest size of bolt, screw or other fixing permitted by diameter of hole in item to be fixed.

#### **1070 GREASING OF FIXINGS:**

Ensure all bolts, screws or other fixings used are greased or lubricated in accordance with manufacturer's instructions.

### **2000 PRODUCTS/MATERIALS**

#### **2010 STANDARDS:**

Comply with BS 3974 Part 1 for fixings. Ensure that fixings such as expanding anchors are tested for tensile loading in accordance with BS 5080.

#### **2020 PLUGS:**

Use plugs of suitable size and length for fixings. Use plastic, fibrous or soft metal non-deteriorating plugs to suit application. Do not use wood plugs.

Ensure that when screw is in place, threaded length is in plug. Ensure plugs used for screw fixing are set-in to correct depth prior to final tightening.

#### **2030 SCREWS:**

Use screws to BS 1210. Generally use sherardized steel wood screws for fixing to concrete, brickwork or blockwork.

In damp or exposed situations use greased brass wood screws.

#### **2040 CAST-IN FIXINGS:**

Where cast-in fixings are permitted, mark out and set fixings in accordance with manufacturer's instructions.

#### **2050 SHOT FIRED FIXINGS:**

Obtain approval prior to using shot fired type fixings.



- 2060 SELF ADHESIVE FIXINGS:**  
Obtain approval prior to using self adhesive type fixings.
- 2070 PROPRIETARY CHANNEL INSERTS:**  
Provide proprietary channel inserts for casting in where indicated.
- 3010 DRILLING:**  
Drill holes squarely. Use drills of requisite size and depth, and appropriate to fabric. Do not flame-cut holes in metal work.
- 3020 PROPRIETARY FIXINGS:**  
Comply with manufacturer's instructions for all fixings.
- 3030 FIXING TO REINFORCED CONCRETE:**  
Take precautions to avoid fixing through reinforcement.
- 3040 FIXING TO BRICKWORK:**  
Do not fix to unsound material or mortar between brickwork courses.
- 3050 FIXING TO TIMBER RAILS:**  
Fix equipment, brackets and supports by drilling hole through timber rail and fixing with bolt, back plate, washer and loose nut.
- 3060A FIXING TO HOLLOW STUD/TILE/BLOCK WALLS:**  
Fix equipment, brackets and supports where there is access at rear of wall, by drilling hole through wall and fixing with bolt, back-plate, washer and loose nut.  
Fix equipment, brackets and supports where there is no access at rear of wall, drill hole and use screw anchor type fixing or gravity type toggle fixing.
- 3070A FIXING TO CONCRETE, BRICKWORK OR BLOCKWORK:**  
Fix equipment, brackets and supports using wood screws in plugs.  
Drill holes and fix using steel bolts of grouted bolt type or expanding bolt type fixing.
- 3080A FIXING TO METALWORK:**  
Fix equipment, brackets and supports by drilling holes and fixing using set screws or bolts complete with washers, shakeproof washers and loose nuts.
- 3090A FIXING TO STRUCTURAL STEELWORK AND CONCRETE STRUCTURES:**  
Provide manufacturer's information on recommended fixing. Obtain approval for any fixing to structure steel work and concrete structures.  
Generally use proprietary fixings to structural steelwork and concrete structures.  
Obtain approval to cut holes in structural steelwork or concrete structures or weld to structural steelwork.



## **Y91 OFF-SITE PAINTING AND ANTI-CORROSION TREATMENTS**

### **1000 GENERAL**

#### **1010 GENERAL REQUIREMENTS:**

Where particular methods of finish and painting are not specified, ensure following requirements are met.

Protect all metal work, plant, equipment, pipelines, ductlines, ancillaries, brackets and supports against corrosion and oxidization.

Provide ferrous metals, machined or otherwise with protective coatings at manufacturer's works.

Ensure all items requiring on-site decorative finishes are provided primed to suit base material and required finish.

#### **1020 DAMAGED FINISHES:**

Following delivery to site, storage on site and installation make good any damage to finishes, by cleaning, degreasing and re-furbishing.

### **2000 PRODUCTS/MATERIALS**

#### **2010A PAINT MATERIALS:**

Use the following materials as appropriate

Solvent borne priming paint to BS 5358 for bare woodwork.

Red Oxide priming paint for bare iron and steelwork.

Zinc Chromate priming paint for bare ferrous and non-ferrous metals.

Calcium Plumbate priming paint to BS 3698 for galvanized steel or composite wood/metal components.

Undercoating paint for previously primed or painted surfaces before the application of finishing coats.

Gloss finishing paint for previously primed or painted/undercoated surfaces.

Epoxy resin paint for specialist coatings requiring resistance to acids, alkalis, oils, solvents, abrasion or high humidity.

Aluminium paint to BS 388 for structural steelwork, storage vessels, heated metallic surfaces and similar applications where moisture and heat resistant properties are required.

Cold galvanizing paint for making good damage to previously galvanized surfaces and protection to galvanized materials modified during installation.

Zinc-rich metallic to BS 4652 for bare iron and steelwork where electrical conductivity has to be assured.

Black tar-based paint to BS 1070 for moisture resistant protection to metal surfaces where decorating appearance is not important.

Bitumen based coatings for cold application to BS 3416 protection to iron and steel, particularly pipelines and fittings for use in contact with potable water.

Bitumen based coatings for cold application to BS 6949 not to be used in contact with potable water.

#### **2020 PAINT QUALITY:**

Ensure paints used are of quality and type to suit application and that primers have good adhesion, covering power, rust-inhibiting and grain filling properties; gloss finishing paints are of machine finish grade having high adhesion and high resistance to solvents, mineral oils, cutting oils, detergents, chipping and impact damage.



- 2030 HEAT RESISTANT PAINT:**  
Use heat resistant paints for applications to surfaces over 80°C.
- 3010 GENERAL:**  
Ensure paints are applied in accordance with manufacturer's instructions and to BS 6150.
- 3020 WEATHER AND OTHER CONDITIONS:**  
Do not apply paints where weather, temperature, humidity or other conditions may have a damaging effect upon finish or paint.
- 3030 CLEANING:**  
Ensure metal surfaces are thoroughly cleaned, all mill and weld scale removed and finally degreased. Clean steel surfaces in accordance with BS EN ISO 8503 (BS 7079).
- 3040 APPLICATION OFF-SITE:**  
Wherever possible ensure paint finishes applied by component manufacturers are spray applied.
- 3050 APPLICATION:**  
Apply paint evenly and ensure finish shows no excessive brush marks, grinning, runs, sagging, ropiness or other application defects.
- 3060 COLD GALVANIZING:**  
Repair damage to galvanized components due to installation process, ie following cutting, drilling or welding, by applying 2 no. substantial coats of cold galvanizing paint.
- 3070 PROTECTION OF BRIGHT MACHINE PARTS:**  
Apply a protective coating to all bright machined parts before despatch from works.  
Do not remove protective coatings unless required for installation, testing or commissioning purposes and in such cases reinstate upon completion.  
Repair any damaged protective coating or bright machined part, or where necessary replace damaged component.  
Use and apply metal coatings in accordance with manufacturer's instructions.  
Complete where possible all welding, drilling, bending and other work before metal coating.



## **Y92 MOTOR DRIVES - ELECTRIC**

### **1000 GENERAL**

#### **1010 STANDARDS:**

Supply and install motors in accordance with BS 4999, BS 5000 and BS EN 60034, as appropriate and local supply authority regulations.

#### **1020 ELECTRICAL SUPPLY:**

Ensure all electrical equipment supplied and installed is suitable for power supply indicated.

#### **1030 PERFORMANCE CHARACTERISTIC DETAILS:**

Provide details of electrical input, starting and performance characteristics of all motors above 750W to an agreed format.

#### **1060 MOUNTING:**

When duplicate motors are required for automatic changeover, mount separately, ensure each is complete with drive and guard and make due allowance for power loss of idling motor.

#### **1070 KEYS:**

Ensure motors and drives are supplied complete with keys and keyways.

### **2000 PRODUCTS/MATERIALS**

#### **2010A STANDARD OPERATING CONDITIONS:**

Ensure motors, starters and ancillary equipment are suitable for operation at full capacity at heights above sea level not exceeding 1000m, with air cooling at an average temperature over 24 hours not exceeding 35°C dry bulb with maximum conditions of 40°C dry bulb and 50 per cent RH.

#### **2050B MOTOR RATINGS - ABOVE 0.75KW UP TO AND INCLUDING 4KW:**

Three phase, squirrel cage induction type, totally enclosed, frame cooled or fan cooled. To BS 4999 Part 105 and BS EN 60034-6 IP44 - IC 01.411.

## Section iV

### Electrical Design and Performance Specification

BMA



**BUILDING SERVICES CONSULTING ENGINEERS**

**2<sup>nd</sup> Floor Britannic Building  
3 Upperhead Row  
Huddersfield  
HD1 2JL**

**Electrical Design & Build Performance Specification**

For The : **Proposed Floodlighting Installation**

At : **Moorends Welfare Ground**

For : **John Hill Associates Ltd  
Architectural and Surveying Consultants  
6 Shaw Wood Way  
Shaw Wood Business Park  
DONCASTER  
DN2 5TB**

Document Ref : **2017-055/SE01**

Date : **July 2017**



A Division Of Kirkholme Consulting Ltd Incorporated In England Company Number 04370297





## **CONTENTS**

### **INTRODUCTION**

- SECTION 1 & 1B - STANDARD GENERAL REQUIREMENTS AND PRELIMINARY CLAUSES**
  
- SECTION 2 - SCOPE OF WORKS**
  
- SECTION 3 - STANDARD TECHNICAL CLAUSES**
  
- SCHEDULE**
  
- SECTION 4 - SUMMARY OF TENDER**



## **INTRODUCTION**

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## **NOTES FOR TENDERERS**

This specification is in three sections:-

### **SECTION 1 - PRELIMINARIES**

The Preliminary clauses included are those that relate to the Engineering Works in particular and must be read in conjunction with the "Preliminaries" of the "Head Contract".

### **SECTION 2 - SYSTEM SPECIFICATIONS**

The system specifications are sub-divided into three parts:-

#### **Part 1 System objectives**

The system objectives are clauses giving details of design information, system performance and description, together with lists of the system schematics and drawings.

#### **Part 2 Selection schedules for the reference specifications**

These selection schedules specify items in the systems that are contained in the Reference Specifications (Y Group). Required Y Group clauses are invoked by reference.

#### **Part 3 Clauses specific to the system**

These specification clauses are specific to the system concerned and make no reference to the Y group clauses.

### **SECTION 3 - REFERENCE SPECIFICATIONS (Clauses from the Y group)**

This section contains all the reference specifications relevant to all the systems for the job. Required clauses are invoked in Part 2 (Selection schedules for the reference specifications) for each system.

## **NON-NES CLAUSES**

Non-NES clauses may appear in Preliminaries, Selection Schedules and Clauses Specific to the Systems.

They will be distinguished by the clause reference beginning with an "alpha" character.



**SECTION 1**  
**GENERAL REQUIREMENTS**



## SECTION 1

### 1.1 GENERAL REQUIREMENTS

General Requirements and Standard Technical Clauses are contained within separate documents comprising:-

For Electrical Services

Brian Mellor Associates Document reference STSES01 Rev B dated April 2015.

These documents will be issued as part of the Tender Documentation and should be read in conjunction with all relevant specifications and Tender Drawings etc. Copies will only be issued in .PDF electronic format.

### 1.2 SCHEDULE OF RATES

A comprehensive Schedule of Rates shall be provided for each of the elements indicated on the Tender Summary in Section 4 of this Specification.

The Schedule of Rates shall be provided within 14 days of the date for commencement of the Contract Works.

### 1.3 OPERATING AND MAINTENANCE MANUALS

The electrical contractor shall provide 2 No. sets of record drawings showing the installations as-fitted together with 2 No. sets of Operating and Maintenance instructions for the systems. Drawings shall be to a scale of not less than 1:50 and the Operating and Maintenance instructions shall be A4 format contained in plastic wallets within a suitably labelled ring binder. Both the operation instructions and drawings shall be provided in .PDF electronic format. In addition the drawings shall also be issued in Autocad 2008 format on CD.

### 1.4 TECHNICAL QUERIES

Any queries in relation to these documents should be addressed to:-

Brian Mellor Associates  
2<sup>nd</sup> Floor  
Britannic Building  
3 Upperhead Row  
HUDDERSFIELD  
HD1 2JL  
Tel. No: 01484-513973

## **1.5 PRELIMINARIES AND GENERAL CONDITIONS**

To complete the works in accordance with the Contract Conditions the Contractor shall make due allowance in his tender for compliance with the Contract Preliminaries.

The Preliminaries describe the works as a whole, and specify general conditions, information and requirements for their execution, such as subcontracting, approvals, testing and completion.

Full details of the Contract Preliminaries are contained within the Contract Documentation detailed elsewhere.

## **1.6 SYSTEM IDENTIFICATION**

All items of control equipment / instruments shall be identified using rectangular traffolyte engraved labels with agreed characters / text. The labels shall be securely fixed to each item of distribution equipment and switchgear

## **1.7 STANDARD SPECIFICATION AND WORKMANSHIP**

The installations shall be carried out in accordance with the requirements of the Standard Technical Specifications issued by Brian Mellor Associates. In addition and complementary to the Standard Specifications, the installations must comply with BS 7671 – IEE Wiring Regulations



**SECTION 2**

**PROJECT SPECIFIC CLAUSES**

**AND**

**DESCRIPTION OF WORKS**

**CONTENTS**

<b><u>Clause</u></b>	<b><u>Description</u></b>
<b>2.1</b>	<b>General Building Description</b>
<b>2.2</b>	<b>Design Standards and Guidance</b>
<b>2.3</b>	<b>Site Communications</b>
<b>2.4</b>	<b>Schedule of Tender Drawings</b>
<b>2.5</b>	<b>Testing and Commissioning</b>
<b>2.6</b>	<b>Equipment Suppliers</b>
<b>2.7</b>	<b>Design Information to be submitted for Comment</b>
<b>2.8</b>	<b>Builderswork</b>
<b>2.9</b>	<b>Record Drawings</b>
<b>2.10</b>	<b>Operating and Maintenance Manuals/Health &amp; Safety File</b>
<b>2.11</b>	<b>Schedule of Rates</b>
<b>2.12</b>	<b>Incoming Services</b>
<b>2.13</b>	<b>Service Co-ordination</b>
<b>2.14</b>	<b>LV Distribution</b>
<b>2.15</b>	<b>External Lighting</b>
<b>2.16</b>	<b>Lighting Control</b>
<b>2.17</b>	<b>Labelling</b>
<b>2.18</b>	<b>Earthing System</b>
<b>2.19</b>	<b>External In Ground Ductwork</b>

**SECTION 2**  
**PROJECT SPECIFIC CLAUSES**  
**AND**  
**DESCRIPTION OF WORKS**

**2.1 General Building Description**

**This is a design and build project, the Electrical Contractor shall be responsible for the design, installation and commissioning of the electrical lighting systems for the project including all associated builderswork.**

This specification covers the design, supply, installation, testing and commissioning of floodlighting installations for the football pitch and training and ancillary areas at Moorends Welfare Ground.

**2.2 Design Standards and Guidance**

The Contractor shall be responsible for the design of all aspects of the electrical services systems including structural supports, bases etc. All calculations shall be submitted for scrutiny prior to any electrical services installations including structural calculations for the new floodlighting installations. The contractor shall employ the services of a structural engineer for this purpose.

Provide all materials and works in accordance with the appropriate British Standard or Code of Practice and where no BS or CP is applicable the Agreement Certificate for the particular item. Comply with all statutory instruments and regulations, and local by-laws relating to the area of the site current at the date of tender.

Comply with the requirements of the Local Authority Building Inspector and the approved documents of the building regulations.

Comply with all Statutory Obligations arising from current legislation and regulations.

Comply with FA guidance for club level floodlighting

Comply with all relevant CIBSE lighting codes including CIBSE LG4

**2.3 Communications**

All technical queries shall be addressed to: -

Brian Mellor Associates  
Tel. No: 01484-513973  
Email: [general@bmellorasc.co.uk](mailto:general@bmellorasc.co.uk)

**2.4 Schedule of Tender Drawings**

Refer to the Schedule of Tender Drawings at the end of section 3 of this specification.

This drawing is only provided to indicate the approximate areas of lighting required. Associated standards will take preference over this drawing where applicable. The contractor shall provide all finalised design, installation, working drawings considered necessary for the complete installation of the works. Refer to section 1 of this specification.

## **2.5 Testing and Commissioning**

The whole of the installations shall be tested and commissioned to the satisfaction of the CA.

Commissioning shall be carried out in accordance with the following: -

- CIBSE Commissioning Codes relevant to the particular installation.
- Section 3 Standard Technical Clauses relevant to the particular installation.
- BS7671 Requirements for electrical installations

All specialist equipment shall be tested and commissioned by the equipment manufacturer to the satisfaction of the CA.

## **2.6 Equipment Suppliers**

Details of the proposed floodlights and columns shall be submitted with the Contractors tender

## **2.7 Design Information to be Submitted for Comment**

Prior to commencement of any site works the Electrical Contractor shall submit all design drawings and related design data / calculations etc., to the Contract Administrator (CA) or his appointed agent for comment and checking.

The drawings, schedules and calculations shall be issued in electronic PDF format for review.

The CA will examine all documents which have been submitted for compliance, in principle, with the design intent. Such an examination shall not relieve the originator of such documents of his responsibilities and obligations under the contract. The CA will require 7 working days from receipt of such information to provide comments.

Prior to submission the contractor shall check and approve all drawings, schedules and any other information provided by manufacturers, nominated suppliers or specialist sub-contractors to ensure that all the requirements of the contract documentation have been incorporated.

All documents submitted for comment shall be accompanied by a certificate indicating that they have been checked by the contractor.

Contract Administrator 's comments will be graded as follows:-

Category A - deemed to be satisfactory and no further comments will be issued by the Contract Administrator.

Category B - deemed to be satisfactory subject to incorporation of Contract Administrator's comments. No further submission required.

Category C - deemed to be unsatisfactory. Contract Administrator's comments must be incorporated. The documents must be re-submitted to the Contract Administrator for checking after modification.

Category D - deemed to be unsatisfactory. The Contract Administrator is not obliged to give any reason for rejection of the documents. The documents must be re-submitted after modification.

In addition to the requirements of clause 2.7 above, the Contractor shall liaise with the Contract Administrator and others as necessary to help ensure co-ordination of the work with related building elements and services.

Planning permission will be required for the installation as such the contractor shall also submit with his design information a drawing indicating light spillage to the entire site and associated lux levels.

## **2.8 Builders Work**

The Contractor is required to carry out all builders work associated with the electrical services installation including, but not limited to the provision of trenching, ducting, holes through walls, column bases including reinstatement and making good to both hard and soft services disturbed, this includes replacing turf where removed. All builders work drawings shall be submitted for comment etc., as described in Clause 2.7 above.

## **2.9 Record Drawings**

The Contractor shall provide and maintain on site one complete set of approved drawings and specifications covering all aspects of the project and which shall be available for inspection during working hours. As works proceed, the Contractor shall amend relevant drawings to include any variations, which may occur.

'As Installed' drawings shall be issued 2 weeks prior to practical completion being achieved for approval by the CA.

On completion 2 sets of paper prints of the record drawings shall be issued with the Health and Safety File.

In addition, all of the drawings and manuals shall be issued on CD in .pdf and AutoCAD format or in accordance with directions from the CA.

## **2.10 Operating and Maintenance Manuals / Health and Safety File**

The Contractor shall provide 2 sets of a project specific Health and Safety File which shall comply with the requirements of section 1 of this specification.



Two weeks before practical completion the Contractor shall provide draft Operating and Maintenance manuals and agree format and contents with the CA.

**2.11 Schedule of Rates**

The Contractor shall provide a fully detailed Schedule of Rates compiled to concur with each of the items on the tender summary. The Schedule shall be provided within 2 weeks of receipt of order.

**2.12 Incoming Services**

The existing pavilion is provided with a 100A TP&N supply within the Switchroom. A spare way is available on the existing Hager MCB board for connection of the new floodlighting installation. The club have been informed that limited power capacity is available for the floodlighting and that a supply upgrade is required. This however is excluded from the scope of this contract and works shall be limited to works associated with the connection of the new floodlighting into the existing installation only. Two pricing options are required as part of the tender submission for the option of discharge lighting or LED lighting. Associated power requirements for each shall be submitted with the Contractors tender return.

**2.13 Service Co-ordination**

The Contractor must co-ordinate all aspects of the electrical installation with all trades and members of the contract and client team, from the start of the design phase through to completion. Liaison must be carried out via the contract administrator for any client actions required.

**2.14 LV Distribution**

The LV distribution system shall be designed, installed and commissioned in accordance with the recommendations of the IEE Wiring Regulations (BS7671) and the following standards and codes:

BS5486-	Low voltage switchgear and control gear assemblies
BS5490:1997-	Specification for classification of degrees of protection provided by enclosures
BS3871-	Specification for miniature and moulded case circuit breakers
BS5467:1989-	Specification for cables with thermosetting insulation for electricity supply for rated voltages of up to and including 600/1000V and up to and including 1900/3300V

A new supply shall be provided for the new floodlighting installation via a new MCB on the existing supply.

Multicore XLPE/SWA/LSF power distribution cabling shall be provided between the switchboard and a new external Green steel weatherproof external enclosure to be provided



as part of this contract. The new enclosure shall be mounted on a new concrete base to be provided as part of this contract.

All armoured cables shall have identification labels fixed throughout their length with tie-wrap type fixings. The labels shall be positioned at either side of wall / floor penetrations, at changes in direction, termination points and at 5m intervals where exposed to view (in risers and voids etc).

A new final circuit MCB board shall be provided within the enclosure for final circuit distribution to the floodlighting columns. XLPE/SWA/LSF cabling shall be provided to floodlighting columns.

All final circuit distribution board sizes shall be determined by the Electrical Contractor. All boards shall be sized to provide 25% spare ways once the installation is completed. Surface mounted metal clad MCB type final circuit distribution board shall be installed with hinged lockable covers complete with:

1. A type written circuit chart in a clear plastic wallet fixed to the rear of the access door.
2. All required outgoing devices. Any way not having a MCB shall have a blank plate fitted.
3. An integral incoming isolator.
4. A label fitted to the distribution board cover indicating where fed from, distribution board reference and area served.
5. Integral multifunction metering for registering total energy usage, maximum Demand, voltage, power factor, current per phase etc.

The Electrical Contractor shall design the complete electrical distribution installation to provide safe operation in the event of a fault including discrimination.

The following parameters shall be used in compiling the design:-

Mains Voltage	400/230 Volts/50 Hz
Voltage Drop- Sub-Mains	1.5%
Voltage Drop- Final Circuits	2.5% Power Circuits – 1.5% Lighting Circuits
Prospective Fault Level	Details to be obtained from the supply authority the
Earth Loop Impedance at Source	Details to be obtained from the supply authority

## 2.15 External Lighting

The Electrical Contractor shall be responsible for the design, supply, installation, testing and commissioning of the flood lighting installations to the areas indicated on the drawings

Floodlighting shall be via a series of column mounted floodlights. The two training areas are to be floodlight via additional separately controllable lighting mounted on the football columns, as such this should be considered when siting the columns. Lighting requirements for each are:-

Football – FA Grade B **Eave** 200lux **Emin** 100lux **Emin/Emax** 0.25 **Emin/Eave** 0.6  
CIBSE Class 2

Training area adjacent pitch– **Eave** 75lux **Emin** N/A **Emin/Emax** N/A

Training area adjacent pitch– **Eave** 75lux **Emin** N/A **Emin/Emax** N/A

The appropriate maintenance factors for the installation shall be used within the design.

In addition a separate presence controlled floodlight shall be provided to the training area adjacent the football pitch for security purposes only. This shall have a separate photocell but shall not be affected by the timeswitch.

Two options are required for the floodlights, one discharge based and one LED based. Costs and details for both shall be provided with the Contractors tender return. Colour rendering and Glare Rating of either option shall be to FA and CIBSE requirements.

When designing the lighting installation the electrical contractor shall ensure that they liaise with the lighting manufacturer to ensure that all the necessary brackets and accessories are included for the correct mounting of the luminaires.

All luminaires shall be mounted on new galvanised steel columns which shall be of the bottom hinged variety. A winch and all required tools shall be provided to operate the columns shall be provided on handover.

The lighting shall be designed in accordance with the current edition of CIBSE LG4 and the applicable FA Guidance.

Upon completion a full verification to FA Guidance shall be undertaken during the hours of darkness to measure and record the achieved design values and a report compiled and presented to the CA.

## 2.16 Lighting Control

The Contactor shall be responsible of the selection subject to approval, design, installation and commissioning of lighting controls for the floodlighting to operate as described below.

Lighting shall be controlled via a master photocell to disable the lighting from switching on when sufficient daylight is available.

A 7 day timeclock shall then be provided to control the hours of operation.

A bank of switches within the cabinet shall be provided for the floodlighting to enable floodlighting for each area to be selected by the operator as well as facilitate a phased switch on of the lighting.



### **2.17 Labelling**

The Contractor shall be responsible for labelling all electrical distribution equipment, isolators, electrical accessories and lighting with dymo industrial self-adhesive labels. Traffolyte labels shall be provided to distribution boards

Sub-main cables shall be labelled using Critchley cable markers.

### **2.18 Earthing System**

The earthing system shall be installed in accordance with the recommendations of the IEE Wiring Regulations (BS7671) and the following standards and codes:

	Local electrical authority regulations
--	----------------------------------------

### **2.19 External in Ground Ductwork**

The external lighting cabling shall be installed through flexible twin wall rigicoil UPVC ducting and preformed access chambers at set intervals and changes of direction.

The duct work installation shall be designed so that cables can be replaced or additional cables installed without disturbing any hard landscaping.

The provision of all associated builderswork is also required



**SECTION 3**

**STANDARD TECHNICAL CLAUSES**



## **SCHEDULES**

### **1. SCHEDULE OF TENDER DRAWINGS**



## 1. SCHEDULE OF TENDER DRAWINGS

The following drawing is provided:-

<b>Drawing No.</b>	<b>Title</b>	<b>Paper Size</b>	<b>Scale</b>
2017-055/E/101	Areas of External Lighting	A1	1:500



**SECTION 4**

**ELECTRICAL SUMMARY OF TENDER**

**Option 1 – LED Lighting**



**SCHEDULE A – Option 1**

**ELECTRICAL ENGINEERING SERVICES**

**MOORENDS WELFARE GROUND  
DESIGN & BUILD PERFORMANCE SPECIFICATION**

**SUMMARY OF TENDER – LED LIGHTING**

	£	p
1 Section 1 Standard General Conditions and Preliminary Clauses		
2 Section 2 General Common Clauses		
2.0 Design		
2.1 Electrical Containment		
2.2 Sub Main Distribution Cable		
2.3 Final Circuit Distribution Boards		
2.4 Electrical Metering		
2.5 FloodLighting		
2.6 Earthing		
2.7 In Ground Ducting Installation		
2.8 Testing and Commissioning		
2.9 O&M Manuals		
3 Section 3 Standard Technical Clauses		

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TOTAL                    £

Signed.....

Company Name.....

Address.....

.....

Date.....



**SECTION 4**

**ELECTRICAL SUMMARY OF TENDER**

**Option 2 – Discharge Lighting**



Section V  
Tender Return Form

**JOHN HILL ASSOCIATES LTD**

**Architectural & Surveying Consultants**

**TENDER FOR**

**PROPOSED FLOOD LIGHTING SCHEME**

**AT**

**MOORENDS WELFARE GROUND**

**FOR**

**THORNE MOORENDS TOWN COUNCIL**

TO:- Thorne Moorends Town Council

Sirs

I/We the undersigned hereby offer to undertake upon the terms and conditions of, and in the manner described in the Conditions of Contract, Specification of Works and drawings which have been furnished to and inspected by me/us to supply all labour, materials and plant to carry out all works required to complete the whole of the works included or implied in the Specification and all Drawings in accordance with the said conditions of contract for the sum of

in words .....Pounds

..... pence (plus VAT) £ .....(Plus VAT)

If successful we would be able to commence the works within ..... weeks of acceptance of the tender.

If successful we would require ..... weeks from the date of possession to complete the works.

Dated this ..... day of ..... Two Thousand and Eighteen

Signed .....

For and on behalf of .....

**JOHN HILL ASSOCIATES LTD**

**Architectural & Surveying Consultants**

**TENDER FOR**

**PROPOSED FLOOD LIGHTING SCHEME**

**AT**

**MOORENDS WELFARE GROUND**

**FOR**

**THORNE MOORENDS TOWN COUNCIL**

1. Tenders are to be delivered or sent by post to reach the office of Thorne Moorends Town Council, no later than 12.00 noon on 8 June 2018
2. Unqualified tenders only must be submitted and any qualifications of the tender or variation of the terms and conditions of contract will result in the rejection of the tender.
3. No undertaking is given that the lowest or any tender will be accepted.
4. The Contractor is expected to check when submitting his tender that the amount stated on the tender form is correct. NBS Guide to Tendering for Construction Projects Alternative 1 Applies.
5. Should the tender under consideration exceed the Employer's Budget then the procedure will be as laid down in the NBS Guide to Tendering for Construction Projects.
6. The Contractor is advised to visit the site prior to preparing his tender

Appendix i  
Drawings Schedule

Appendix ii  
TMTC Certificates B & D

**THORNE MOORENDS TOWN COUNCIL**  
**Floodlighting Scheme Moorends Welfare**  
**PART B: STATEMENT CONFIRMING BONA FIDE**  
**(GENUINE) TENDERING**

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In respect of the belief that the fundamental nature of selective tendering is that Thorne Moorends Town Council shall receive bona fide (genuine) competitive tenders from all those tendering.

I/WE CERTIFY THAT:

- 1.1 The tender submitted with this document is a bona fide (genuine) tender, intended to be competitive.
- 1.2 I/WE have not fixed or adjusted the amount of the Tender under or in line with any agreement or arrangement with any other person.
- 1.3 I/We have not done, and agree that we will not do at any time before the hour set for the return of the Tender, any of the following actions:
  - a. Communicate with a person other than the person calling for this Tender the amount or approximate amount of this Tender (except where the disclosure, in confidence, of the approximate amount of the Tender was necessary to get hold of insurance premium quotations that were required for the preparation of the Tender);
  - b. Enter into any agreement with any other person that he/she shall not tender or discuss the amount of any Tender sent in; and
  - c. Offer, pay, give or agree to give any sum of money or valuable consideration, directly or indirectly, to any person for doing, having done, causing or having caused to be done, with regard to this tender or to any other Tender any act or thing described above.

Name:

Position:

For and on behalf

of:

Dated:

***In this statement:***

⇒ ***'Person' includes any person, body or association corporate or incorporate; and 'Any agreement or arrangements' includes any transaction of the sort described above, formal or informal and whether legally binding or not.***

**THORNE MOORENDS TOWN COUNCIL**  
**Floodlighting Scheme Moorends Welfare**

**PART D: CERTIFICATE IN RESPECT OF UNAUTHORISED  
APPROACHES TO THORNE MOORENDS TOWN COUNCIL  
EMPLOYEES**

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I/We hereby certify that I/We have not made any unauthorised approach in writing or otherwise to any employee of Thorne Moorends Town Council to ascertain any information relating to individual or collective rates of pay, conditions of service or to obtain any operational information to assist in submitting this tender or any other tender or proposed tender and that no person employed by me/us acting on my/our behalf has done any such act.

I/We hereby undertake that I/We will not in the future do any such unauthorised act as specified above in connection with the tender or any proposed tender and that no person employed by me/us acting on my/our behalf will do any such act.

Name:

Position:

For and on behalf of:

Dated:

Appendix iii  
Pre Construction Information

Appendix iV  
Pre-Qualification Questionnaire

## Thorne Moorends Town Council Supplier & Subcontractor Pre-Qualification Questionnaire

TMTC are committed to high standards of health, safety and welfare. Contractors working on TMTC sites must ensure that they comply with all current health, safety and environmental legislation, industry standards and good working practices.

All contractors must satisfy the requirements of the questionnaire in order to be accepted and placed on the Approved Contractors List. No contractor will be permitted to work on any TMTC projects without prior approval.

All sections of the questionnaire must be completed. Any sections not applicable must be clearly indicated. Simply completing the questionnaire will not achieve a successful assessment; documentary evidence must be provided to support your answers.

In the event that you are unsure of your response, please contact our project Co-ordinator

Please note that we will request updated information from you periodically to ensure that you are continuing to maintain your current systems and procedures.

<b>Part 1: Company Details</b>			
Supplier	<input type="checkbox"/>		
Subcontractor	<input type="checkbox"/>		
Trading Name			
Address			
Town / City			
County			
Post Code			
Website			
Description of services / goods that your company provides:			
Have you worked for TMTC before?			YES / NO
Which project did you last work on with TMTC and approx. date?			
<b>Main Contact</b>			
Name			
Email			
Phone		Fax	
<b>Your Company</b>			
How many direct staff does your company employ?			
Do you as a company employ sub-contract or agency staff?			YES / NO
<b>Who has executive responsibility for health, safety &amp; environmental issues in your company?</b>			
Name			
Position			
Email			
Phone		Fax	

<b>Part 2: Quality, Safety and Environment</b>		
<b>1</b>	Does your company operate a Quality Management System e.g. ISO 9001? If YES, please attach a copy of certificate.	YES / NO
If NO, please give details of how you manage quality assurance within your organisation.		
<b>Safety Schemes in Procurement</b>		
<b>2</b>	Are you a member of CHAS or Constructionline, or any other SSIP's? Please see <a href="http://www.ssip.org.uk">www.ssip.org.uk</a> for a list of accredited members.  <b>Please attach a copy of your latest membership certificate / approval letter and proceed to Q14. If not, please continue with Q3.</b>	YES / NO
<b>Health and Safety</b>		
<b>3</b>	Does your company have a health and safety policy? If yes please enclose a copy.	YES / NO
<b>4</b>	When was your health and safety policy last reviewed?	
<b>5</b>	Please provide details of how you bring the details of your health and safety policy to the attention of your employees.	
<b>6</b>	How do you monitor the health and safety performance of your direct employees?  Please provide an example of a site inspection.	
<b>7</b>	Please provide the name of the person or organisation that provides competent health and safety advice to your organisation:	
	Name	
	Organisation	
	Address	
	Telephone	
	Email	
Please attach an up to date CV for the above person ensuring that details of relevant health and safety qualifications are included.		
<b>8</b>	Does your company undertake health and safety training to both staff & operatives? If yes, please attach a copy of your training matrix to this form and provide some sample certificates.	YES / NO
<b>9</b>	Asbestos awareness training is a legal requirement for anyone who can potentially be at risk of exposure. Because asbestos is widely found in older buildings, TMTc expect all subcontractors to have received asbestos awareness training by a reputable body i.e. UKATA. Does your company provide training for relevant staff members? If yes, please provide copies of asbestos awareness training certificates.	YES / NO
<b>10</b>	Has your company or individuals employed by the company been prosecuted for any breaches of health and safety legislation within the past five years? If YES, give brief details:	YES / NO

<b>11</b>	Has your company been issued with any improvement notices or prohibition notices within the past 3 years? (Please note the HSE's database of prosecutions may be checked to verify this information). If YES, give brief details:				YES / NO
<b>12</b>	Provide details of your accident history for the past 3 years.				
	Year	Fatal Accidents	Reportable Accidents	Minor Accidents	Near Misses
<b>13</b>	Do you carry out your own Risk Assessments, Method Statements and COSHH Assessments? If NO, please state who does and how site specific risk assessments are undertaken:  Please provide a copy of a recent risk assessment and method statement.				YES / NO
<b>14</b>	How do you assess the competence of companies you place your contracts with?				
<b>15</b>	Please confirm that all subcontractors employed by yourselves will be: <ul style="list-style-type: none"> <li>• Suitably qualified and experience to fulfil the contract</li> <li>• Properly qualified and have relevant accreditations</li> <li>• Provided access to documentation enabling them to fully appreciate all aspects of work; and</li> <li>• Are able to demonstrate capability and resources to meet the requirements of the contract</li> </ul>				YES / NO YES / NO YES / NO YES / NO
<b>Environmental Management</b>					
<b>16</b>	Does your company operate an Environmental Management System e.g. ISO14001? If YES, please attach a copy of the certificate. If NO, please explain how your company reduces effects on the environment:				YES / NO
<b>17</b>	Has your company been prosecuted under Environmental Legislation?				YES / NO
	Date	Details:			

<b>18 Insurance Details</b>			
<b>Employer's Liability</b> – please attach copy			
Insurer		Policy Number	
Limit of Indemnity		Renewal Date	
<b>Public Liability</b> – please attach copy			
Insurer		Policy Number	
Limit of Indemnity		Renewal Date	
<b>Professional Indemnity Insurance</b> – please attach copy			
Insurer		Policy Number	
Limit of Indemnity		Renewal Date	
<b>Accounts Information</b>			
VAT Registration No.		Unique Tax Reference	
Company Registration No.		National Insurance (Where applicable)	
<b>Bank Details</b>			
Account Name			
Sort Code		Account Number	

Minimum Contract Value	£	Maximum Contract Value	£
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<b>Declaration</b>			
Print Name		Role	
Signature		Date	

### DOCUMENTATION CHECKLIST

The following information **MUST** be returned with this questionnaire. If any are not applicable please write 'None'. Please do not return complete policy or procedural documents – just statement pages (signed and dated).

<b>Quality</b>	ISO 9001:2000 certification certificate(s)	
<b>SSIP</b>	Accreditations – CHAS, Constructionline, SAFEcontractor	
<b>Health and Safety</b>	Health and Safety Policy Statement (Revised in the last 12 months, signed and dated)	
	Health and Safety Advisor's CV	
	Training Matrix	
	Sample Training Certificates	
	Asbestos Awareness Training Certificates	
	Copies of any Improvement, Prohibition Notices or prosecutions received during the last 5 years	
	Sample Risk Assessment and Method Statement	
	Example Site Inspection Report	
	Copies of ISO 9001, ISO 14001 and OHSAS 18001 Certificates	

**For Internal use only**

Requested by		Signature		Date	
Reviewed by	Health & Safety Manager	Signature		Date	
	Project Manager	Signature		Date	
	Accounts	Signature		Date	
Decision	Approved	<input type="checkbox"/>			
	Additional information required	<input type="checkbox"/>			
	Failed application	<input type="checkbox"/>			

Comments: