PROPOSED ELECTRICAL INSTALLATIONS AT BRITAM CENTRE

FOR

THE BRITAM HOLDING PLC
P.O. BOX 30375 00100
NAIROBI

GENERAL CONDITIONS, SPECIFICATIONS AND

BILLS OF QUANTITIES

FOR

ELECTRICAL INSTALLATIONS

RELEASE DATE: 19th February **2026**

CLOSING DATE: 26th February 2026

SERVICES ENGINEERS
NORKUN INTAKES LTD
P.O. Box 605 - 00100
NAIROBI

info@norkun.com

PROPOSED ELECTRICAL INSTALLATIONS AT BRITAM CENTRE UPPERHILL, NAIROBI

Contract Conditions, Specifications and Bills of Quantities

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1a. EXPRESSSION OF INTENT TO PARTICIPATE IN TENDER

EXPRESSSION OF INTENT TO PARTICIPATE IN TENDER

This form is to be completed on receipt of the tender document from Britam Holding Company (Kenya) Limited.

This page is to be completed immediately and scan copy in PDF format e-mailed to Procurement Tenders@britam.com. The data contained in this form will be used to send out any addenda that may arise. Firms that do not register their interest by completing this form may not be sent addenda that may arise.

Name of the firm's representative completing this form:
_____

Firm's Name: _____

Address: _____

Tel No: _____

Email Address: _____

Signature: _____Date: _____

Signed by (Name): _____

Position in Firm: _____

1b. FORM OF TENDER

Dear Sirs,

PROPOSED ELECTRICAL INSTALLATIONS AT BRITAM CENTRE UPPERHILL, NAIROBI

I/We understand that the works, the subject of this tender include

PROPOSED ELECTRICAL INSTALLATIONS

……

I/We undertake in accordance with the particulars set out in the preliminaries and to the satisfaction of the Engineer, to execute and complete the Contract works within……..……weeks and as per the specifications and drawings for the sum of Kenya Shillings.
(KShs.) ……..

I/We confirm that this Tender is subject to adjustments by any variation ordered by the Engineer.

I/We undertake to commence the works within 7 days from the date of official confirmation of acceptance of the tender.

I/We understand that you are not bound to accept the lowest or any tender and that no expenses incurred by us in the preparation of this tender will be allowed.

I/We agree that this tender shall remain valid for, and shall not be withdrawn within ninety days from the final date of submission of tenders and in the event of your acceptance to execute formal contract agreement with the client.

For and on behalf of

Official stamp:

Signed by: ..... Date: .....

SECTION 02:

2a. PRELIMINARIES AND GENERAL CONDITIONS

NAMES OF PARTIES

The following will be inserted in the Articles of Agreement: -

Client: M/S Britam Holding PLC
Services Engineers M/S Norkun Intakes Ltd

INTRODUCTION

Purpose of the Tender

The Britam Holding Company Limited ("Britam") invites qualified firms to submit their RFQ for Proposed Electrical Installations at Britam Centre Upperhill, Nairobi.

This Request for QUOTATIONS (RFQ) is being made available to interested service providers on a restricted tender basis. This document is intended to provide vendors with sufficient understanding of the Britam's requirements to enable them to respond.

For the purposes of the RFQ, it is necessary to disclose information in this document, and its schedules, which is considered confidential and should therefore not be used (otherwise other than in furtherance of this tender) or disclosed to any third party without explicit prior written consent of Britam.

Britam on its part also acknowledges that it is requesting through this RFQ for information that is confidential and therefore commits in equal terms to reciprocal confidentiality.

Acknowledgement of Bidding Documents

Britam invites Bidders for **Proposed Electrical Installations at Britam Centre Upper hill, Nairobi.** in accordance with the requirements set out in this document. Within **three (3) working days** of receipt of the RFQ, the Bidder is required to acknowledge receipt of the RFQ and notify his intention to submit a bid by email to Britam at tenders@britam.com. The mail will include the signed registration template on Page 4 of this document.

Working days are defined as being any day of the week between Monday and Friday (0800 – 1700 Hrs) excluding weekends and gazetted public holidays in the Republic of Kenya).

Failure to do so shall be perceived as an intention not to submit a bid and the Bidder will be eliminated from the bid process and required to destroy the RFQ document in keeping with confidentiality requirements.

Point of Contact

All enquiries or correspondence concerning the details of this tender should be addressed, in the first instance by e-mail to: tenders@britam.com . The subject on the email should be **"PROPOSED ELECTRICAL INSTALLATIONS AT BRITAM CENTRE UPPERHILL, NAIROBI".**
All responses from Britam to the Bidder shall be channeled through the Procurement Officer.
It is the responsibility of the Bidder to obtain any further information required to complete this RFQ.
Any clarification request and their associated response will be circulated to all Bidders.

All clarifications must be sought at the latest 5 days prior to the close of the RFQ.

Mandatory site visit will be on 23rd February 2026 at 10.00am – Britam Centre.

ABOUT BRITAM HOLDINGS PLC

Organization Profile

Britam Holdings PLC ("Britam") is a leading diversified financial services group, listed on the Nairobi Securities Exchange. The group has interests across the Eastern and Southern Africa region, with operations in Kenya, Uganda, Tanzania, Rwanda, South Sudan, Mozambique, and Malawi. The group offers a wide range of financial products and services in Insurance, Asset management, Banking and Property. For more information, please visit http://www.britam.com.

The Group offers a wide range of products and services to individuals, small businesses, corporations, and government entities. The range of products includes life insurance, pensions, health insurance, and general insurance through its insurance businesses in the region. The financial solutions which include, unit trusts, investment planning, wealth management, offshore investments, retirement planning and discretionary portfolio management which are offered through its asset management business. In addition, the company carries out property development, and has substantial investments in the banking sector. For More information, please visit http://www.britam.com

Britam Vision

To be LEADING diversified financial services company in our chosen markets across Africa.

Britam Mission

Providing you with financial security EVERY STEP OF THE WAY.

Bid Preparation and Submission

RFQ For "PROPOSED ELECTRICAL INSTALLATIONS AT BRITAM CENTRE UPPERHILL, NAIROBI".

Bid documents in soft copy merged in one PDF (not zipped single documents) must be submitted in two separate documents, 1(one) technical- and 1 (one) commercial bid, password protected and clearly identified as:

tenders@britam.com

with a clear subject line *"PROPOSED ELECTRICAL INSTALLATIONS AT BRITAM CENTRE UPPERHILL, NAIROBI".*

Offers must be submitted in two separate documents, 1(one) technical- and 1 (one) commercial bid, password protected and clearly identified as:

The file with the RFQ should be identified as follows:
NAME OF THE COMPANY, "PROPOSED ELECTRICAL INSTALLATIONS AT BRITAM CENTRE UPPERHILL, NAIROBI".

GENERAL CONDITIONS OF CONTRACT

Introduction

Specific terms of contract shall be discussed with the bidder whose proposal will be accepted by the Company. The resulting contract shall include but not be limited to the general terms of contract as stated below from 5.2 to 5.14.

Award of Contract

Following the opening and evaluation of proposals, the Company will award the Contract to the successful bidder whose bid has been determined to be substantially responsive and has been determined as the

best-evaluated bid. Britam will communicate to the selected bidder its intention to finalize the draft conditions engagement in consultation with the bidder.

Application of General Conditions of Contract
These General Conditions (sections 5.2 to 5.14) shall apply to the extent that they are not superseded by provisions in other parts of the Contract that shall be signed.

Bid Validity Period
Bidders are requested to hold their proposals valid for ninety (90) days from the closing date for the submission.

Non-variation of Costs
The prices quoted for the service and subsequently agreed and into the contract shall be held fixed for the contract period.

Delays in the Bidder's Performance

Delivery and performance of the Transaction shall be made by the successful Bidder in accordance with the time schedule as per Agreement.

If at any time during the performance of the Contract, the Bidder should encounter conditions impeding timely delivery and performance of the Services, the Bidder shall promptly notify the Company in writing of the fact of the delay, its likely duration and its cause(s). As soon as practicable after receipt of the Bidder's notice, the Company shall evaluate the situation and may at its discretion extend the Bidder's time for performance, with or without liquidated damages, in which case the extension shall be ratified by the parties by amendment of the Contract.

Except in the case of "force majeure" as provided in Clause 5.14, a delay by the Bidder in the performance of its delivery obligations shall render the Bidder liable to the imposition of liquidated damages pursuant to Clause 5.7.

Liquidated damages for delay
The contract resulting out of this RFQ shall incorporate suitable provisions for the payment of liquidated damages by the bidders in case of delays in performance of contract.

Governing Language
The Contract shall be written in the English Language. All correspondence and other documents pertaining to the Contract which are exchanged by the parties shall also be in English language.

Applicable Law
This agreement arising out of this RFQ shall be governed by and construed in accordance with the laws of Kenya and the parties submit to the exclusive jurisdiction of the Kenyan Courts.

Successful Bidder's Obligations

The successful bidder:
Is obliged to work closely with Britam staff, act within its own authority, and abide by directives issued by the Company that are consistent with the terms of the Contract.

Will abide by the job safety measures and will indemnify the Company from all demands or responsibilities arising from accidents or loss of life, the cause of which is the Bidder's negligence. The Bidder will pay all indemnities arising from such incidents and will not hold the Company responsible or obligated.

Will be responsible for managing the activities of its personnel, or subcontracted personnel, and will hold itself responsible for any misdemeanors.

Will not disclose the Company`s information it has access to, during the course of the work, to any other third parties without the prior written authorization of the Company. This clause shall survive the expiry or earlier termination of the contract.

DESCRIPTION OF SITE

The site of the works is at Britam Centre Upperhill Nairobi. The works will be carried out adjacent to occupied premises. Due care will be required during construction so that the occupants and facilities in the adjacent premises and the premises themselves are not interfered with in any way.

The tenderer is recommended to visit the site and will be deemed to have satisfied themselves with regard to the relevant details of preliminary. If the tenderer, for whatever reason, feels specialized attendance will be required, with significant financial implications or requires specialized mobilization to start the works, he should spread the cost of such works in his unit rates.

No claims whatsoever by the Contractor for additional payment will be allowed on the grounds of any misunderstanding or misapprehension in respect of any such matters or otherwise, should the Contractor be required to offer specialized attendance prior to, or during, the performance of the contract.

DEFINITIONS & INTEPRETATION OF TERMS

The terms, phrases and abbreviations shall be deemed to have the following meanings wherever used hereinafter and in all contract documents.

Engineer: Shall in the case of Electrical/Mechanical works mean 'Norkun Intakes Ltd' Nairobi and, or in the event of any of their deaths, or ceasing to be the Engineers for the purposes of this Contract, such other person as the client shall nominate for that purpose. For the purpose of Mechanical and Electrical engineering works the Engineer shall be deemed vested with the duties of, and be the representative of the Client, except on respect of variations which involve the Contract sum.

Client: Shall mean the client whose name is indicated in item 1 above and shall include his or their heirs, executors, administrators, assigned successors and duly appointed representatives. For the purposes of this work, the terms "Client" and "Contract" shall have the same meaning.

Contractor: Shall mean the person or persons, partnership, firm or company, whose tender for the Contract for the works has been accepted, and who has or have, signed the Contract and shall include his or their heirs, executors, administrators, assigned successors and duly appointed representatives.

Main Contractor: Shall mean the person or persons, partnership, firm or company, whose tender for the main building contract for the development will be accepted, and who has or have, signed the contract and shall include his or their heirs, executors, administrators, assigned successors and duly appointed representatives.

Works: Shall mean all or part of the works, material and articles, wherever the same are being manufactured or prepared, which are to be used in the execution of this Contract and whether the same may be on the site or not.

Approved: Shall mean approved by the Engineer at his absolute discretion.

Directed: Shall mean directed by the Engineer at; his absolute discretion.

Selected: Shall mean selected by the Engineer at his absolute discretion.

M^3: Shall mean cubic meter

M^2: Shall mean square meter

M: Shall mean meter

LM: Shall mean Linear Meter

Kg: Shall mean Kilogram

No.: Shall mean Number

Item / Lot: Shall mean total sum of all items combined

Prs: Shall mean Pairs

B.S.: Shall mean the current British Standard Specification published by the British Standards institution, 2 Park Street, London, W.I. England

K.S.: Shall mean the current Kenya standards specification published by the Kenya Bureau of standards

As before: Shall mean in all respects as earlier described in the same or previous bill

Ditto: Shall mean the whole of the preceding description except as qualified in the description. Where it occurs in descriptions of succeeding terms it shall mean the whole of the preceding description which is contained within the appropriate brackets.

Fix Only: Shall mean take delivery on site (unless otherwise stated), unload where necessary, transport within site compound, store, unpack, check contents against orders and packing lists, assemble as necessary, distribute and hoist or install to position, test and commission.

Supply Only: Shall mean procure, deliver to site (unless otherwise advised), unload where necessary, transport within site compound, store, unpack, check contents against orders & parking lists, repack, assemble as necessary and store neatly in the storage space provided by others as directed.

Supply and Install: Shall mean undertaking both supply only and fix only.

Agreement: Shall means this Agreement, its Schedules, the Contract Drawings, the accepted Bills of Quantities, the specifications, the letter of acceptance, the Purchase Order, and such other documents as may be expressly incorporated in the letter of acceptance or contract agreement (save as may otherwise be varied by this Agreement)

Bills of Quantities, Contract Bills or BOQ: Shall mean the document drawn up by the Engineer and priced by the Contractor to arrive at a contract price.

Certificate of Practical Completion: Shall mean a certificate issued by the Engineer / Architect to the Contractor to signify a state of completion where, in the opinion of the Engineer / Architect, the Works are substantially complete and can effectively and conveniently be used for the intended purposes

Code of Conduct: Shall mean the Contractor Code of Conduct as set out in Schedule 9 to this Agreement

Practical Completion: Shall mean that the Works have been substantially completed in all material respects such that the Site is capable of being taken over and used by the client for the purpose for which it was intended without prejudicing the safe and convenient use of the Site and there are no Defects other than those identified in the Defect List

Contract Drawings: Shall mean drawings showing and describing the Works to be done or to be prepared by the Contractor and includes any modifications to such drawings and where the context requires includes drawings prepared by the Contractor and approved by the client

Contract Period: Shall mean the period agreed for the construction of the Works and stated in the appendix to these conditions or extended in accordance therewith

Contract Price: Shall mean the price for the Works as stated the agreement or as adjusted in accordance with the contract.

Defect: Shall mean any aspect of the Works which is not in accordance with the contract or to the reasonable satisfaction of the Engineer / Architect

Final Acceptance: Shall mean that the Services have been carried out and completed within the terms of this Agreement and all the Defects List items completed

Final Certificate: Shall mean a certificate issued by the Engineer / Architect to the Contractor signifying that the Works have been carried out and completed in accordance with the terms of contract and that all adjustments to the contract price have been made in accordance herewith.

Final Account: Shall mean the document prepared by the Engineer containing all the adjustments to the contract price in accordance with the conditions of contract and which in his opinion is the total value of the Works at completion.

Interim Payment Certificate: Shall mean any certificate of payment issued periodically as the Works progress by the Engineer / Architect

Prime Cost Sum: Shall mean a sum included in the contract bills for works or services to be executed by a nominated sub-contractor, statutory or other authority or for materials or goods to be obtained from a nominated supplier.

Provisional Sum: Shall mean a sum included in the contract bills for the execution of work which cannot be entirely foreseen, defined or detailed at the time the tender documents are issued.

EXTENT OF INSTALLATIONS

The Tenderer shall include in his tender, prices, manufacture, inspection, testing, packing, shipment, insurance, shipping, customs duties, taxes, delivery to site, unloading and all other charges. The Tenderer shall also include for complete erection, tests on completion, setting to work, finishing and painting and maintenance of all items of plant and equipment described or implied within these Technical Specifications and shown on the relevant drawings to the satisfaction of the Engineer and the Architect.

The installed services within the buildings shall be complete in all respects as specified herein, and shall include all items of equipment, materials, accessories, fittings, supports, etc. necessary whether such items are specifically referred to in the Contract or not. The Tenderer shall be deemed to have included in his tender price all items necessary such that the installations are complete in all respects and left in good working order.

If awarded the Contract, the Contractor shall be expected to provide fully detailed drawings shop of the entire installation together with layouts of all proposed civil and building works etc. required to accommodate/house the plant and equipment, these layout drawings and details being related to the existing layouts as may be necessary. The drawings shall be submitted for approval within three (3) weeks of the

award of the Contract such that the Engineer can be made aware of all requirements. It shall be deemed to be the responsibility of the Contractor to ensure all civil and builder's works required for this Contract are prepared and/or provided to suit the programme of this Contract. No claims will be entertained.

All proposed new layouts and structures shall be subject to the full approval of the Engineer

PROGRAMME OF WORKS.

The Tenderer shall provide within a stipulated period of acceptance of his tender and award of Contract, a complete programme for the proposed installations to be executed indicating the anticipated commencement and completion dates of the following activities:

Submission of working drawings for approval
Placing of orders with other specialists for plant and equipment to be incorporated in the works
Receipt by the Contractor from other specialists of plant to be incorporated in the works.
Manufacture by the Contractor of plant to be incorporated in the works
Inspection and testing by the Engineer
Shipment of the plant from country of manufacture
Delivery of the plant and equipment to site
Erection on site, details for all activities
Kenya Power & Lighting Company installations, ICT installations, National, County or any other statutory body installations as desired by contract
Tests on Completion.
Training to management team

Operations shall be commenced when instructed and shall be carried forward to completion with the greatest possible expediency, to the satisfaction of the Engineer, in accordance with the Programme. The Contractor's programme shall be agreed with the Engineer and shall adhere fully to the requirements and timing of the agreed Main Contractor's programme.

TENDER CONDITIONS

Any act of collusion that may distort normal competitive conditions may cause the rejection of the tenders concerned. By participating in the tendering, tenderers certify not to be involved in such acts of collusion.

Tenders containing abnormally high or low unit prices and /or lump sums may be rejected. Before such rejection, however the tenderer may be given the opportunity of giving a detailed explanation in writing.

Tenders must be returned complete and tenderers or their assigned representatives are at liberty to witness the tender opening at the time and venue stated in the letter of invitation to tender. Tenders received after the stated time will be returned unopened and incomplete tenders will be rejected.

Tenders are invited in strict accordance with the documents issued, counter offers submitted with tenders will not be considered, letters of qualifications with tenders may be ignored if they have the effect of modifying either the terms of a tender or the compatibility of a tender with the other tenders. However, should a tenderer, in good faith wish to propose modifications to the tender terms, conditions and contents for the purposes of reducing the tender amount then he shall contact the Engineer in writing well before the date of tender opening. Should the Engineer approve the proposed modification, all tenderers will be advised in due time for the modification of their tenders. No proposed modification will be considered unless this procedure has been followed.

The client is not bound to accept the lowest or any tender, nor is the client bound to divulge reasons for the acceptance or non-acceptance of any tender. Any tender may be accepted by the client within the stated period unless previously withdrawn by the tenderer.

All deletions, additions and corrections to figures inserted in the tender document are to be counter signed by the tenderer.
In the event of two or more tenders being in the same sum, tenderers may be given seven (7) days within which to revise their tender prices. Should there again be two or more tenders in the same sum, and in the absence of any qualities to give one tenderer preference over the other(s), then, the Contract may be awarded by drawing lots in the presence of the tenderers concerned.

TENDER TECHNICAL DATA

Where included in the Tender Documents, all Tenderers shall complete Schedules of technical data. Otherwise the Tender may not receive full consideration, and will be liable to rejection.

TENDER EVALUATION PROCEDURES

Following the return of the tenders for the works measured in these bills of quantities, arithmetical and other analysis will be carried out in order to select the lowest acceptable tender in terms of responsive and realistic pricing, etc. This section will be at the sole discretion of the client.

The unit rates offered by the selected tenderer will then be applied to new quantities measured by the Engineer for the revised scope of works.

The resultant total, together with the priced preliminaries and any modified prime cost and provisional sums will be consolidated into a sum for which the Contract will be signed.

This procedure will be applied only to the selected tender. Neither the Client nor the Consultants will enter into discussion or any correspondence with the other tenderers after the selection process has been carried out and no reasons will be given for selection or non-selection.

Any tenderer unable to comply with these procedures will be disqualified from the selection process

ACCESS TO SITE AND SECURITY

Means of access to the site will be as directed by the Engineer. No other access will be permitted in any circumstances.

AREA TO BE OCCUPIED BY THE CONTRACTOR

Areas to be occupied by the Contractor for use as storage shall be as directed by the Project Engineer.

DRAWING(S)

Tender Drawings:

The Contractor will be deemed to have examined the drawings before tendering and to have satisfied himself regarding their details and regarding the nature and extent of the works and the method of installation involved. No claims arising out of misapprehension in these respects will be allowed.

The Drawings indicate generally the arrangement of the installations and are for assistance in tendering only. The position of equipment and apparatus shown thereon are approximate only, the exact positions, together with the actual runs of ductwork, trunking and conduit etc., will be agreed upon with the Engineer and the Client prior to commencement of work. It shall be deemed that the prices entered by the Contractor include for the repositioning, of the various services, to meet the above requirements. No claims will be entertained.

The Engineer will furnish the Contractor within a reasonable time after the receipt by the Engineer of a written request for the same, any details of which, in the opinion of the Engineer are necessary for the execution of any part of the works. Such a request shall be made only within a reasonable time prior to the execution of such work in order to fulfill the Contract. One copy of the Drawings, details and Technical Specifications shall be kept on the site until the completion of the Contract and the Engineer shall at all reasonable times have access to the same. The Contractor shall return all copies of Drawings and other relevant details to the Engineer on the completion of the Contract.

Additional Drawings will be issued by the Contractor to the Engineer to suit the design requirements of the works. These Drawings being issued either during or after the tender period as may be required or necessary. These Drawings will supplement the details contained within the Technical Specifications and Bills of Quantities and the Tenderer shall be deemed to have taken these into account in his pricing. Where the Contractor can demonstrate that the Drawings relate to new approved or additional items these new or additional items shall be priced to approval in accordance with the Contract rates and prices.

Award / Contract Drawings:

Two (2) copies of all drawings and a copy (1) of the specifications will be furnished free of cost to the Contractor (whose tender has been accepted) for his own use. Any extra copies will be paid for.

The Contractor shall at his own risk and cost execute and perform the works described in the conditions of contract and bills of quantities and detailed in the drawings provided and supplied to the Contractor for the purpose of works and completely finish the said works in a good workmanship and with the utmost expedition.

The Contractor shall satisfy himself as to the correctness of all drawings and measurements as per site conditions. If the Contractor finds any discrepancy in the drawing or between the drawing and the specifications he shall immediately refer the same to the Engineer who will decide which shall be followed.

Figured dimensions shall be taken in preference to the scale mentioned on or attached to any drawing. Details shown on drawings shall be taken in preference to items and quantities in the specification.

Shop / Working Drawings:

The Contractor shall prepare fully detailed Shop / Working Drawings for all items of plant, equipment and accessories required for installation under this section of the Contract. Two (2) copies of each Drawing shall be forwarded to the Engineer for approval and or comments and one (1) soft copy in PDF and CAD formats. One (1) copy will be returned stamped "Approved" or "Not-Approved". Where Drawings require further information and/or modifications to meet the comments made by the Engineer they shall be re-submitted, again as above, for approval.

When Drawings have been approved two (2) further copies as above shall be forwarded to the Engineer, together with copies to the Architect, Site and the Client.

Shop / Working drawings, and, where relevant, calculations in respect of the following shall be prepared by the Contractor and submitted to the Engineer for his approval commencing within ten (10) days from acceptance of the tender. These are (As Applicable to the specific service):

Cabling and external cable routes
Details of all conduit and trunking runs in respect of different services
Details of lighting and power circuits, routes etc.
Details of sub-main switchgear and distribution boards
Details of Lightning and surge protection
Details & Layouts of all ducts, chases, holes, trenches and all other services throughout the whole of the building and associated external works
Details & Layouts of Fire alarm system and all circuit diagrams
Details & Layouts of all Security Installations
Details & Layouts of all Structured cabling & ICT Installations
Details & Layouts of all Audio Visual & Voice Evacuation Installations
Details & Layouts of all BMS Installations
Details & Layouts of all Generator Installations
Details & Layouts of all Lift Installations
Details & Layouts of all UPS Installations
Details & Layouts of all Automatic Voltage Stabilizer Installations
Details & Layouts of all Rectifiers & Inverter Installations
Details & Layouts of all Plumbing & Drainage Installations
Details & Layouts of all Air Conditioning Installations
Details & Layouts of all Solar water heating Installations
Details & Layouts of all Fire Fighting Installations
Details & Layouts of all Water Heating Installations
Details & Layouts of all Specialized Kitchen Equipment Installations
Details & Layouts of all Sewage & Water Treatment Installations
Details of all equipment and panels
Technical literature for all the services

All Shop / working drawings shall be to scale and fully detailed with all the important dimensions shown and the construction of key components indicated.

During progress of the building works, the Contractor shall make all necessary checks on site to ascertain that the various services can be installed as specified and shown on the approved Drawings.

Where such works cannot be so installed, this must be immediately brought to the notice of the Engineer and Architect prior to the progress of such works.

The Engineer, in conjunction with the Architect and the Client, will check and return the Drawings submitted for approval within a reasonable period, but in any case not exceeding fourteen (14) days from receipt of the Drawings.

The layouts of plant and equipment are for general guidance only. The Contractor shall assess the requirements and prepare a plant layout Shop / Working drawing for approval within twenty one (21) days, the required liaison being maintained with other specialists, such that an agreed layout is submitted for approval.

Record (As-Built) Drawings:

As soon as the works are complete and all tests satisfactorily carried out, the Contractor shall hand to the Engineer two (2) sets of Record Drawings, together with one (1) set of soft copy of the same in PDF and CAD formats, showing the works as finally installed. These Drawings shall be prepared on approved transparent plastic material in black ink or as approved by the Engineer.

The certificate, of making good defects, will not be issued until this condition has been complied with.

Record Drawings are in addition to detailed Working Drawings and shall show all cable routes, circuits, trunking, conduits, plant, trenches, ductwork and ducts etc., together with the entire Electrical installation, as finally installed.

The Engineer will provide the Contractor with a set of Contract Drawings (in addition to the two (2) sets provided for the Contractor's site and office use), which shall be maintained by the Contractor's representative on site and which shall be used for recording of Contract variations as they occur. This set of Drawings shall be available for the Engineer's inspection on site, and shall be kept up to date.

The cost of the preparation and submission of the above Contract and Record Drawings shall be deemed to be included within the Contractor's prices.

CONTRACT AGREEMENT AND CONDITIONS

General:

The articles of Agreement and conditions shall be based on the agreement and schedule of conditions of building contract forms published by the Kenya Association of Building and Civil Engineering Contractors' (KABCEC).

FIDIC conditions for electrical and mechanical works shall form complementary reference where clear interpretation cannot be made.

Communications Authority (CA) conditions for structured cabling, ICT & Security works shall form complementary reference where clear interpretation cannot be made.

Water and Electricity Supply

The Main Contractor will make water and electrical power available to the Contractor. The Main Contractor and the Contractor will mutually agree whether or not the latter should pay for the water /electricity used for the works. That notwithstanding, no excuse will be entertained for power failure or lack of water as the Contractor is required to make his own arrangements in such circumstances.

Contractor's Materials

Purchase of materials by the Contractor and their storage on site for inclusion in payment certificates far in advance of reasonable requirements may be allowed at the sole discretion of the Engineer. This however is also subject to availability of such storage space.

Storage space may be provided on site.

INSURANCE

The Contractor shall during the execution of the works, insure himself and keep himself insured against all liability under the WIBA or any amendment thereto for accidents to workmen employed by him on the said works and shall hold the client and all parties to the contract harmless in respect of any such liability.

The Contractor shall further insure himself and keep himself insured against all liabilities arising from all Third party claims arising from accidents and he shall hold the client, the Consultants and all parties to the contract harmless in respect of any such liabilities.

No payments on account of the work executed will be made to the Contractor until he has satisfied the Engineer either by the production of an Insurance Certificate that the foregoing provisions have been complied with in all respects.

Thereafter the Engineer may from time to time check that premiums are duly paid up by the Contractor who shall, if called upon to do so, produce receipts of premium renewals for the Engineer's inspection.

BOND

The Contractor shall find and submit for the approval by the Engineer one (1) surety who shall be an established bank, Insurance company or fidelity guarantee corporation and who will be willing to be bound to the client and/the Client in an amount equal to ten percent (10%) of the Contract amount for the due performance of the Contractor upto the date of completion as certified by the Engineer and who will then and if called upon, sign a bond to that effect, on the same day as the Contract agreement is signed.

In the event of the surety named not being approved by the Engineer, the Contractor shall furnish within seven (7) days another surety to the approval of the Engineer.

SAFETY, HEALTH AND WELFARE OF WORKPEOPLE

The Contractor shall allow for providing for the safety, health and welfare of workpeople and for complying with any relevant ordinances, Regulations or Union agreement.

NATIONAL INSURANCE AND PENSIONS

The Contractor shall allow for making any National Social Security Fund and National Hospital Insurance Fund payments due in respect of workpeople.

HOLIDAY AND TRANSPORT OF WORKPEOPLE

The Contractor shall allow for providing holidays and transport for workpeople and for complying with any relevant ordinances or union agreement.

TRAINING LEVY

The Contractor's attention is drawn to legal notice no. 237 of October, 1971, which requires payments by the Contractor of a training levy on all contracts of more than KShs. 50,000/= in value and his tender must include for all costs arising or resulting therefrom. Proof of payment of those training levies will be required.

EXISTING PROPERTY

The Contractor shall take every precaution to avoid damage to all existing property including flower beds, fences, roads, cables, office equipment, pipes, drains, plant, equipment, adjacent buildings and other services and he will be held responsible for all damages arising from the execution of this Contract to the afore-mentioned property and he shall make good all such damage where directed at his own expenses to the satisfaction of the Engineer.

FOREMAN

The Contractor shall keep constantly on works a competent English-speaking foreman and any directions or explanations given by the Engineer to such a foreman shall be deemed to have been given to the Contractor.

SUPERVISION AND WORKING HOURS

The works shall be executed under the direction, and to the entire satisfaction in all respects, of the Engineer who shall at all times during normal working hours have access to the works and to the yards and workshops of the Contractor or other places where work is being prepared for the Contractor.

The working hours shall be those generally worked by good employers in the building and civil engineering trades taking note of gazetted holidays unless the Engineer shall so direct.
No work shall be covered up in the absence of the clerk of works without the prior approval of the Engineer in writing

SAMPLES

The Contractor shall furnish at his own cost any samples of materials or workmanship that may be called for by the Engineer for his approval or rejection and any further samples in the case of rejection until such are approved by the Engineer, and the Engineer may reject any materials or workmanship not in his opinion up to the approved samples.

The Engineer shall instruct for the testing of such materials as he may at his discretion deem desirable and the testing shall be made at the Contractor's cost.

The Contractor shall allow in his tender for such samples and tests.

TRADE NAMES

Except where expressly stated, where trade names of manufacturer's catalogue numbers are mentioned in these specifications, the reference is intended, as a guide to the type of the article or material required. The Contractor may use any article or material equal in type or quality to those therein described subject to the prior approval of the Engineer, and at his (Engineer's) absolute discretion. The onus of proof as to equivalent quality will rest with the Contractor, whose tender will be deemed to include for the makes described hereafter.

MATERIALS, TOOLS, PLANT ETC.

The Contractor shall allow for providing of all ladders, tools, plant and transport required for the works, except in so far as may be specifically stated otherwise.

All materials and workmanship used in the execution of works shall be of the best quality and description unless otherwise described. Any materials for the works condemned by the Engineer shall immediately be removed from the site at the Contractor's expense.

All materials, fittings and accessories are to be new and in accordance with the requirements of the current legal and regulatory framework where such exist, and with the relevant international standards.

Uniformity of type and manufacture of fittings and accessories is to be as far as practicable preserved throughout the whole Works.

The Contractor shall provide at his own risk and cost all materials, scaffolding, tools, plant, transport and workmen required for the works except, insofar as may be stated otherwise herein.

The Contractor shall order all materials to be obtained from overseas immediately after the Contract is signed and shall also order materials to be obtained from local sources as early as necessary to ensure that such materials are on site when required for use in the works.

Any defects which may appear, either of materials or of workmanship, during the defects liability period provided by the Contract, shall be made good by the Contractor at his own expense, as and when directed.

If the Contractor shall fail to carry out such orders, as by the preceding paragraph provided within such reasonable time as may be specified in the order, the materials or works affected may be made good by others in such manner as the Engineer may direct, in which case the cost thereby incurred shall, upon the written certificate of the Engineer, be recovered from the Contractor as liquidated damages.

ORDERS

Copies of all orders for major items of plant, equipment and materials places with suppliers shall be provided in triplicate to the Engineer together with a soft copy

INSPECTION AND TESTS AT MANUFACTURER'S WORKS

The Engineer, or his duly authorized representative, shall have at all reasonable times access to the Contractor's premises to inspect and examine the materials and workmanship of the mechanical and electrical plant and equipment during its manufacture.

If part of the plant and equipment is being manufactured on other premises, the Contractor shall obtain on behalf of the Engineer, or his duly authorized representative, permission to inspect as if the plant and equipment was manufactured on the Contractor's own premises. Such inspection, examination or testing, if made, shall not relieve the Contractor from any obligation under the Contract.

Where the plant and equipment is a composite unit of several individual pieces manufactured in different places, it shall be assembled and tested as one complete working unit, at the Maker's works, to specifications and the relevant International Standards where applicable.

TRANSPORT

All plant and equipment shall, during transportation be suitably packed, crated and protected to minimize the possibility of damages and to prevent corrosion or other detoriation.

On arrival at site all plant and equipment shall be examined and any damage to parts and protective priming coats made good before installation.

Adequate measures shall be taken by the sub-contractor to ensure that plant and equipment do not suffer any detoriation during transit and transportation.

Prior to installation, all accessories, plant and equipment shall be thoroughly cleaned.

If, in the opinion of the Engineer any equipment has detoriated or has been damaged to such an extent that it is not suitable for installation, then the sub-contractor shall replace this equipment at his own cost.

STORAGE

Space for storage will be provided by the Main Contractor but the Sub-contractor will be responsible for the provision of any lock-up sheds and stores required.

Nominated sub-contractors are to be made liable for the cost of any storage accommodation provided specially for their use. No materials shall be stored or stacked on suspended slabs without the prior approval of the architect and structural engineer

SUNDRIES

The necessary holding down bolts, supporting brackets and templates, guards and screens, locks, piping, conduits, lamps and other requisite sundries whether specified in detail or not shall be provided, under the Contract and it shall be deemed that the Contractor's prices, rates and the like include for all such items.

BLASTING

Blasting will not be allowed unless with express authority of the Engineer.

HOISTING

The Contractor is referred to the Drawings and to the general description of the building. Throughout these specifications generally no mention is made of heights for hoisting.

All prices must include for hoisting and fixing at any level within the limits shown on the drawings or included in the general description of works. Where a particular level is specified the Contractor shall price accordingly.

CASING UP AND PROTECTING

The Contractor shall be responsible for casing up or otherwise protecting to the satisfaction of the Engineer all parts of the Contract works liable to cause injury and for removing such protection and making good on completion.

The Contractor shall also carefully protect from injury by weather all Work and materials which may be affected thereby and allow in his prices for all dams, pumping, shoring, temporary drains, sumps etc. necessary for the purpose. The Contractor shall clear away and make good at his own cost to the satisfaction of the Engineer all damage caused thereby.

BUILDERS WORK & CIVIL WORKS

Builder's Work and Civil Works that are incidental to this section of the Contract (Ordinarily referred to as Builders Works in Conjunction with Services or abbreviated BWICS) such as cutting of holes in walls and floors, provisions of foundations for the plant and machinery, shall be the responsibility of the Main Contractor. The Contractor shall be fully responsible for the preparation of all such details that relate to such works, the details being subject to approval by the Architect and Engineer prior to submission to the Main Contractor for action. Other items such as fixing of brackets, cables and ductwork and trenching, making good etc. shall be carried out by the Contractor to suit the installation of all the services.

It is the Contractor's sole responsibility to ensure that all holes and chases are in the required position and that any additional ducts, holes and chases necessary for erection of the installations in situ concrete walls, floor slabs etc., are included in the early stages of construction as appropriate.
The Contractor shall furnish the Engineer, Architect and Main Contractor with all the necessary information including position of foundations, brackets and fixings and shall ensure that such works are performed in accordance with available information.

The Contractor shall include in his tender all supports, fixings, plugging of holes in walls, ceilings and floors to facilitate the fixing of the pipework, accessories, and all other portions of the specified installations. Any purpose-made fixing brackets shall also be provided and installed by the Contractor, including escutcheon plates and the like.

The Contractor shall supply and install approved pipework, ductwork, trays, Ladders, Light fittings and Equipment support brackets and hangers. It shall be deemed that prices include for any special requirements and that the Contractor has visited the site during the tender period to ascertain all details.

The Contractor shall pay particular attention to the fixing and alignment of items. All items shall be installed square, true and perpendicular to floors in clear parallel lines i.e. as shown on Drawings and as may be required at site to the Engineers approval.

SETTING OUT OF WORK

The Contractor will be responsible for laying out his work and shall obtain all the necessary information as may be required to carry out the work. Such information shall be obtained sufficiently in advance to avoid any possibility of delay to the Works as a whole.

The Contractor shall be fully responsible, and shall seek, the details of all work being carried out by the various trades on Site, particularly where such trades may interfere with each other, or where co-ordination is necessary. No claims for extra costs will be entertained arising from omissions, oversight, or neglect in this regard.
In advance of the delivery of the plant and equipment, the Contractor shall arrange for the supply of all-necessary foundation bolts, templates, nuts, plates, sleeves, anchorages, etc., as required and as may be directed by the Engineer.

ERECTION AND CHECKING OF WORK

The Contractor shall provide, and be solely responsible for, all skilled and unskilled labour, tools, lifting tackle and other equipment required for handling of plant and equipment when transporting to Site, within the Site and during erection.

All erection works shall be subject to approval by the Engineer.

All parts shall pass such tests as required by the Engineer to prove compliance with the Contract irrespective of any tests which may already have been carried out at the Manufacturer's Works. In particular, all special tests made at the Manufacturer's Works shall be repeated at limits approved by the Engineer.

WORKS TO BE DELIVERED UP CLEAN

On completion of the works, the site and the works shall be cleared of all plant, scaffolding, rubbish and unused materials and shall be delivered up in a clean and perfect condition in every respect to the satisfaction of the Engineer.

TESTING AND SITE PERFORMANCE

The Contractor shall allow for all testing of material and installations required by these specifications and he shall be responsible for all expenses incurred in completing such tests, including costs of materials and labour, equipment, transport and all other costs.

The Contractor shall give notice of the date of the specified tests to be performed on completion of installation. The notice shall be made in writing to the Engineer at least five (5) days to the date of the specified tests. Unless otherwise agreed the tests shall take place within seven (7) days of the stated date or on such day or days as the Engineer shall in writing notify the Contractor in writing. The tests shall be carried out under normal working conditions to the satisfaction of the Engineer and shall extend over such continuous periods as he may direct.

All skilled labour, supervision, apparatus, fuel and instruments required for carrying out the tests will be the responsibility and at the expense of the Contractor. The accuracy of the instruments shall be demonstrated if required. The Contractor shall ensure and avail proof that test instruments are in good working condition and have been calibrated by an authorized agent.

If any part of the plant or equipment fails to pass the specified tests, further tests of the said part shall, if required by the Engineer, be repeated. The Contractor shall, without delay, put in hand such modifications as found necessary so as to meet the requirements of the Contract and any expense which the Client may have incurred by reason of such further tests shall be deducted from the Contractor's Contract price.
Each completed system within the installation shall be tested as a whole under operating conditions to ensure that each component functions correctly in conjunction with the rest of the system.

TIME FOR COMPLETION AND LIQUIDATED DAMAGES

The Contractor shall proceed with the works in such manner and in such order, as the Engineer shall direct so as to complete the works on the shortest possible time.

It is the responsibility of the Contractor to ensure that all material, fittings, equipment and items to be supplied are ordered and delivered to the site ready for installation at such times as to cause no hold up to the programme of work

NOTE:
The sub-contract completion period shall be the same as that of main contract.
Liquidated damages and Ascertained damages shall be calculated pro-rata on the rate provided in the main contract.

SPECIALIST MANUFACTURERS

Where specialists are not nominated by the Client, the Contractor shall appoint specialist manufacturers and suitable specialists for any sections of the Works described herein in which he is not himself an experienced, recognized and approved specialist.

The Tenderer shall, on submission of his tender, indicate the names of all proposed specialist manufacturers and specialists, together with the precise sections of the Works for which each will be responsible. The Contractor may be required to seek alternative manufacturers or Contractors or to accept specialists

nominated by the Engineer. It shall be deemed that the prices entered in the tender include for this requirement.

For plant and equipment supplied by suppliers other than the Contractor, the Contractor will be required to furnish an agreement between himself and the supplier stating that he is authorized by the supplier to deal in the plant and equipment and that he is authorized to stock the necessary spare parts or that the Client will be authorized to revert to the supplier in the event of breakdown of the plant or equipment.

The Contractor shall allow in his prices for phasing his work to meet the requirements of the other specialists, and for varying his programme or otherwise, to comply with the erection programme of such specialist. No additional costs will be allowed to the Contractor for and disruptions to his programme, or otherwise, in his compliance with the above requirements.

PAYMENT AND CERTIFICATES

Payments shall be made through certificates direct to the Contractor. All payments shall be less retention as specified in the Contract agreement. The Contractor shall be paid only for work done and /or materials on site. Payments shall be subject to prevailing statutory deductions such as withholding tax, etc.

The percentage of certified value retained should be 10%. Limit of Retention shall be a sum equivalent to 5% of the Contract sum.

No certificate so issued by the Engineer/Architect shall in itself be considered conclusive evidence as to the sufficiency of any work or materials to which the terms and conditions of this agreement or from his liability to make good all defects as provided thereby.

VALUATION OF LUMP SUMS AND PRELIMINARY COSTS

Lump sums entered in these bills of quantities against any item of general condition or preliminaries will be included in appropriate valuations according to reasonable assessment by the engineer of actual costs involved in each item.

PAYMENT FOR MATERIALS ON SITE
All materials for incorporation in the works must be properly installed before payment is effected unless specifically exempted by the Engineer. This is to include the materials of the Contractor, and his nominated suppliers.

PAYMENT FOR MATERIALS OFF SITE

Payment for any material off site will be subject to the Contractor providing a bank guarantee of equivalent value and clearly indicating that the bank undertakes to pay the client the full sum of the guarantee amount immediately upon the client's first written demand declaring the tenderer to be default and without cavil or argument. This shall be from an **Approved Bank**.

The Bank Guarantee validity period to be no sooner than the end of the Defects Liability Period of the project except where a special waiver is granted by the client in writing.

Advance payments will also be treated as Material off site save for being secured by an Advance Payment bank bond.

CLAIMS FOR EXTRAS

This is a fixed price contract and no claims whatsoever on extras will be entertained save where a variation to the contract is expressly directed by the engineer in writing.

FLUCTUATIONS

This is a fixed price Contract and no claims will be allowed on fluctuations. The tenderer's prices will be deemed to have allowed for forecasts on price fluctuations, inflation or exchange rate.

COMMISSIONING & TRAINING

The Contractor shall train the Client's Maintenance management team or his representative on the operation and maintenance of the various components forming the mentioned installation and shall provide drawings, diagrams and manuals to ensure the Maintenance Management Team or his representative is completely conversant with such installations.

Proof of training will be required and must have the names and signatures of those trained and the dates and what they were trained on.

The Contractor shall ensure that the services installations are left in complete safe working order and operating to the satisfaction of the Engineer.

TEST RECORDS

The Contractor shall make the necessary records of all the tests carried out, and when the tests have been successfully completed he shall provide the Engineer with test records and reports in a format to be agreed.

DUST, INSECT AND VERMIN PROOFING

All equipment, likely to be affected by ingress of dust, shall be effectively dust proofed and vermin proofed where no protection is afforded in its normal manufactured form. All materials used shall be in general resistant to attack by insects, micro-organisms or other fauna or flora.

Materials used for such protection shall be to the approval of the Engineer.

PAINTING & FINISHING

All plant and equipment installed under this Contract shall be painted or otherwise finished to approval in accordance with appropriate international code for standard colours to be furnished by the Contractor prior to the shipment or manufacture of the plant or equipment including all pipework, ductwork, etc. Such finish shall be entirely compatible with the conditions of heat, humidity, exposure to the weather, and other relevant factors arising from the materials, location and condition of operation of the equipment.

The Engineer may request samples of paint finishes, the cost of which shall be deemed to have been included within the tendered prices for all works.

All final painting of equipment, fixtures, and accessories shall be carried out by the Contractor, except where it is the usual practice of the manufacturer of items of plant and equipment to apply a high standard of protective finishing paintwork in the shop before dispatch. This will be acceptable provided the Contractor at his own costs makes good any damage to paintwork, occurring in shipment, transportation and installation.

The interiors of electrical switchboards, control panels, and similar items, shall be finished in an approved enamel colour and shall comply with the appropriate international standards for enamel finish which shall be furnished by the Contractor prior to shipment or manufacture of the plant or equipment. The exteriors of such panels and enclosures shall be of international standards specification colour as specified by the Engineer.

LABELS

All items related to the installations shall be neatly and clearly labeled externally with identification marks corresponding with those on Drawings or in Technical Specifications. Final details shall be agreed upon by the Contractor and the Engineer.

Identification labels shall be of laminated plastic material engraved, black on white, with no less than 6mm "Lino" style letters and shall be fixed on or adjacent to all items by means of at least two brass screws or to the approval of the Engineer. Self-adhesive labels shall not be permitted.

All main switches, circuit breakers, isolators, valves, motors, switch-fuse, consumer service units, and distribution boards etc. shall be neatly and clearly labeled externally with identification marks corresponding with those on the Drawings or Technical Specifications using “Red Trafolyte Labels” of Minimum 10mm Height.

Final details shall be agreed upon by the Contractor and the Engineer.

All labels/plates shall be in English language

DEFECTS LIABILITY PERIOD

The defects liability period shall be 6 months from the date of Certificate of Practical Completion.

COMPLETION DOCUMENTS

The contractor shall supply the Engineer with the following sets of completion documents in three (3) sets hard copy on scale of 1:100 and a soft copy in both PDF and CAD formats.

Record (As-Built) Drawings: As stated above.

Maintenance manuals:

At the start of the defects liability period, the Contractor shall hand over to the Engineer, Three (3) sets of maintenance and operations manuals for each plant and equipment installed. These manuals shall be in English and shall be fully illustrated.

Test Records: As stated above.

WARRANTY AND PERFORMANCE STANDARDS

The Contractor must furnish the client through the Engineer with a general written warranty covering quality of workmanship, material and equipment and be compelled thereby for a period as shall be provided in the Contract Schedules.

Whereas in a case where the period is not mentioned, then the Warranty cover should be for a minimum of one year (12 Months) after practical completion of the Contract.

The Contractor must make good, at his own expense, such repairs and replacements as may be required as a consequence of negligent workmanship or defective materials.

The Contractor must also procure such warranties and guarantees as aforesaid from all manufacturers and/or suppliers of materials or equipment incorporated in the project under this contract.

The Contractor must comply in all respects with given standards of workmanship as defined and described in the specifications and Bills of Quantities and relevant codes of Practice.

The Contractor must also comply with all tests of materials as required and/or directed by the Engineer.

Total for preliminaries and general conditions C/F to price summary page

Kshs…….....

2b. PARTICULAR SPECIFICATIONS FOR ELECTRICAL INSTALLATIONS

1. SCOPE

The Electrical Contractor shall supply labour and supply, deliver, install, fix, connect, test, label and commission the electrical works, clean, complete and working to every detail as described in the specification and by related specifications and on the drawings listed in the Schedule or Drawings to the satisfaction of the Consulting Engineers.

The electrical Contractor shall be responsible for the supply, delivery, installation, connection, testing and setting to work of the entire electrical system in accordance with the Contract Documents.

The electrical Contractor shall provide all the necessary tools, skilled and un-skilled labour to comply and complete in accordance with the main contractor's works program.

2. STANDARDS & REGULATIONS

The electrical portion of the works shall comply with the current regulations of:

- The Electric Power Act
- Electric Power Rules
- The Kenya Power and Lighting Co. Ltd.
- The latest Kenya Bureau of Standards.
- Codes of Practice of the British Standards Institution
- The Regulations for Electrical Equipment in buildings issued by the Institution of Electrical Engineers and Technologists (I.E.T)
- This specification.

3. POWERSUPPLY

The supply voltage at the point of use shall be

- 240 volts single phase or
- 415 volts 3 phase 50 Hz.

This shall be a TN-C-S system via separate neutral and protective conductor throughout the system.

4. CONDUIT INSTALLATIONS

4.1 GENERAL

All conduits shall be installed strictly in accordance with the manufacturer's instructions.

All conduit fittings and accessories, including couplers, ordinary clips, saddles, pipe hooks, reducers, stopping plugs, lockouts and male and female bushes shall be manufactured dimensionally, similar to B.S.S. 31/1940. Solid tees shall not be used. Solid inspection elbows or bends or inspection tees shall be used only in exceptional circumstances and then only with the Engineer's approval.

Where it eases the installation of cast-in-situ back entry boxes on the loop-in system, purpose made bends manufactured by Egatube and comprising a tight bend with a push socket at one end and a threaded socket at the other end may be used with the Engineer's approval.

4.2 FIXING OF CONDUITS

Conduits shall be installed on the loop-in system and shall either be cast-in-situ in the main concrete structure, concealed in chases cast in concrete walls, or chases cut in solid partition walls, run in ceiling spaces or in hollow partitions of floors, or concealed below the floor screed, whichever shall prove to be the most suitable method of installation for use in the building under construction. Unless it is clearly specified or shown on the drawing, the method of installing conduits shall be subjected to the approval of the Engineer.

Sunken conduits run in chases in walls shall be fixed by means of mild steel pipe hooks or non-metallic saddles spaced not more than 1 m apart. Where a conduit is concealed behind plaster it shall be sunk to a depth of either 10 mm below finished plaster level, or installed flush with the structural wall level before application of plaster, whichever is the lesser depth

Conduit fixed on the surface of walls or ceiling shall be fixed by spacer bar saddles fixed not more than 1 m apart.

Surface conduit shall also be fixed 230 mm on both sides of all boxes, the box itself securely fixed. Where such an arrangement of boxes and saddles would prove to be both unsightly and unnecessary, short lengths of conduit not exceeding 1 m in length between boxes need not be secured further than by connection to the adjacent boxes. In such cases the **Engineer reserves the right** to insist upon additional fixing being provided, should he for any reason whatsoever consider such additional fixing necessary.

Where two or more lines of conduit run parallel to each other, on the surface of walls, etc., the distance between them shall not be less than 15mm and conduits shall not cross.

Conduits shall be installed in such a manner as to prevent interference with other services and shall be kept at least 180 mm clear of gas or water pipes, and heat in excess of 68 degrees C.

A means of expansion shall be provided in conduit runs in excess of 6 m without any bend or set, by use of 'Egetude' expansion couplings, which shall also be used at building expansion joints.

Conduits cast-in-situ shall be frequently secured to the steel reinforcement work, with heavy binding wire to prevent movement of the conduit and conduit boxes during the pouring and vibrating of the concrete. Outlet boxes shall be securely fixed to the shuttering with nails, or by means, which shall be visible as a marker on removal of the shuttering only where marks can be concealed.

Conduit shall be installed after the first grid of steel reinforcement work is securely fixed and all open ends of conduits shall be protected by couplings plugged with a suitable non-metallic stopping plug. **The number of right angle bends in conduit cast-in-situ shall not exceed two between boxes.**

Immediately prior to installation of the wiring all conduit and fittings shall be dried and cleaned out by drawing through a cloth swab. Rawl plugs shall be used for fixing to brickwork, self-tapping screws for fixing to aluminium section, raw nuts, raw-anchors spring toggles, gravity toggles or raw bolts, shall be used for fixing to other materials as **approved by the Engineer.**

Corners shall be turned by easy bends or sets made in accordance with the manufacturer's instructions without altering the section or splitting conduit.

4.3 CONDUITS BENDING

The conduits shall be bent and formed strictly in accordance with the manufacturer's instructions: -

i. Small sizes, i.e. 20 and 25 mm shall be bent cold by inserting the correct size bending spring. It is essential for right angle bends that the conduit is bent past 90 degrees to allow for "spring back".
ii. Large size of conduit shall be pre-heated before inserting rubber cord to prevent kinking. Conduits badly formed or bent or damaged in any way shall not be used.

4.4 CIRCULAR BOXES INSPECTION

Boxes will not be permitted in floors unless approved. Boxes cast-in-situ must face downwards from the ceiling/floor section. Small standard circular non-metallic conduit boxes, conforming dimensionally with B.S. 31/1940 with standard circular non-metallic (4mm) lids and nylon fixing screws, shall be provided and fixed at all junctions.

The above circular boxes or equivalent looping boxes shall be provided and securely fixed for all ceiling points. When the conduit is run on the surface, all circular boxes for ceiling points shall be fixed with screws.

Where ceiling roses occur and the ceiling box is recessed below the finished level of the ceiling, suitable extensive rings to accommodate the ceiling rose must be provided. Where ceiling boxes, including extension rings, are flush with the ceiling surface, break joints rings shall be provided to hide the joints.

Where a non-metallic outlet box of thermoplastic material is used for the suspension of lighting fitting, care shall be taken to ensure that the temperature of the box does not exceed 60C. The weight suspended from the box shall not exceed 3 kg.

Where wiring system incorporates galvanized conduit and trunking, the trunking shall be deemed to be galvanized unless specified otherwise.

The number of cables to be installed in trunking shall be such as to permit easy drawing in without damage to the cables, and shall in no circumstance be such that a space factor of 45% is exceeded.

Conduits and trunking shall be mechanically and electrically continuous. Conduits shall be tightly screwed between the various lengths so that they butt at the socketed joints. The internal edges of conduit and all fittings shall be smooth, free from burrs and other defects. Oil and other insulating substances shall be removed from the screw threads. Where conduits terminate in fuse-gear, distribution board, adaptable boxes, non-spouted switchboxes, etc., they shall, unless otherwise stated, be connected thereto by means of smooth bore male brass brushes, compression washers and sockets. All exposed threads and abrasions shall be painted (using an oil paint for black enamelled tubing and galvanised tubing immediately after the conduits are erected. All bends and sets shall be made cold without altering the section of the conduit. The inner radius of the bend shall not be less than four (4) times the outside diameter of the conduit.

Not more than two right angle bends will be permitted without the inter-position of a draw-in box.

Where straight runs of conduit are installed, draw-in boxes shall be provided at distances not exceeding 15 m. No tees, elbows, sleeves, either of inspection or solid type, will be permitted.

Conduits throughout shall be of sufficient section and so arranged with draw-in boxes to allow easy drawing in and out of any one or all of the cables in the conduit.

Conduits shall be swabbed out prior to drawing in cables, and they shall be laid so as to drain off all condensed moisture without injury to end connections.

Conduits and trunking shall be run at least 150 mm clear of hot water and stem pipes, and at least 75 mm clear of cold water and other services unless otherwise approved by the Engineer.

Conduits installed and buried in walls shall allow a minimum of 15 mm cover. These conduits and those cast-in-situ concrete slabs shall be given one coat of rust prevention paint before installation of conduit and before concrete is placed. Sunk circular conduit boxes shall be provided with break joint rings of white moulded material or metal.

Surface conduit shall be run in square symmetrical lines and shall be marked on site for approval before installation. Conduits shall be fixed by means of distance saddles spaced at not more than 1.2 m for 20mm and 50mm conduit and 1.5 m for larger sizes.

Conduits shall be fixed at each side of conduit boxes at a distance not exceeding 250 mm, and the saddles shall be equally spaced.

Where conduit runs enter specified areas requiring flameproof equipment, barrier boxes shall be inserted immediately before the conduit enters the flameproof area.

All conduits installed within this area shall be solid drawn galvanized, as shall be conduit fittings and accessories and Buxton Certified as suitable for Group 11 Hazards. Equipment shall comply with B.S 229, B.S.S. 889, and C.P. 1003. In **NO CASE SHALL** conduits from different distribution boards be connected at one box, likewise cables from different distribution boards shall not be housed in the same conduit specified.

All conduit boxes except loop-in pattern concrete floor shall be fixed direct to the structure apart from the support provided by the conduits. Box lids where required, shall be heavy gauge metal, secured by means of zinc plated or cadmium steel screws. All adaptable boxes and lids of the same size shall be interchangeable.

Boxes used in conjunction with mineral insulated copper sheathed cable boxes shall be galvanized and painted after erection.

Draw-in boxes in the floor are generally to be avoided but where they are essential they must be grouped in positions **approved by the Engineer** and covered by suitable floor straps, either with non-ferrous tray or covers.

The floor trap covers are to be recessed and filled in with a material to match the floor surface.

The Contractor must take full responsibility for the fillings of all covers, but the fillings in materials will be supplied and carried out by the Main Building Contractor.

Where it is intended to fix enclosed lighting fittings directly to a box to suspend a fitting of weight in excess of 3 kg, Egetude steel insert clips shall be used.

4.5 SWITCH AND SOCKET OUTLET BOXES

All boxes intended for switches, socket outlets or other outlets shall be fitted with brass ferrules to accommodate fixing screws.

All other conditions are as stated in item above on Circular boxes.

4.6 STOPPING PLUGS

All spare ways in junction boxes, etc., left for possible future extensions shall be fitted with the stopping plugs.

4.7 JOINTING

Joints shall be made water-tight by the use of 'Egaweld' cement applied with a brush or rug. 'Egaweld' shall be applied to the complete circumference of conduit. Conduit shall be thoroughly cleaned at the ends to ensure a good adhesion of the fittings. 'Egaweld' shall not be permitted to enter into the conduit.

4.8 CAPACITY OF CONDUITWORK

The cables shall run in the conduits so as not to exceed the capacities as set out in the IEE Regulations.

Conduits shall be best quality new super high impact grade heavy gauge 'A' riding PVC unplasticised conduits as manufactured by Egetude suitable for plain connections.

Conduits of sizes less than 20 mm shall not be used without the written authority of the Engineer.

5. TRUNKING INSTALLATIONS

Trunking shall only be installed in situations which will remain readily accessible throughout the life of the buildings. No cable trunking shall be installed behind a plastered ceiling or in other inaccessible situations.

All cable trunking shall comply with BS 4678, part 1 "Steel surface trunking" and part 2 for "Steel under floor (duct) trunking".

Sheet steel cable trunking may be used on installations employing steel conduits, for connecting two or more switchboards together or where several conduits would otherwise have to run alongside each other. Proper allowance should be made for the derating of cables installed together in a container system. The cables must be capable of carrying the current imposed by the equipment connected. Attention is drawn to Chapter 52 of the IEE Regulations, particularly Section 522, 523 and Appendix 4: the current carrying capabilities of cables indicated shall not be exceeded. The Engineer must be consulted as to precise details concerning trunking routes and applications.

All lengths of trunking shall be heavy gauge zinc coated steel connected together by internally fitted rectangular couplings of sufficient width to provide a minimum bearing face of 25mm, to which the lengths shall be bolted on site or welded at the factory.

Adequate provision shall be made to allow for expansion.

All Tee pieces and bends shall be formed with similar means of connection and the inner radii area shall be such that cables will not be bent through a radius less than that prescribed in the IEE Regulations. Only bends and tees of approved pattern will be accepted.

All fixing screws within the trunking shall be of the round head type. The trunking shall have an over-lapping well-fitted lid securely fixed to the trunking by approved means that will avoid damage to the cables. Self-tapping screws shall not be used.

All necessary accessories including long sleeve couplings, end piece, bends, sets, tees, reducers, branches, fillets, pin racks, cable retainers etc., shall be purpose-made units rather than being fabricated on site.

Where a change in direction of trunking run occurs, the deviation should be effected by a purpose-made unit manufactured on similar lines to the bends and tee pieces described above. Where this is not practical, changes in direction shall be fabricated in a neat workmanlike manner. All joints shall fit closely and gaps will not be permitted. All burrs and sharp edges shall be removed and no screw shall protrude into or out of the trunking.

Trunking shall be firmly attached to its associated equipment either by bolted flanges or by male bushes and couplings.

Where trunking is connected to equipment by means of flange connectors, the entry into the equipment shall be of the same cross-section as the trunking.

Where trunking does not terminate in equipment, the otherwise open end shall be capped with a cover suitably bolted in position.

Where communications, extra low voltage circuits (category 1) etc., are contained in a trunking, the requisite number of separate compartments shall be provided to segregate the wiring. Where conduits are taken off such trunking they shall not pass through other compartments unless prior permission is obtained from the Engineer.

The entire trunking is required to be recessed in the structure of the building; the finished edge of the trunking is to be installed flush with the plaster work.

Trunking runs shall be so arranged that the lid or cover plate is always on the top or side and not underneath, unless this cannot be avoided, in which case the Engineer's permission shall be obtained.

Wherever trunking passes through walls, vertical partitions etc., a fixed piece of trunking lid shall be fitted to the trunking extended 25 mm either side of the wall or other barrier, this is to allow removal of the adjacent lid without disturbing the building fabric. Care shall be taken to ensure that no opening is left between the trunking and the building structure through which fire might spread.

In addition, a suitable barrier of incombustible material shall be provided and fitted inside the trunking, in accordance with the IEE Regulations 528. On vertical runs of trunking internal incombustible barriers shall be fitted at the distance between floors or 5m, whichever is the less, in accordance with IEE Regulations 527.1.

All necessary trunking support work, hangers, brackets and fixing requirements shall be provided by the electrical Contractor.

Earth links of the appropriate size and type shall be installed at every jointing coupling manufactured bend, etc., throughout the entire trunking system. Where trunking is used to provide a protective conductor it shall comply with the requirements of Chapter 54 of the IEE Regulations, particularly Section 543; alternatively, a separate protective conductor shall be installed in the trunking to comply with section 543 of the IEE Regulations.

In cases where sheet steel trunking is installed and there is danger of movement, a flexible earth conductor shall be installed bonding all joints in the trunking. This shall be fitted in addition to the standard earth links. Cable retaining strips shall be fitted at 1 m intervals. Insulated cable support pins shall be fitted at intervals of 4 m in vertical runs of trunking and at the top of the vertical trunking.

6. INSTALLATION OF CABLES

6.1 GENERAL

Cables shall be rated for the maximum connected load with due consideration to the following factors: -

i. Voltage drops not in excess of 4% of the nominal voltage.
ii. Ambient temperature.
iii. Degree of excess-current protection.
iv. Grouping
v. Cables run under defined conditions.

6.2 BENDING OF CABLES

Bending of cables shall be in accordance with clause 522.8.3 of the IEE Regulations and no cable shall be bent to radius less than that specified by the cable manufacturers.

6.3 JOINTS IN CABLES

The wiring shall be carried out on the looping-in principle. All joints shall be made at the terminals of main switches, distribution boards, ceiling roses, switches and socket outlets, etc. and fixed apparatus only. **No joints** shall be made in conduits and other cable raceways unless specifically approved.

6.4 PVC / XPLE INSULATED CABLE

The wiring shall be carried out in 250 Volt grade or 440 Volt grade for 3 phase PVC / XLPE Insulated cables, as specified elsewhere run drawn in non-metallic conduits. The cables shall be of the sizes specified on the drawing.

6.5 WIRING INSTALLATION

Cables shall be drawn into accessories, distribution boards and switchgear **after** the erection of the conduit system. Under no circumstances shall it be permitted to draw cables into an incomplete section of the conduit installation.

6.6 CABLES IN CONDUITS AND TRUNKING

All cables shall be polyvinyl chloride (PVC) insulated to BS 6604, "PVC-insulated cables (non-armoured) for electric power lighting", 450/750-volt grade, or cross linked polyethylene (XPLE) unless an alternative is specified elsewhere in the contract documents.

The quality and size of cables contained in any one conduit shall comply with IEE Regulations.

No cable with a cross-section area of less than 1.5mm2 shall be used. All cables installed in a conduit or trunking system shall be PVC / XLPE insulated conductors and shall be colour coded in accordance with the IEE Regulation 524.3 and 514.3.

Final sub-circuits shall be run in conduits separate from main or sub-main cables.

All cables in conduit shall be drawn in simultaneously.

All cables shall be drawn in without the use of excessive force, without the use of lubricants and the wiring shall be easily withdrawable.

6.7 TERMINATION OF CABLES

Cables shall be terminated in accordance with **Chapter 52 of the IEE Regulations, particularly Section 527.**

Cables shall be terminated by one of the following methods: -

a) The cable conductors shall be sweated into lugs of the appropriate size for the cable and equipment terminal.
b) The cable conductors shall be secured by compression type lugs of the correct size for the cable and equipment terminal.
c) The cable conductors shall be secured in pinch screw terminals.
d) The cable shall be secured by means of clamps.

Where cables are required to terminate at connectors, as at lighting points, such connectors shall secure all the strands of stranded cables. Care shall be taken to ensure that cables are not damaged during preparation for termination.

Cables terminating at pinch screw terminals shall be twisted together and single cables shall have the conductor doubled back to ensure adequate surface for pinching screws.

Cables connected to lamp holders or other components at which heat is produced shall be insulated with heat resisting material capable of withstanding, without detriment, the temperature encountered.

All terminations on PVC/SWA/PVC insulated cables shall be by compression type glands of an approved design and manufacture with facilities for clamping the armouring the outer sheath of the cable.

Glands mounted outdoors shall incorporate a seal to prevent ingress of moisture into the gland, and all glands shall be fitted with a thermoplastic shroud.

Where circular terminations are to be made, these shall be completed using Ross Counterney terminals.

Where cables are terminated in "Klippon" type terminals with parallel faced jaws, the individual cores shall be terminated using the appropriate flat or hook blade crimped lugs. Where the terminal faces are concaved, the cores shall be terminated in wires pin crimped lugs.

The electrical Contractor shall avoid multiple connections under one screw or one pin. Where more than two wires are required, a common termination jumper bar shall be used.

Terminals shall be mounted on rails or supports. All internal wiring is to be clearly marked by markers.

6.8 SEGRAGATION OF SERVICES

Cables of differing voltages shall be segregated so that there is no possibility of a fault in a power cable damaging any adjacent cables or imposing a different voltage upon them in accordance with **IEE regulation 528.**

6.9 IDENTIFICATION OF CABLES

All cables shall be fitted with non-corrosive cable identification bands at each end, and at all changes of direction where they leave a group of cables. All cable cores connected to equipment having marked terminals shall be fitted with non-corrosive identification bands bearing markings corresponding to those of the terminals at both ends.

7. EARTHING

All earthing shall be as PME Earthing (TN-C-S) System

The whole of the metallic portion of the installation, other than current carrying parts, shall be electrically and mechanically bonded to the consumer's main earth terminal and also if applicable, to the lightning protection system or other points specified.

The installation shall be earthed in accordance with the Seventeenth Edition of the Regulations for Electrical Installation issued by the IEE, BS CP1013, "Earthing" and BS 6651' "The protection of structures against Lightning". The electrical Contractor's attention is drawn to Chapter 54 of the IEE Regulations and to the Earthing and Lightning Protection Consultants Handbook publication CHB/4/95 by W. J. Furse & Co Ltd.

A main earth terminal shall be supplied and installed adjacent to the electricity supply cable termination. The terminal shall be of ample size and capacity to suit the installation. All items of equipment, switchgear, etc., shall be bonded to this earth terminal using PVC / XLPE insulated PVC / XLPE sheathed cables, coloured green and yellow as per table 51 and sized in accordance with **section 543 of the IEE Regulations**. An invorine label reading **"SAFETY ELECTRICAL CONNECTION - DO**

NOT REMOVE" in engraved upper case characters not less than 4.75mm high, shall be permanently fixed immediately adjacent to or on the earth terminal.

A heavy duty copper clamp **complying with BS. 951** shall be used to bond the main protective conductor to the electricity supply cable armouring or metallic sheath (where applicable the armouring and sheath shall be bonded together).

All protective conductors shall, where possible, be enclosed within metal trunking or conduit serving switchgear, distribution board etc., so as to provide mechanical protection. Where protective conductors are run on building surfaces they shall be properly fixed and supported by means of PVC coated metal saddles along selected routes.

Earth continuity between separate items of switchgear, distribution boards etc., mounted adjacent to one another shall be affected by means of high conductivity continuous copper tape, or PVC / XLPE sheathed cable, coloured green and yellow **as per table 51** and sized in accordance with the **Section 543 of the IEE Regulations**, connecting all items to the earth terminal.

All items of switchgear, accessories, luminaires, conduits, and the outer sheaths of MICC cables, the armouring of all PVC/SWA/PVC cables together with all other items of electrical plant and equipment shall be effectively earthened by means of a protective conductor.

At every terminal point on the fixed wiring an integral earth terminal shall be provided e.g BESA boxes, accessory boxes etc. A protective conductor shall be provided and installed between this terminal and the earth terminal on the associated switch, socket outlet, luminaire etc.

Each circuit protective conductor shall be connected to a multiway earth terminal provided and fixed within each distribution board. The earth terminal shall be provided with an adequate number of ways such that not more than one conductor per terminal shall be installed and the earthing conductors shall be connected in the same sequence as the current carrying conductors.

All metal piped services, e.g., Heating, Water and Gas Services, wastes and piped services at sinks, baths and showers etc., shall be bonded to the earth terminal in accordance with the **IEE Regulations 411.3.1.2.**

A 50 mm section of each gas and water pipe, at position close to their entry into the relevant building, shall be cleaned and made smooth. A copper-earthing clamp designed to permit the connection of protective conductors shall be provided and sized in accordance with **Section 543 of the IEE Regulations.**

The clamp shall be a proprietary type or shall be fabricated from high conductivity copper strip, minimum size 40 mm x 4 mm which shall encircle the cleaned sections of the pipe. A permanent label indelibly marked with the words, **"SAFETY ELECTRICAL CONNECTION - DO NOT REMOVE"** in legible type not less than 4.75 mm high, shall be permanently fixed at the points of connections.

The final connection of bonding conductors from gas, water pipes and other services to the earthing terminal shall not be completed until earth electrode and earth impedance tests have been satisfactorily completed.

Bonding connections to pipework shall be as un-obstructive as possible and where practicable shall be made in service ducts or accessible voids and shall be indicated on the Record Drawings.

All materials and sundry item shall be provided whether or not specifically mentioned necessary to completely and effectively earth the installation. The installation shall be fully protected against

dampness and corrosion and the effect of electrolytic action between dissimilar materials. A completely permanent installation shall be provided which shall be fully accessible for regular testing and inspection.

The value of earth resistance from any point of an installation to the general mass of earth shall be low enough to ensure operation of circuit protective devices and shall in any case not exceed the following:

i. **Four (4) ohms for electrical equipment**
ii. **One (1) Ohm for ICT Equipment**
iii. **Seven (7) ohms for lightning protection system**

Each earthing cable shall terminate in an approved design of cable lug.

Where earth conductors are run upon structures or walls they shall be fastened by means of heavy gauge non-ferrous fasteners not more than 0.75 m apart on horizontal runs and not more than 1.2 m apart on vertical runs and to give a minimum clearance of 4 mm from the fixing face.

In the event of the electrical Contractor not being able to establish a suitable earth connection to the electricity supply cable, earth electrodes shall be installed which shall be galvanized or copper clad steel extendable rods not less than 16 mm diameter and not less than 1.2 m in length. Connections to electrodes shall be made by means of solderless mechanical clamps.

To avoid corrosion, all earth system connections shall be cleaned bright and immediately covered with silicon MS4 compound or approved equal.

Earth pits, where required, shall be in accordance with the Contractor's relevant drawings, with the facility to disconnect the earth ring while measuring the electrode earth resistance.

Where fittings and accessories require earthing, an earth continuity conductor shall be run through the conduit. The earth continuity conductor shall be a green coloured PVC / XLPE insulated copper wire of minimum size 2.5 sq. mm and shall be continuous between terminals. Where the earth terminal is formed by a brass screw and washer, "Ross Courtney" type terminations shall be used. All switches, socket outlets, ceiling boxes etc., shall be supplied with an earth terminal.

Earth Continuity: Each final sub-circuit that is required to be earthed shall be provided with its own individual earth continuity conductor which shall be run from a terminal on the earth bar in the distribution board or consumer's control unit protecting that particular final sub-circuit.

8. FUSED SWITCH UNITS, SWITCHFUSES AND ISOLATORS

The above units comply with **BS 5419 and shall be 500-volt type** and installed where specified and indicated on the relevant drawings.

All switchgear shall be provided with suitable locks for padlocking the switches in the 'OFF' position. The cover shall be interlocked with the operating mechanism to prevent it from being opened in the 'ON' position. This interlocking shall also prevent the switch from being closed with the cover open unless for maintenance purposes. The cover shall be gasketted to prevent ingress of dust.

The switch action mechanism shall be of the parallel operation (double break type having cartridge fuses mounted switches) and shall be **ASTA certified** to meet adequately all the duties specified.

The end plates shall be removable for drilling for conduit or cable entry and shall be fitted with additional distance pieces where necessary. Switchgear boards shall be fixed to the wall/floor by Rawl bolts or other approved fixings.

No building alteration shall be allowed when moving the switchboard into position, the switchboard being supplied in sections to be built in position, if so required.

Switchgear shall be delivered to site when required to suit the progress of the works. Care shall be taken to preserve the manufacturer's paint finish. Any refurbishing etc. shall be carried out, using paint obtained from the switchboard manufacturer, to the original standard of finish.

All fuses in switchgear shall be HRC fuses sized for the fused-switch units or switch-fuses etc., in which they are incorporated. They shall be ASTA certified for compliance with BS 88, Category of Duty 440 A.C 5 Class 01 and in all cases fuse links shall be selected to provide circuits discrimination.

9. CONTROL PANELS AND CUBICLES

The details specified shall apply as far as fused switches, bus-bars and rating etc are concerned. The panels shall be constructed from rolled steel channel minimum size 60 mm x 30 mm deep x 5 mm or equivalent angle section clad with sheet steel of 3 mm gauge. 2 mm gauge may be used for covers and doors of not more than 1 m square.

Terminals shall be of the "Klippon" standards rail-mounted feed-through type or approved equal. All terminals shall be identified by means of numbered or lettered marking tags, which shall be identical to the number of letters applied to the cables. Cables shall be identified as terminations by means of cable markers as manufactured by "Klippon" or approved equal. 25% spare terminals capacity within wiring duct shall be provided. All components motors, starters, relays, timbers, etc. shall be labelled showing their reference and function and these shall relate to the panels' schematic wiring diagram provided with the "As-built" drawing and manuals.

All control panels shall be fitted with multi-pole isolating switches through which all electricity supplies shall pass. The door(s) of the control panel shall not open unless the isolating switch is in the "off" position. A facility to lock the control panel isolating switch in the "off" position shall be included.

10. DISTRIBUTION BOARDS

a) General

All distribution boards, unless stated otherwise, shall be miniature Circuit Breaker Distribution Boards and shall be of surface or flush type, as specified or instructed on site. Facilities for local isolation of the distribution boards shall be provided by either a local fused-switch unit or an integral isolating switch, whichever is specified.

Where surface mounted on a flush installation, all conductors shall terminate behind the board in an adequate box. For surface mounting, trunking shall be fixed between the board and ceiling level, or conduits run directly into the board. Adequate earth continuity connection shall be made between the various components.

b) Miniature Circuit Breaker Distribution Boards

MCB distribution boards shall comply with BS. 5486 part 12 'Particular requirements for miniature circuits-breaker boards'. The cases shall be constructed of heavy gauge sheet steel, in such a manner as to afford rigidity and maximum ease of wiring for full size circuit and main cables.

The cover shall be provided with an efficient gasket or alternatively designed with generous overlapping edges to prevent the ingress of dust. Components shall not be manufactured from zinc alloy in conjunction with sheet steel where they are relied upon for earth continuity.

Where the cover is required to be lockable, cylinder type locks shall be provided, having two keys per lock. All locked distribution boards shall be handed to the Engineering Supervisor on completion of the works. The cases shall be provided with detachable cable/conduit terminating plates, which shall be reversible and interchangeable from top to bottom.

All screws and nuts used in the construction of the case shall be fitted with shakepoof washers and care taken to ensure efficient earth continuity. An external earthing terminal with cable socket shall be fitted.

All MCB banks shall be fitted to frames, with robust locking plates provided to ensure the frames rigidly in the fixed position.

The banks shall be so spaced to obviate the necessity for insulating barriers, but protection shall be provided by means of insulating shields to prevent accidental contact with main bus-bars and incoming mains cable.

Bus-bars shall be of high conductivity, hard drawn copper conductors connected to the MCB contacts by means of spring washered screws or bolts, unless plug-in type MCB's are specified.

Neutral bars shall be similar to the main bus-bars and shall have two screw terminals per way for rating of 30 amps or over. Single screw connections will be allowed for capacities up to 30 amps. The neutral bars shall have one terminal for each MCB within the board, and connection of conductors to the neutral bar shall be in the same order as the MCB ways.

Where installations are carried out with cables with a protective conductor, all distribution boards shall also contain internal earthing bars similar to the neutral bars detailed above, with one terminal for each MCB within the board. Earthing conductors shall be connected in the manner described for neutral conductors to neutral bars.

Where a main integral isolating switch is provided in an MCB case it shall be arranged to isolate incoming live and neutral main cables from the bus-bars. The isolator switch shall be rated at 500 volts and of the quick make-and break pattern with positive action. Incoming and outgoing terminals shall be fitted with two clamping screws and outgoing conductors to the bus-bars shall be high conductivity hard drawn copper rods.

Isolating switches shall comply with IEE Regulations, Part 537, and shall be capable of carrying their full rated load continuously and shall 'make' or 'break' their full rated load without undue burning of the contacts.

c) Miniature Circuit Breakers (MCB’s)

All MCB's shall have movements which are positive in both directions (make and break) so as to enable units to be closed decisively by the operation of the handle, and to be able to assume the 'OFF' position unless the contacts are definitely separated, to safeguard against false indications.

The hand shall be trip free to make it impossible for the operator to hold the breaker in the closed position under faulty conditions. The operating mechanism and arc chambers of the circuit breaker shall be separated from the terminals and fixing screws.

Terminal identification shall be readily discernable as viewed from the front of the board with automatic and clear signal identification for both 'ON' and 'OFF' position.

All terminals shall be readily accessible from the front and each wiring chamber shall be closed by a screw fixed cover which protects the terminals and prevents dust from settling on the insulation.

Where the full capacity of a distribution board is not required the electrical Contractor shall fix blanking plates in the vacant MCB housings. All MCB's shall be rated at 500 volts minimum, and comply with BS 3871 "Miniature and moulded case circuits breakers" and 4752 part 1, "Circuit breakers".

11. LABELLING AND ENGRAVING

a) Labelling

All fused-switch units, switch fuses, switches, bus-bar chambers, distribution boards etc., and all items of equipment on the main panel shall be identified in accordance with **Section 514 of the IEE Regulations** and shall have securely fitted externally a white 'Traffolyte', 'Formica' or other approved plastic laminate label engraved with 6 mm high black letters detailing the function of the equipment and any reference number.

Red, Yellow, Blue, Black & Green plastic laminate phase discs shall be fixed inside all switchgear and distribution boards to indicate to which phase of the supply the various circuits are connected. The colour rings shall comply with **Part 524 of the IEE Regulations.**

Each TP or TP & N item of switchgear shall have fitted on the cover a white plastic laminate label having **'CAUTION' - 415 VOLTS'** engraved in 10 mm high red lettering.

b) Engraving

The electrical Contractor shall allow for engraving of all switched fused spurs, double pole switch accessories and any other accessories which are customarily required.

The accessory plate shall be engraved in either black or red, capital letters 5 mm high, detailing and appliance or equipment being supplied by the accessory e.g., 'WATER PUMP' etc.

12. MOUNTING HEIGHTS

The approximate position of main switchgear, control equipment distribution boards, fittings and accessories shall be as indicated on the Drawings. Actual positions shall be determined on site by the Engineer.

Unless otherwise stated on the relevant drawings or directed by the Engineer the following mounting heights of all accessories above finished floor level shall be adhered to: -

i. Lighting Switches - **1400 mm to center**
ii. Socket Outlet and Spur - **300 mm to center (or 150 mm above work top level to center)**
iii. Distribution Boards - **1800 mm to lower edges.**

All groups of accessories shall be in line either vertically or horizontally or as specified.

13. LUMINAIRES

All Luminaires shall be of the manufacture, size and type specified and shall comply in all respects to BS 4533 **"Electric Luminaires".**

The electrical Contractor shall supply and install all luminaires including lamps, lamp holders, control gear, capacitors, glassware, diffusers or other attachments, heat resistant internal cables, fuses and terminals and all necessary suspension gear. In case where Luminaires are supplied by the client the Contractor shall deliver to site, store, install, commission and set to work.

Unless otherwise stated, indoor luminaires shall be suitable for **Class 1 normal indoor environments**, giving a degree of protection against ingress of moisture or dust.

All Luminaires shall be assembled and installed in accordance with the respective manufacturer's instructions/recommendations, in the position and mounting heights specified.

Luminaires shall not be installed under dirty and hazardous site conditions, and any damage or deterioration to luminaires installed under these conditions shall be made good by the electrical Contractor.

The Luminaires shall be cleaned free of dust and dirt after completion of the installation. Where dirt, dust, corrosion or other conditions cause imperfections in the luminaires, they shall be replaced.

Luminaires, diffusers, attachments or glassware etc., shall be properly stored to final erection, in such a manner as to avoid damage of any kind.

Luminaires fixings shall generally be suitable for direct connection to conduit boxes or as otherwise specified. Luminaires not provided with suitable BESA box shall be modified as necessary.

Where a flexible cord supports, or partly supports, a luminaire the maximum mass supported by the cord shall not exceed the values set out in **IEE Regulations 522.8**

The minimum cross-section area flexible cord to the employed shall be 0.75mm2.

Specified attention shall be given to Chapter 52 of the IEE Regulations, particularly Regulation 521-5 and 521-6, Appendices 1 to 15.

Pendant tungsten luminaires shall be fitted with heat resistant flexible cord complying with BS 6500, capable of continuous operation with a conductor temperature of 150 degrees C. The cable shall be of the circular multi-core type, finished white, if not otherwise specified.

Ceiling mounted tungsten luminaires; spotlights and other luminaires of the category 'hot' luminaires shall be wired internally with cables suitable for continuous operation at 185-degree C. Where cable tails are provided they shall be of the heat resistant type capable of operation at 185-degree C.

Exterior luminaires, fixed to the walls of buildings etc., shall be wired such that final circuit wiring terminates within the luminaire. All final circuit cables so installed shall be provided with heat resistant slaves from the connection point within the luminaire for a distance of 300 mm.

All fluorescent and other discharge luminaires shall be provided with an integral fused connector block. The rating of the fuse shall be in accordance with the manufacturer's instructions to protect the internal wiring of the luminaire and to provide discrimination between final circuit protection and luminaire protection.

All recessed and semi-recessed luminaires in ceilings shall be connected by three core 0.75 mm2 high temperature flexible cord from the terminals of the luminaires to a plug-in ceiling rose fixed and connected to an accessible outlet box in the wiring system, within the suspended ceiling immediately above the luminaire. The ceiling rose shall be accessible via the opening provided in the ceiling.

The electrical Contractor shall ensure that the methods of suspension for luminaires are electrically and mechanically sound.

Luminaires suspended by means of tubes shall be fitted to ball joints allowing a swing of at least 20 degrees all round. Reliable earthing between the fixed and moving parts shall be provided by means of a flexible braided copper tape.

Fluorescent luminaires shall be provided with a minimum of two fixings, except in the case of recessed modular luminaires or surface-mounted luminaires exceeding 300 mm in width, where four number fixings (one from each corner) shall be provided by means of conduit drops or threaded rods.

Normally visible luminaires support shall be conduit. All fluorescent luminaires shall be solidly mounted with all assembly nuts, bolts and accessories made tight to prevent vibrations and noise. Anti-vibration packing shall be fitted where necessary. Luminaires mounted direct to trunking shall be fixed by means of the manufacturer's recommended fixing assemblies.

Unless stated otherwise, all luminaire supports shall be fixed to the building primary structure. Luminaires shall not be supported from suspended ceiling unless otherwise specified. The electrical Contractor shall be responsible for mounting and fixing arrangements.

Break joint rings of approved colour shall be provided for all suspended luminaires and fluorescent batten luminaires where the batten is of insufficient width to cover completely the conduit box and its associated clearance hole in the ceiling.

The metalwork of all luminaires shall be effectively bonded to the earthing system in accordance with Chapter 54 of the IEE Regulations.

Care shall be taken to ensure that the internal wiring of luminaires and the cables of any fixed wiring shall not be in contact with high temperature areas in luminaires.

Lighting track shall be of the type, size, finish, number of circuits and manufacture specified and shall comply with the requirements of the relevant section of **BS.4533.** The positions of luminaires as shown on the Drawings are approximate only and exact position shall be determined after reference to the **Engineering supervisor.**

14. LIGHTING SWITCHES

Lighting switches shall be of the type, size and manufacture as specified.

Wall and ceiling switches shall comply with **BS 3676.** Wall and ceiling switches controlling A.C lighting circuits shall be rated 6 or 10 amps and be of the slow-break quick-make, type unless stated otherwise.

Where several switches on one phase are shown at one position, a ganged box shall be used.

Where switches at any location are connected to different phases, purpose-make phase barrier switches shall be installed. The phases shall be separated by means of rigidly fixed barriers and the cable for each phase shall be confined to the area enclosed by the barriers for that phase.

Switches connected to a particular phase shall have separate cover or covers fitted over each phase. The covers shall be engraved, "CAUTION 415 VOLTS".

The switch plate of the specified finish shall be fitted over phase cover to render the switch unit indistinguishable from the switches that are not phase barrier switches.

Alternatively, each gang shall have its own piping and box for each phase, physically separated from other phases with similar arrangements.

For flush position on a plastered or equivalent finish wall, the switches shall have overlapping plates.

In any places where the finish is fair-faced brickwork, the wiring shall be installed on the back of the wall and make a back entry into the accessories. Each switch in these areas shall be neatly recessed and shall incorporate an overlapping plate.

For surface-mounted positions and such Plant Rooms, Electrical Switch room etc., employing a surface-mounted system or wiring, switches shall be surface-mounted, having metal front plates of an aluminium finish, mounted in matching metal boxes.

15. SOCKET OUTLETS

All socket outlets and plugs shall be supplied and installed in accordance with the manufacture, type, sizes and finish specified.

All round pin 2A, 5A, 15A, and 30A socket outlets shall comply with the requirements of **BS 546.**

All sockets outlets shall be switched and complete with safety shutters, unless otherwise specified.

All switched sockets outlets shall be complete with steel boxes of the same manufacture, complete with earth terminal.

Assemblies shall comply fully with the requirements of the **IEE Regulations concerning the bonding** of protective conductor terminals and each such terminal shall be connected by a conductor, having a minimum cross-sectional area of 2.5 mm2, to a permanent earthing terminal incorporated in the associated box providing an effective, solid connection to the earth continuity conductor of the installation.

Where the assembly does not provide a reliable electrical contact between the cover plate and box with effective connection of metal operating bars and toggles, then an insulated earthing lead shall be provided, solidly connected to the metal plate and operating bar or toggle and terminating at the fixed earthing terminal incorporated in the associated box. 13 amp sockets will generally be installed using ring circuits in accordance with **15 of the IEE Regulations.**

All plugs shall be of moulded rubber or other resilient material complying with **BS 1363 or BS 546**. The plug shall have internal cord grip. 13 amp plugs shall be fitted with cartridge fuse links to **BS 1362**. The fuse rating shall be selected to give protection to the flexible cord or cable connected.

All fuses installed within 13 Amp plug top, fused spurs, clock connections etc., shall be cartridge fuse links rated at 240 volts, **ASTA certified for compliance with BS 1362** 'General purpose fuse links for domestic and similar purposes', or **BS 464** 'Cartridge fuse links (rated at up to 5 amperes) for AC and DC service', or **BS 2950** 'Cartridge fuse-link for telecommunications and light electrical apparatus'.

All equipment which is locally fused shall have fitted fuses with characteristics which are recommended by the manufacturer of the equipment.

If any appliance or equipment suffers due to incorrect fusing of the appliances, such appliances or equipment shall be repaired or replaced at the electrical Contractor's cost, to the satisfaction of the Engineer.

16. INSPECTION AND TESTING

A visual inspection shall be made in accordance with IEE Regulations Chapter 61. References shall be made to Appendix 6 of the IEE Regulations, which is a checklist for initial inspection of installations.

The electrical installation shall be inspected and tested by the electrical Contractor in accordance with Chapter 61 of the IEE Regulations.

Where any part of installation is to be concealed within a building, fabric tests shall be made to ensure that the installation is satisfactory prior to concealment.

Upon completion of the works the whole installation shall be subjected to the tests detailed hereafter and every defect shall be noted, corrected and brought to the notice of the Engineer.

All tests shall be witnessed by the Engineer to his full satisfaction and he shall be given at least one week's notice in writing of the proposed tests.

All labour and test instruments shall be provided by the electrical Contractor and the instruments shall be correctly calibrated and certified for the limits of accuracy required and shall be operated by a competent person. If, in the Engineer's opinion, a particular instrument is not suitable, then an acceptable alternative shall be provided. The Engineer shall be at liberty to demand the use of any testing instrument or apparatus that he may reasonably consider to be necessary in the execution of the testing.

In the event of the installation failing to pass the test, the Engineer has the full authority of the Employer to deduct from the Contract Price all reasonable expenses incurred, due to him being required to attend a repetition of the test.

The following items, where relevant, shall be tested in the sequence indicated. Standard methods of testing, in respect of some of the following regulations of this section, are given in Appendix 6 of the IEE Regulations.

i. Continuity of ring final circuit conductors.
ii. Continuity of protective conductors, including main supplementary equipotential bonding.
iii. Earth electrode resistance.
iv. Insulation resistance.
v. Insulation of site-built assemblies.
vi. Protection of barriers or enclosures provided during erection.
vii. Insulation of non-conducting floors and walls.
viii. Polarity.
ix. Earth fault loop impedance.
x. Operation of residual current devices and fault voltage operated protected devices.

Upon completion of all tests and commissioning, two copies of detailed certificates shall be provided by the electrical Contractor to show that the equipment, materials, installation etc., have been tested and commissioned. One copy of each, duly completed and signed shall be submitted to the Engineer within 15 days of the results being obtained. The second copy of the certificates shall be retained to be included with operator and maintenance manuals. The results of the test and details of completion for the electrical test shall be detailed on the Test and Completion Certificates respectively; issued by the National Inspection council for Electrical Installation Contracting or other approved authority.

17. SUPPLY AND DISTRIBUTION

a) Metering

The K.P&L.Co. (Power Utility Company) Meter is to be located in the meter board

HT Meter from Power Utility Provider shall be as specified in the Utility provider requirements

All switch fuses, fuse switches, MCBs, MCCB's including meters shall be of reputable manufacture meeting current British standards as stipulated in the general specifications. Any other quality that does not strictly meet these standards shall not be acceptable.

b) Supply

The premise is to be fed from the HV / LV switchboard. This feeds power panels, rising mains, distribution boards and consumer units located at various load centers.

These boards feed various sub-mains boards, which in turn feed the final sub-circuits

18. LIGHTING AND SMALL POWER INSTALLATIONS

a) Installation system

With the exception of where otherwise noted on the drawings, the installation shall throughout be carried out in PVC or XLPE cables of not less than 1.5mm² copper drawn in high grade PVC conduit.

b) Lighting control system accessories

The switching arrangements for the indoor lighting shall be as indicated on the drawings.

Types of Manufacturer for accessories and fixed apparatus to be used shall be as Specified in the bills of quantities. Where the in the event it is not mentioned, the default manufacturers shall be as MK, ABB,, Clipsal, Philips or Legrand but shall be subject to the approval of the Engineer.

c) Connections to fixed appliances

The Contractor shall supply and interconnect flexible cords between spur units'/outlet boxes and the appliances where flex connections are needed.

All connections shall be made by white heat-resisting PVC / XLPE flexible cords having fuse rating in accordance with the respective circuits subjected to a minimum of 1.5mm².

d) Mounting heights and locations

All mountings heights stated shall mean the heights from finished floor level to underside of the accessory.

i. Lighting control switches - 1400mm above floor level and 100mm away from architrave. If mounted in a column they shall be located in the center.

ii. Socket Outlets - 300mm above finished floor except for areas that are otherwise stated on the drawings.

iii. Connection Units and Outlets - Connection units having cord outlets shall be located as to limit the length of the flex cord to approx. 600mm and be located slightly higher than the inlet on the appliances. The same applies to outlet boxes.

iv. Conduit Boxes (General) - Where one fitting is shown in a room the box shall be in the centre (unless otherwise stated). Where two or more fittings are to be installed, they shall be half of the between two fittings. Where one row of fittings is to be installed they shall be located in the center. Where installed between beams they shall be in between two beams. All boxes shall be with covers.

e) Wall and ceiling finishing's

The Contractor is to obtain information regarding ceiling claddings before the installation is commenced as he will be held responsible if the conduit boxes as well as for switches and socket outlets, telephone etc are not installed at the right depth.

f) Lighting fittings

The Contractor shall supply, deliver to site, install and commission all the fittings.

Types of Manufacturer for light fittings and associated accessories to be used shall be as Specified in the bills of quantities. Where the in the event it is not mentioned, the default manufacturers shall be as Thorn & Philips but shall be subject to the approval of the Engineer.

Where appliance's fittings shall be supplied complete with bulbs or tubes, the tubes shall be as Thorn or Osram Manufacturers. The bulbs shall also be Phillips, Osram or GE makes. Equivalent makes may be substituted but shall be subject to the approval of the Engineer.

g) Fixing and location

Details of fixing and location of various fittings are as shown on relevant drawings.

Fluorescent and incandescent fittings shall, in addition to being fixed to the conduit boxes, also be fixed by means of PVC covered raw plugs (no wooden plugs) at the fixing centres.

h) Outdoor Installations

A rubber gasket shall be fitted on the conduit boxes for the outdoor fittings in order to provide a waterproof seal.

All switch panels shall be as Specified in the bills of quantities. Where the in the event it is not mentioned, the default manufacturers shall be as MK, ABB,, Clipsal, Philips or Legrand but shall be subject to the approval of the Engineer.

Each switch panel shall be fed from a particular phase as NOT more than one shall be allowed inside one panel. Separate conduits shall be installed to each panel.

i) Power installations

The Contractor shall include for all installations shown on the drawings and specified in the bills of quantities.

The Contractor shall satisfy himself that there is a continuous conduit, trunking and/or duct system to facilitate installation of the entire power installation and shall be held responsible where continuity does not exist.

j) Installation system

The installation system for the indoor installation shall be carried out in concealed PVC conduits, PVC ducts and surface mounting trunking. The size of the cables shall not be less than 2.5mm² for ring main circuits.

19. FIRE ALARM INSTALLATIONS (Where Applicable)

The installation for the above shall be carried out using fire tuff 1.5mm² copper cables drawn in high impact grade PVC conduits.

The Contractor shall ensure a continuous link-up between individual break-glass call units, automated devices, bells and the panels. Also the link between individual occupancies and the main panel that shall be located in the block shall be ensured.

The fire alarm system must be intelligent type and fully addressable.

20. STRUCTURED CABLING, SECURITY, CCTV, ACCESS CONTROL & BMS INSTALLATIONS (Where Applicable)

a) Installation system

In the bid for electrical installation, supports for all cables in the structured cabling, security, CCTV, Access Control & BMS systems shall be included.

The electrical bidder shall include for trunking, conduits etc. to ensure a continuous supply system from the telephone / ICT room / Server room to any individual outlet.

The ICT and security contractors shall do all cabling and the backbone superhighway along the vertical building riser.

The same shall have appropriate plug on points for the occupants on each floor.

Holes in structures shall be provided by the main contractor.

The conduits shall at each point terminate in deep switch-boxes as specified for lighting control switches.

b) Mounting heights and locations

Mounting heights shall be as for socket outlets.

c) Blank-off plates

All Blank off plates shall be as Specified in the bills of quantities. Where the in the event it is not mentioned, the default manufacturers shall be as MK, ABB,, Clipsal, Philips or Legrand but shall be subject to the approval of the Engineer.

Blank plates shall be flat type and shall match wall colour.

21. EXCLUSIONS

Exclusions (This clause DOES NOT apply for this contract)

Excluded from this Sub-Contract is;

i. Control panels for motor-starters and internal wiring between control-panels, motors, thermostats etc.

ii. Supply and installation, including wiring, of alarm security and equipment. This excludes conduits, draw-wires, boxes, holes in trunking system and blank-off plates, which forms part of this Sub-Contract.

iii. All telephone system and equipment. This excludes conduits, draw-wires, boxes, holes in trunking systems and blank-off plates which forms part of this contract.

22. DEFINITIONS & INTEPRATION OF ELECTRICAL TERMS

The terms, phrases and abbreviations shall be deemed to have the following meanings wherever used hereinafter and in all contract documents.

i. Lighting Point:

"Install a lighting point complete with concealed diameter 20mm Ø H.G. PVC conduit, conduit couplers, conduit bends, Patress box, wiring in 3x1.5mm2 PVC / XLPE S/C CU cables and all accessories, complete from the light point to the consumer to the light switch point but excluding the light switch".

ii. Socket Outlet:

"Install 13A power outlet comprising Trunking/concealed diameter 20mm Ø H.G. PVC conduit, conduit couplers, conduit bends, box, ring mains wiring in 6x2.5mm2 PVC / XLPE S/C CU cables and all accessories including 13A switched Socket plate.
All socket outlets must have safely shutters on both live and neutral.

iii. Telephone Point:

"Install telephone cord outlet point complete with Trunking/ concealed diameter 25mm Ø H.G.PVC conduit box, and draw wire. "

All Telephone outlets must have Continuous links interlinking all the points.

iv. 20A DP Outlet:

"Install outlet for 20A DP switch comprising Trunking/ of concealed diameter
25mmØ H.G PVC conduit, wiring in 3x2.5mm2 PVC / XLPE S/C CU cables,box and 20A DP switch plate with neon light and all accessories".

v. Security Alarm Call Point.

"Install outlet for security alarm call point comprising Trunking/concealed diameter 20mm Ø HG PVC conduit, draw wire and box including blanking plate.

All call points must be interconnected.

vi. Consumer Unit:

"Supply and install SP/N power consumers' unit complete with SP/N Integral isolator".

vii. Distribution Board:

"Supply and install TP/N power distribution board, complete with TP/N integral isolator."

viii. Earthing:

Protective multiple earthing to Kenya Power and Lighting Co. (K. P. & L. Co.) Standards comprising 1200mm deep-driven pure electrolytic copper earth electrode, electrode clamps, yellow/green earth lead, earth pit complete with cover and all accessories".

ix. Labelling:

"Comprehensive, concise and instructive permanent labelling of all the sub-circuits, complete with identification of the sizes of all the sub-circuit cables, permanent traffolyte identification of the board such as "DB A" and identification of the sizes of the sub-mains and their origin e.g. "Board A: Supply, 4.x16mm2; SOURCE, DB1"

x. Blanking Plates:

"Supply and install blanking plates in all the spare ways."

xi. Switched Spur Outlet:

"Install 13A fused, switched spur outlets with neon light and 5A Integral fuse complete with Concealed diameter 20mm Ø H.G PVC Conduit, box, wiring in 3x2.5mm2 wiring for power supply and all accessories ".

xii. Trunking:

"Supply and install 250x50mm white stove-enamelled 3-compartment metal trunking (to details shown) complete with bends, end plates cover, screws etc and all accessories.

xiii. Cooker outlet:

"Install 45A DP cooker control unit, complete with concealed box, concealed diameter 25mm Ø H.G.PVC conduit, box, wiring in 3x6.0mm2 PVC / XLPE S/C CU cables and all accessories including 45A DP cooker control unit, with an integral socket fitted with neon lights, and cooker connector unit.

xiv. 32A TP outlet:

"Install outlet for 32A TP switch comprising of concealed diameter 32mmØ HG PVC conduit, wiring in 4 x 6.0+6.0mm2 etc. PVC / XLPE S/C CU cables, box, 32A TP switch plate with neon light and all accessories.

xv. Specifications

All light fittings and associated accessories to be used shall be as Specified in the bills of quantities. Where the in the event it is not mentioned, the default manufacturers shall be as Thorn & Philips but shall be subject to the approval of the Engineer.

All Sockets, telephone outlets, TV outlets, switches, spur outlets, fixed apparatus and all other related accessories to be used shall be as Specified in the bills of quantities. Where the in the event it is not mentioned, the default manufacturers shall be as MK, ABB,, Clipsal, Philips or Legrand but shall be subject to the approval of the Engineer.

All Isolators and associated accessories to be used shall be as Specified in the bills of quantities. Where the in the event it is not mentioned, the default manufacturers shall be Hager but shall be subject to the approval of the Engineer.

All Distribution boards / Consumer units and associated accessories to be used shall be as Specified in the bills of quantities. Where the in the event it is not mentioned, the default manufacturers shall be ABB but shall be subject to the approval of the Engineer.

All Conduits and associated accessories to be used shall be as Specified in the bills of quantities. Where the in the event it is not mentioned, the default manufacturers shall be Metro but shall be subject to the approval of the Engineer.

All conduits/ducts must be heavy gauge. Where steel pipes are specified, they must be minimum of **Class B** in strength.

xvi. Contract

The electrical contract shall be for supplying, delivering, fixing / installing, testing, commissioning and setting to work to the full satisfaction of the Engineer and the Contractor's price must include all costs for the entire process.

The installation shall be carried out strictly in accordance with the provision of the **17th Edition of Wiring regulations as published by the Institution Electrical Engineers, Great Britain**, the most current relevant **standards issued by the Kenya Bureau of Standards**, and with strict adherence to the safety requirements and **by-laws of the Kenya Power and Lighting Co. Ltd.**

All equipment and accessories supplied for the contract must be certified by the Kenya Bureau of Standards and a certificate issued upon request.

The Contractor shall ensure that the highest standards of workmanship and highest quality materials are used at all times. Inferior workmanship and low quality materials shall be rejected and replaced at the Contractors own cost.

Other than ceiling fixture accessories, light fittings etc, all the other mounting heights will be re-confirmed with the Engineer on site.

All light fittings must be completed with appropriate lamp, bulb, tube, starter, control gear, etc as applicable.

2c. PARTICULAR QUALIFICATION FOR BIDDERS – ELECTRICAL INSTALLATIONS

TABLE 01:

NOTE: All Attachments should be bound in 1No. document with fliers separating the particular sections which shall be presented as part of the Bid. **Presentation shall follow the order stated below.**

BIDDERS REQUIREMENTS			
Item	**Feature**	**Minimum Requirements**	**Bidder's Response / Comment (√ or X)**
A	***MANDATORY REQUIREMENTS FOR BID EVALUATION***		
A1	**Company / Firm Registration Certificate**	Attach Certificate	
A2	**Registration with Relevant Bodies & Category as Applicable** **(Note:** For any document Listed, Documentary Evidence of the Certificate Should be attached)		
		NCA 4	
		LOCAL AUTHORITY	
		P.I.N. Registration Certificate	
		VAT Registration Certificate	
		Tax Compliance Certificate	
		EPRA	
		Manufacturers Authorization Letter	
		OTHER (Fill in Pen)	
A3	**Company Profile** A detailed soft company profile indicating the principle place of business MUST be attached to the Bid (Hard Copy or Soft copy in CD / USB Flash drive)	Attach Copy	
A4	**Power of attorney of signatory of Bid (if Joint Venture)**	Attach Copy	
A5	**Long Lead Items Program of Works:** Bidder to attach a Proposed program (Work method and schedule), Descriptions, drawings, and charts, as necessary, which show the lead times for the long lead items timelines	Attach	

BIDDERS REQUIREMENTS			
Item	**Feature**	**Minimum Requirements**	**Bidder's Response / Comment (√ or X)**
A6	**Indicate Total Annual Revenue of Construction work performed in the last 3 years in Kshs.** ● Attach Proof of Financial Statements ● Attach Bank Contacts: Name, Address & Telephone Numbers of the banks that may provide references if contacted by Employer		
		2022	
		2023	
		2024	
B	***OTHER REQUIREMENTS***		
B1	**Brochures of Equipment's offered**	Attach with all details	
B2	**Financial Resources Access:** ● Evidence of access to Financial Resources to meet the qualification requirements: cash in hand, lines of credit, etc. ● List here as appropriate & Note that Proof in Documentary Evidence may be require to be provided upon request	Attach	
B3	**Equipment Guarantee (By bidder) and warranty period specified by manufacturer** **Note:** Minimum of 24 Months is required **Note:** Schedule to be attached of all equipment on warranty	Attach: Note: Warranty shall be specific from date of completion of project.	
B4	**Annual Maintenance Charges** ● After Expiry of DLP and Warranty Period, Indicate the proposed charges to be levied for annual maintenance of equipment & accessories ● NOTE: The above are to be Labour only charges excluding parts which shall be fitted only with prior approval by the client.		
		1st Year (Kshs.)	**Kshs.**
		2nd Year (Kshs.)	**Kshs.**
		3rd Year (Kshs.)	**Kshs.**
B5	**Foreign Currency**	State Foreign currency used in the pricing (if any) and rate of exchange to KShs.	**1…… (Foreign Currency)** **= ……. KShs.**

BIDDERS REQUIREMENTS			
Item	**Feature**	**Minimum Requirements**	**Bidder's Response / Comment (√ or X)**
B6	**Response Time**	In event of emergency, the response time shall be how many hours (Preferred is 3 Hours)	..... **Hours**
B7	**Delivery Period of Equipment from Date of Award (Fill Where Applicable)**		
		Days	
		Weeks	
		Months	
		Years	
B8	**Delivery Period of Site Works from Date of Award (Fill Where Applicable)**		
		Days	
		Weeks	
		Months	
		Years	

TABLE 02:

1.11	**Work of a similar nature and volume performed as Prime Contractor over the last five years. The values should be indicated in the same currency used above. Also list details of work under way or committed, including expected completion date.**			
PROJECT NAME & COUNTRY	**CLIENT / CONTACT PERSON**	**LEAD CONSULTANT**	**TYPE OF WORK DONE & YEAR OF COMPLETION**	**CONTRACT VALUE (Kshs.)**

TABLE 03:

1.12	**Qualification and experience of key personnel proposed for administration and execution of the Contract. Attach biographical data.**		
POSITION	**NAME**	**QUALIFICATIONS**	**YEARS OF EXPIRIENCE IN PROPOSED POSITION**
PROJECT MANAGER			
SITE FOREMAN			
OTHER(S)			

TABLE 04:

1.13	**Proposed contracts and firms involved.**		
SECTION OF THE WORKS	**VALUE OF CONTRACT**	**CONTRACTOR (NAME & ADDRESS)**	**EXPIRIENCE IN SIMILAR WORK**

TABLE 05:

1.14	**Information on current litigation in which the Bidder is involved.**	
OTHER PARTY(IES)	**CAUSE OF DISPUTE**	**AMOUNT INVOLVED**

TABLE 06:

1.15	**Additional Requirements:** Bidders should provide any additional information required in these documents to fulfill the requirements thereof if applicable		

Signed (As in form of Tender)_____

Official Stamp & Date _____

2c. SPECIAL NOTES TO ALL TENDERERS

CONTRACT TYPE: This is a fixed price Contract and no claims shall be entertained on whatever ground. The Contractor is advised to include all such costs as he projects may arise in his unit rates. Any variations in the exchange rate will also be no excuse for any variations in the contract sum.

COPYRIGHT: The copyright of this specification is vested in the Engineers and no part thereof may be reproduced without their express permission, given in writing.

CURRENCY: The specifications must be priced in Kenya Currency i.e. Shillings and Cents unless Otherwise as may be expressly stated

QUALIFICATION: The tenderer shall not otherwise qualify the text of this specification. Any alteration or qualification made without authority will be ignored and the text of the specification as printed adhered to.

BILLS OF QUANTITIES: The Bills shall be read in conjunction with the Preliminaries, General Conditions of Contract, Technical Specifications and Drawings

PAGES IN DOCUMENT: The tenderer is required to check the number of pages in this document and should any be found to be missing or the figures indistinct, he/she must inform the Engineers at once and have the same rectified. Should the tenderer be in doubt the precise meaning of any item, word or figures or for any reason whatsoever observe any apparent omission of words or figures, he must inform the Engineers in order that the correct meaning may be decided upon before the date for the submission of the tenders.

RATES & PRICES: The rates and prices tendered in the priced Bills of Quantities shall, except insofar as it is otherwise provided under the Contract, include all Plant, equipment, labor, supervision, materials, erection, maintenance, insurance, profit, together with all general risks, liabilities and obligations set out or implied in the Contract, including taxes and duties (including V.A.T). The quantities given are provisional and are for guidance only. The whole works shall be re-measured upon practical completion.

FILLING OF RATES: A rate or price shall be entered against each item in the priced Bills of Quantities, whether quantities are stated or not. The cost of items against which the Contractor has failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bills of Quantities.

PRICE ALLOWANCES: The tenderer shall be deemed to have made allowances in his unit prices generally to cover items of preliminaries or additions to prime cost Sums or other items priced against the respective items.

TAXES: The tenderer's price shall include all government taxes including duties, VAT, etc. No claims whatsoever will be allowed if the tenderer does not price them as aforementioned. VAT must be calculated for all sums as filled in the document which includes contingencies, PC Sums etc.

COST: The whole cost of complying with the provision of the Contract shall be included in the Items provided in the Bills of Quantities, and where no items are provided the cost shall be deemed to be distributed among the rates and prices entered for the related Items of Work.

TENDER EXPENSES: In no case will expense incurred by the tenderer in preparation of this tender be reimbursed.

REFERENCES: General directions and descriptions of work and materials are not necessarily repeated nor summarized in the Bills of Quantities. Reference to the relevant sections of the Contract documentation shall be made before entering prices against each item in the priced Bills of Quantities.

PC SUMMS & CONTINGENCIES: Provisional Sums and contingencies included and so designated in the Bills of Quantities shall be expended in whole or in part at the sole discretion of the Engineer.

Under no circumstances shall the contingencies in the BQ be used to cater for contractor's omissions or underquoting of items listed in the Bills.

Under no Circumstances shall the contractor claim any costs e.g. profits, attendance, etc. connected to the PC sums and contingencies if the client were to omit or relocate the same to others

ERRORS: No liability whatsoever will be admitted nor claim allowed in respect of errors in the completed tender due to mistakes in this document which should have been rectified in the manner described above.

Errors in pricing will be corrected by the Engineer for any arithmetic errors in computation or summation as follows: -

a) Where there is a discrepancy between amounts in figures and in words, the amount in words will govern; and

Where there is a discrepancy between the unit rate and the total amount derived from the multiplication of the unit price and the quantity, the unit rate as quoted will govern, unless in the opinion of the Engineer, there is an obviously gross misplacement of the decimal point in the unit prices, in which event the total amount as quoted will govern and the unit rate will be corrected

MATERIALS ORDERING: The Contractors shall be solely responsible for the accurate ordering of materials in accordance with the drawings and these specifications.

CLIENT SUPPLY ITEMS: The client retains the right to decide if the contractor would supply specific fittings / items as specified and the fittings / items or whether the same shall be handled via direct procurement by the client

Under no Circumstances shall the contractor claim any costs e.g. profits, attendance, etc. connected to the "Client Supplied" items if the client were to Omit or relocate any items noted as "Client Supply" in the Bills to others.

Fix Only: Shall mean take delivery on site (unless otherwise stated), unload where necessary, transport within site compound, store, unpack, check contents against orders and packing lists, assemble as necessary, distribute and hoist or install to position, test and commission.

Supply Only: Shall mean procure, deliver to site (unless otherwise advised), unload where necessary, transport within site compound, store, unpack, check contents against orders & parking lists, repack, assemble as necessary and store neatly in the storage space provided by others as directed.

Supply and Install: Shall mean undertaking both supply only and fix only

Appendices 1 and 2: must be filled and submitted with the RFQ

Signed (As in form of Tender)_____

Official Stamp & Date _____

TECHNICAL EVALUATION

	ITEM	DESCRIPTION	Marks Total 100
	1	**Compliance With Technical Specifications:** **(Note: Tender Evaluation Committee to carryout analysis showing how decision on this requirement has been arrived at)** *The Bidder for Evaluation shall attach evidence of the requested items.*	**70**
	1a	*Manufacturers Compliance and Certificate attached:* ***(100% yes - 10 otherwise- 0 mark)***	*15*
	1b	*Technical Compliance as per* ***Technical Compliance Schedule*** *Below* ***(100% yes 25 otherwise 0 mark)***	*25*
	1c	*Work Plan and methodology as per* ***methodology Compliance Schedule*** *Below* ***(as per the marks below)***	*30*
	2	**Qualification And Experience of KEY Personnel** Academic Qualifications and Experience (Evidence to be provided)	
	2a	Director of the firm: - 1No. Holder of at least a Diploma with 10yrs experience in relevant Engineering field	1
	2b	Project Managers: - 1No. Holder of at least a Diploma with 5yrs experience in relevant Engineering field	2
	2c	Artisans with Trade Test Certificate in Relevant Field: - 5No. Holder of at least a Certificate with 5yrs experience in relevant Engineering field	5
	2d	Occupational Health & Safety Officer (Bidder to provide CVs supported by academic /professional certificates) One (1No.) Occupation Health and Safety officer registered under the Company or collaborating companies	2
	3	**Experience of the firm in similar services** Provide One (1No.) projects of similar nature, complexity or magnitude in the last 10 years (Evidence to be Provided in form of completion letters or equivalent)	5
	4	**Financial Reports**	
	4a	Audited Financial report (Certified on each page) – Last 3 Years Average Annual Turn-over equal to or greater than the cost of the project	2

	4b	Evidence of Financial Resources (Cash in Hand, Lines of Credit, Overdraft Facilities, etc.: Financial Resources should finance the projected monthly cash flow for three months.	3
	5	**Adequacy of Tools and Equipment** Bidder must give proof of ownership or leasing of equipment	
	5a	Transport: 1No. Pickups	1
	5b	Equipment: 2No. Grounding tester. 1No. Thermal imaging unit 2No. Lugging and glanding tools 1No. Insulation tester. 1No. Phase rotation meter. 3Sets PPE Equipment. 2No. Drilling tools. 2No. Cutting tools. 1No. Power data logger	 1 1 1 1 1 1 1 1 1
	Total		**100**

Technical Compliance Schedule as per issued catalogues, datasheets and any other technical specification documentation.

ITEM	DESCRIPTION	SPECIFICATIONS	YES/NO
1	Internal Lighting Luminaires	Emergency lighting c/w battery emergency kit with 3hr autonomy	
		Rated voltage of fittings 85-265VAC	
		IEC 60598	
		LED chip technologies: COB LED, Cree, Samsung	
2	Solar Lighting	Pole height 8m	
		Light source c/w sensor 200W LED LamP. Led Chip: 192PCS 6500K. 2200 lumens;IP66 guard level	
		Solar panel - 5V/35W, high-efficiency polycrystalline PV module, A-class	
		Controller-12V/24V 10A, light/time intelligent control, PWM mode; various protections; waterproof, IP68 guard level; various protections	
		Battery- LiFePO4 32650 30Ah Discharge Time: 18 Hours +	
		Intelligent Control: The solar street light will automatically charge during the day, turn on at dusk, and turn off at dawn with an adjustable photocell control	
3	UPS	Rating: 60KVA	
		True online double conversion	
		3 phase input, 3 phase output	
		Internal static bypass	
		Communication interface: SNPM	
		LCD monitoring display	
		Batteries: SMF VRLA	
		bBackup time: 15mins	
		IP rating: 20	
		Surge protection & harmnic suppression	

METHODOLOGY

1	Explain clearly your understanding of the scope of the works as per the mandatory pre-tender site visit	5
2	Explain your plan to execute the work with understanding the facility is in operation with minimal disruption	5
3	Explain clearly material and debris handling within the facility Supply Storage Material movement within the building Removal of debris and excess material	5
4	Provide clear work program, work plan and material procurement schedule	5
5.	Explain clearly testing & commissioning method for the complete systems including the existing and giving complete data and report using certified personnel	5
6	Explain clearly risk management strategy and mitigation measures. Risk associated with the works Health and safety of the contractor staff Health and safety of the residents and visitors Installation risks	5
7	Describe clearly type of warranties of the new installations and the existing after commissioning	5

N/B: Full Compliance by the tenderers shall be required to score 70% of the technical. Hence, the tenderer shall not proceed to financial evaluation.

FINANCIAL EVALUATION

Bidders who qualify at the technical evaluation shall be evaluated at this stage as per the Client conditions

SECTION 03:

Bills of Quantities

Britam Centre
Remedial Works - Ele