BANKI KUU YA KENYA

CENTRAL BANK OF KENYA

Haile Selassie Avenue

P.O. Box 60000 - 00200 Nairobi Kenya

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TENDER FOR PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK – STATIONS -PHASE III PROJECT- INCORPORATING FIRE SAFETY OCCUPATIONAL SAFETY AND HEALTH SERVICES FOR CENTRAL BANK OF KENYA

TENDER NO. CBK/29/2012/2013/A

CLOSING ON 11TH JUNE, 2013 AT 10.30AM

SUB-CONTRACT CONDITIONS, SPECIFICATIONS AND BILLS OF QUANTITIES FOR:

ELECTRICAL INSTALLATIONS

CLIENTS REPRESENTATIVES:

Director
Department of Estates, Supplies & Transport
Central Bank of Kenya
P.O. Box 60000 – 00200
NAIROBI.

PROJECT CONSULTANTS:

ARCHITECTS:
Edon Consultants International Ltd
P.O. Box 19684 – 00202
NAIROBI.

QUANTITY SURVEYORS:
Quanti – Bill Consult
P.O. Box 34360 – 00100
NAIROBI.

ELECTRICAL & MECHANICAL ENGINEERS:
Feradon Associates Ltd
P.O. Box 7375 – 00300
NAIROBI.

APRIL 2013

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI

SUB-CONTRACT FOR ELECTRICAL INSTALLATIONS

CONTENTS **PAGES**

Feradon Associates Ltd.,
Consulting Engineers,
Mucai Road, Golf Course,
P O Box 7375 – 00300
Ronald Ngala,
NAIROBI.

FEBRUARY, 2012
REVISION I, JULY 2012
REVISION II – OCTOBER, 2012
REVISION III – MARCH, 2013

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI

SUB-CONTRACT FOR ELECTRICAL INSTALLATIONS

SPECIAL NOTES FOR ALL TENDERERS:

Important: **The site for the proposed works has a number of existing installations. The Sub-contractor will be required to ensure there's no interference with supply of services to neighbouring organizations. The sub-contractor will be required to take all precaution and care so that no damage will occur to the existing installations on site. The sub-contractor is also advised to secure all the necessary insurance policies as he will be solely held responsible for any damages to the existing system, injuries to persons resulting from his activities and/or interference with normal operations of the building that may result from his negligence, actions or otherwise.**

1. These notes shall form part of these specifications and conditions.

2. 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 must inform the Engineers at once and have the same rectified. Should the tenderer be in doubt about 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 Engineer in order that the correct meaning may be decided upon before the date for the submission of the tenders.

3. 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.

4. The tenderer shall not alter or 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 will be adhered to.

5. 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, if those have not been priced against the respective items.

6. The tenderer's price shall include all government taxes including duties, V.A.T. etc. No claims whatsoever will be allowed in respect of duties, VAT etc if the tenderer fails to include them in his unit prices. It is also to be noted that VAT will be included in the unit rates and NOT worked out as a percentage of the total.

7. In no case will any expenses incurred by the tenderer in preparation of this tender be reimbursed.

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

9. The specifications must be priced in Kenya Currency i.e. Shillings and Cents.

10. All the tenderers must make a declaration that they have not and will not make any payment to any person which can be perceived as an inducement to enable them to win this tender.

11. The works shall be carried out in accordance with provisions of the 16th Edition of IEE wiring Regulations, the most current Kenya Standards governing such works, and relevant provisions of the current KPLC by-laws.

Signed (As in Tender)..... Date/Stamp.....

FORM OF TENDER

To: Director,
Department of Estates, Supplies and Transport
Central Bank of Kenya,
Haile Selassie Avenue,
P O Box 60000-00200,
NAIROBI

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
SUB-CONTRACT FOR ELECTRICAL INSTALLATIONS

1. In accordance with the Instructions to Tenderers, Conditions of Contract described or inferred to from the Kenya Association of Building and Civil Engineer Contractors (KABCEC), Form of Sub-Contract Agreement, Specifications, Drawings and Bills of Quantities for the execution of the above named Works, we, the undersigned offer to construct, install and complete such Works and remedy any defects therein for the sum of:

   Kshs……..***[Amount in figures]***

   Kenya Shillings……***[Amount in words]***
2. We undertake, if our tender is accepted, to commence the Works as soon as is reasonably possible after the receipt of the Employer's Representative's notice to commence, and to phase the works in accordance with the building programme and to complete the whole of the works within the time of the main contract.
3. We agree to abide by this tender for 120 days from the date of official tender opening**,** and shall remain binding upon us and may be accepted at any time before that date.
4. Unless and until a formal Agreement is prepared and executed this tender together with your written acceptance thereof, shall constitute a binding Sub-Contract between us and the Main Contractor.
5. We understand that you are not bound to accept the lowest or any tender you may receive.
6. We submit the Name of …… as Surety who has signed the form attached and is willing to be bound to the Main Contractors in an amount equal to 5% of the sub-contract amount for the due performance of the sub-contract upto the date of completion of the works and who will when and if called upon sign a Bond to the offset without limitations on the same day as the Sub-contract Agreement is signed but in the event the surety name is not approved we agree to furnish within 7 days another surety to your approval.
7. We agree in the event of your acceptance of this Tender, to execute the formal Sub-contract Agreement within Fourteen (14) days from notification of acceptance.

Dated this …… day of ……20…..

Signature ……. Name …….

In the capacity of ……duly authorized to sign tenders for and on behalf of:

……..***[Name of Tenderer[*** of……..***[Address of Tenderer]***

PIN No. ……VAT CERTIFICATE No. ……

Witness: Name …….

Address …….

Signature ……

NB: Tenderers are required to attach the surety undertaking, dully signed by the surety, to this Form of Tender.

To: **Director,**
Department of Estates, Supplies and Transport
Central Bank of Kenya,
Haile Selassie Avenue,
P O Box 60000-00200,
NAIROBI

Sirs,

FORM OF UNDERTAKING

We _____

of _____ , being a duly registered Commercial Bank in Kenya, are willing to act as Surety and to be bound to (MAIN-CONTRACTOR) in the sum equal to Ten percent (10%) of the Sub-Contract Sum, for the due performance by

_____ (Tenderer)

of _____

of a Sub-Contract which he/they contemplate(s) entering into with the Main-Contractor for the supply, installation, testing and commissioning of Electrical Installations as described in this document, and the accompanying relevant drawings for Central Bank of Kenya, according to the terms of the Performance Bank Guarantee a copy of which has been inspected by us without addition of any limitations.

We agree to enter into a Bank Guarantee under the above mentioned terms when and if called upon to do so.

Signature _____ (Surety)

Date_____

Witness _____

To be completed by proposed Surety
and returned with Tender Documents.

DEFINITIONS

The following terms and expressions used in the Sub-Contract document shall have the following meanings:

Client Representative	Director, Department of Estates, Supplies and Transport Central Bank of Kenya P O Box 60000-00200, NAIROBI.
Architects	Edon Consultants International Ltd P. O. Box 19684-00200, NAIROBI.
Electrical/Mechanical Engineers	Feradon Associates Ltd., Consulting Engineers, P.O. Box 7375-0030, NAIROBI.
Quantity Surveyors	Quanti-Bill Consultants P.O. Box 34360-00100, NAIROBI.

PART A:

INSTRUCTIONS TO TENDERERS

INSTRUCTIONS TO TENDERERS

CONTENTS

AWARD OF CONTRACT

INSTRUCTION TO TENDERERS

Note: The tenderer must comply with the following conditions and instructions and failure to do so is liable to result in rejection of the tender.

GENERAL

1. Definitions

(a) "**Tenderer"** means any person or persons partnership firm or company submitting a sum or sums in the Bills of Quantities in accordance with the Instructions to Tenderers, Conditions of Contract, Specifications, Drawings and Bills of Quantities for the work contemplated, acting directly or through a legally appointed representative.

(b) **"Approved tenderer**," means the tenderer who is approved by the Employer.

(c) Any noun or adjective derived from the word **"tender"** shall be read and construed to mean the corresponding form of the noun or adjective **"bid".** Any conjugation of the verb "tender" shall be read and construed to mean the corresponding form of the verb "bid."

(d) **Employer"** means **Central Bank of Kenya, P O Box 60000-00200, Nairobi, and Tel: 2860000**

2. Eligibility and Qualification Requirements

2.1 This invitation to tender is open to all tenderers who have been pre-qualified.

2.2 To be eligible for award of Sub-Contract, the tenderer shall provide evidence satisfactory to the Employer of their eligibility under Sub clause 2.1 above and of their capability and adequacy of resources to effectively carry out the subject Sub-Contract. To this end, the tenderer shall be required to update the following information already submitted during pre-qualification:-

(a) Details of experience and past performance of the tenderer on the works of a similar nature within the past five years and details of current work on hand and other contractual commitments.

(b) The qualifications and experience of key personnel proposed for administration and execution of the contract, both on and off site.

(c) Major items of construction plant and equipment proposed for use in carrying out the Sub-Contract. Only reliable plant in good working order and suitable for the work required of it shall be shown on this schedule. The tenderer will also indicate on this schedule when each item will be available on the Works. Included also should be a schedule of plant, equipment and material to be imported for the purpose of the Sub-Contract, giving details of make, type, origin and CIF value as appropriate.

(d) Details of subcontractors to whom it is proposed to sublet any portion of the Sub-Contract and for whom authority will be requested for such subletting.

(e) A draft Program of Works in the form of a bar chart and Schedule of Payment which shall form part of the Sub-Contract if the tender is accepted. Any change in the Program or Schedule shall be subjected to the approval of the Engineer. The program of works must be presented in detail, to include all milestones from commencement to commissioning, and handing over.

(f) Details of any current litigation or arbitration proceedings in which the Tenderer is involved as one of the parties.

2.3 Joint Ventures

Tenders submitted by a joint venture of two or more firms as partners shall comply with the following requirements:-

(a) The tender, and in case of a successful tender, the Form of Agreement, shall be signed so as to be legally binding on all partners.

(b) One of the partners shall be nominated as being in charge; and this authorization shall be evidenced by submitting a power of attorney signed by legally authorized signatories of all the partners.

(c) The partner in charge shall be authorized to incur liabilities and receive instructions for and on behalf of any and all partners of the joint venture and the entire execution of the Sub-Contract including payment shall be done exclusively with the partner in charge.

(d) All partners of the joint venture shall be liable jointly and severally for the execution of the Sub-Contract in accordance with the Sub-Contract terms, and a relevant statement to this effect shall be included in the authorization mentioned under (b) above as well as in the Form of Tender and the Form of Agreement (in case of a successful tender).

(e) A copy of the agreement entered into by the joint venture partners shall be submitted with the tender.

3. Cost of Tendering

The tenderer shall bear all costs associated with the preparation and submission of his tender and the Employer will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the tendering process.

4. Site Visit

4.1 The tenderer is advised to visit and examine the Site and its surroundings and obtain for himself on his own responsibility, all information that may be necessary for preparing the tender and entering into a Sub-Contract. The costs of visiting the Site shall be the tenderer's own responsibility.

4.2 The tenderer and any of his personnel or agents will be granted permission by the Employer to enter upon premises and lands for the purpose of such inspection, but only upon the express condition that the tenderer, his personnel or agents, will release and indemnify the Employer from and against all liability in respect of, and will be responsible for personal injury (whether fatal or otherwise), loss of or damage to property and any other loss, damage, costs and expenses however caused, which but for the exercise of such permission, would not have arisen.

4.3 The Employer shall organize a site visit at a date to be notified. A representative of the Employer will be available to meet the intending tenderers at the Site.

Tenderers must provide their own transport. The representative will not be available at any other time for site inspection visits.

Each tenderer shall complete the Certificate of Tenderer's Visit to the Site, whether he in fact visits the Site at the time of the organized site visit or by himself at some other time.

TENDER DOCUMENTS

5. Tender Documents

5.1 The Tender documents comprise the documents listed here below and should be read together with any Addenda issued in accordance with Clause 7 of these instructions to tenderers.

a. Special Notes for all Tenderers
b. Form of Tender
c. Form of Undertaking
d. Definitions
e. Instructions to Tenderers
f. Conditions of Contract
g. Agreement and Conditions of Sub-Contract for Building Works
h. Preliminaries and General Conditions
i. General Specifications for Electrical Installations
j. Particular Specifications for Electrical Installations
k. Bills of Quantities and Schedule of unit rates
l. Schedule of Unit Rates
m Standard Forms
n. Drawings

5.2 The tenderer is expected to examine carefully all instructions, conditions, forms, terms, specifications and drawings in the tender documents. Failure to comply with the requirements for tender submission will be at the Tenderer's own risk. Pursuant to clause 23 of Instructions to Tenderers, tenders which are not substantially responsive to the requirements of the tender documents will be rejected.

5.3 All recipients of the documents for the proposed Sub-Contract for the purpose of submitting a tender (whether they submit a tender or not) shall treat the details of the documents as "private and confidential".

6. Clarification of Tender Documents

6.1 A prospective tenderer requiring any clarification of the tender documents may notify the Employer in writing or by telex, cable or facsimile at the Employer's mailing address indicated in the Invitation to Tender. The Employer will respond in writing to any request for clarification, which he receives earlier than 7 days prior to the deadline for the submission of tenders. Written copies of the Employer's response (including the query but without identifying the source of the inquiry) will be sent to all prospective tenderers who have purchased the tender documents.

7. Amendment of Tender Documents

7.1 At any time prior to the deadline for submission of tenders the Employer may, for any reason, whether at his own initiative or in response to a clarification requested by a prospective tenderer, modify the tender documents by issuing Addenda.

7.2 Any Addendum will be notified in writing or by cable, telex or facsimile to all prospective tenderers who have purchased the tender documents and will be binding upon them.

7.3 If during the period of tendering, any circular letters (tender notices) shall be issued to tenderers by, or on behalf of, the Employer setting forth the interpretation to be placed on a part of the tender documents or to make any change in them, such circular letters will form part of the tender documents and it will be assumed that the tenderer has taken account of them in preparing his tender. The tenderer must promptly acknowledge any circular letters he may receive.

7.4 In order to allow prospective tenderers reasonable time in which to take the Addendum into account in preparing their tenders, the Employer may, at his discretion, extend the deadline for the submission of tenders.

PREPARATION OF TENDERS

8. Language of Tender

8.1 The tender and all correspondence and documents relating to the tender exchanged between the tenderer and the Employer shall be written in the English language. Supporting documents and printed literature furnished by the tenderer with the tender may be in another language provided they are accompanied by an appropriate translation of pertinent passages in the above stated language. For the purpose of interpretation of the tender, the English language shall prevail.

9. Documents Comprising the Tender

9.1 The tender to be prepared by the tenderer shall comprise: the Form of Tender and Appendix thereto, a Tender Surety, the Priced Bills of Quantities and Schedules, the information on eligibility and qualification, and any other materials required to be completed and submitted in accordance with the Instructions to Tenderers embodied in these tender documents. The Forms, Bills of Quantities and Schedules provided in the tender documents shall be used without exception (subject to extensions of the schedules in the same format and to the provisions of clause 13.2 regarding the alternative forms of Tender Surety].

10. Tender Prices

10.1 All the insertions made by the tenderer shall be made in INK and the tenderer shall clearly form the figures. The relevant space in the Form of Tender and Bills of Quantities shall be completed accordingly without interlineations or erasures except those necessary to correct errors made by the tenderer in which case the erasures and interlineations shall be initialed by the person or persons signing the tender.

10.2 The tenderer for every item in the Bills of Quantities shall insert a price or rate whether the quantities are stated or not. Items against which no rate or price is entered by the tenderer will not be paid for by the Employer when executed and shall be deemed covered by the rates for other items and prices in the Bills of Quantities.

The prices and unit rates in the Bills of Quantities are to be the full [all-inclusive] value of the work described under the items, including all costs and expenses which may be necessary and all general risks, liabilities and obligations set forth or implied in the documents on which the tender is based. All duties and taxes and other levies payable by the Sub-Contractor under the Sub-Contract or for any other cause as of the date 7 days prior to the deadline for the submission of tenders, shall be included in the rates and prices and the total tender prices submitted by the Tenderer. Such duties to include import duty, Value Added Tax (VAT), local authority (levies) and any other taxes (levies that may be imposed by the government and/or local authorities.

Each price or unit rate inserted in the Bills of Quantities should be a realistic estimate for completing the activity or activities described under that particular item and the tenderer is advised against inserting a price or rate against any item contrary to this instruction.

Every rate entered in the Bills of Quantities, whether or not such rate be associated with a quantity, shall form part of the Sub-Contract. The Employer shall have the right to call for any item of work contained in the Bills of Quantities, and such items of work to be paid for at the rate entered by the tenderer and it is the intention of the Employer to take full advantage of unbalanced low rates.

10.3 Unless otherwise specified the tenderer must enter the amounts representing 10% of the sub-total of the summary of the Bills of Quantities for Contingencies and Variation of Prices [V.O.P.] payments in the summary sheet and add them to the sub-total to arrive at the tender amount.

10.4 The tenderer shall furnish with his tender written confirmation from his suppliers or manufacturers of unit rates for the supply of items listed in the Conditions of Contract where appropriate.

10.5 The rates and prices quoted by the tenderer are subject to adjustment during the performance of the Sub-Contract only in accordance with the provisions of the Conditions of Contract. The tenderer shall complete the schedule of basic rates and shall submit with his tender such other supporting information as required under the Conditions of Contract.

11. Currencies of Tender and Payment

11.1 Tenders shall be priced in Kenya Shillings and the tender sum shall be in Kenya Shillings.

11.2 Tenderers are required to indicate in the Statement of Foreign Currency Requirements, which forms part of the tender, the foreign currency required by them. Such currency should generally be the currency of the country of the Tenderer's main office. However, if a substantial portion of the Tenderer's expenditure under the Sub-Contract is expected to be in countries other than his country of origin, then he may state a corresponding portion of the Sub-Contract price in the currency of those other countries. However, the foreign currency element is to be limited to two (2) different currencies and a maximum of 30% (thirty percent) of the Sub-Contract Price.

11.3 The rate of exchange used for pricing the tender shall be selling rate or rates of the Central Bank ruling on the date seven (7) days before the final date for the submission of tenders.

11.4 Tenderers must enclose with their tenders, a brief justification of the foreign currency requirements stated in their tenders.

12. Tender Validity

12.1 The tender shall remain valid and open for acceptance for a period of one hundred and twenty (120) days from the specified date of tender opening or from the extended date of tender opening (in accordance with clause 7.4 here above) whichever is the later.

12.2 In exceptional circumstances prior to expiry of the original tender validity period, the Employer may request the tenderer for a specified extension of the period of validity. The request and the responses thereto shall be made in writing or by cable, telex or facsimile. A tenderer may refuse the request without forfeiting his Tender Surety. A tenderer agreeing to the request will not be required nor permitted to modify his tender, but will be required to extend the validity of his Tender Surety correspondingly.

13. Tender Surety

13.1 The tenderer shall furnish as part of his tender, a Tender Surety in the amount stated in the Appendix to Instructions to Tenderers.

13.2 The unconditional Tender Surety shall be in Kenya Shillings and be in form of a certified cheque, a bank draft, an irrevocable letter of credit or a guarantee from a reputable Bank approved by the Employer located in the Republic of Kenya.

The format of the Surety shall be in accordance with the sample form of Tender Surety included in these tender documents; other formats may be permitted subject to the prior approval of the Employer. The Tender Surety shall be valid for THIRTY (30) days beyond the tender validity period.

13.3 Any tender not accompanied by an acceptable Tender Surety will be rejected by the Employer as non-responsive.

13.4 The Tender Sureties of unsuccessful tenderers will be returned as promptly as possible but not later than twenty eight (28) days after concluding the Sub-Contract execution and after a Performance Security has been furnished by the successful tenderer. The Tender Surety of the successful tenderer will be returned upon the tenderer executing the Sub-Contract and furnishing the required Performance Security.

13.5 The Tender Surety may be forfeited:

(a) if a tenderer withdraws his tender during the period of tender validity: or

(b) in the case of a successful tenderer, if he fails
(i) to sign the Agreement, or
(ii) to furnish the necessary Performance Security

(c) if a tenderer does not accept the correction of his tender price pursuant to clause 24.

14. No Alternative Offers

14.1 The tenderer shall submit an offer, which complies fully with the requirements of the tender documents.

Only one tender may be submitted by each tenderer either by himself or as partner in a joint venture.

14.2 The tenderer shall not attach any conditions of his own to his tender. The tender price must be based on the tender documents. The tenderer is not required to present alternative construction options and he shall use without exception, the Bills of Quantities as provided, with the amendments as notified in tender notices, if any, for the calculation of his tender price.

Any tenderer who fails to comply with this clause will be disqualified.

15 Pre-Tender Meeting

15.1 The tenderer's designated representative is invited to attend a pre-tender meeting, which if convened, will take place at the venue and time stated in the Invitation to Tender. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.

15.2 The tenderer is requested as far as possible to submit any questions in writing or by cable, to reach the Employer not later than seven days before the meeting. It may not be practicable at the meeting to answer questions received late, but questions and responses will be transmitted in accordance with the following:

(a) Minutes of the meeting, including the text of the questions raised and the responses given together with any responses prepared after the meeting, will be transmitted without delay to all purchasers of the tender documents. Any modification of the tender documents listed in -–Clause 9 which may become necessary as a result of the pre-tender meeting shall be made by the Employer exclusively through the issue of a tender notice pursuant to Clause 7 and not through the minutes of the pre-tender meeting.

(b) Non attendance at the pre-tender meeting will not be cause for disqualification of a bidder.

16 Format and Signing of Tenders

16.1 The tenderer shall prepare his tender as outlined in clause 9 above and mark appropriately one set "ORIGINAL" and the other "COPY".

16.2 The copy of the tender and Bills of Quantities shall be typed or written in indelible ink and shall be signed by a person or persons duly authorized to sign on behalf of the tenderer. Proof of authorization shall be furnished in the form of the written power of attorney, which shall accompany the tender. All pages of the tender where amendments have been made shall be initialed by the person or persons signing the tender.

16.3 The complete tender shall be without alterations, interlineations or erasures, except as necessary to correct errors made by the tenderer, in which case such corrections shall be initialed by the person or persons signing the tender.

SUBMISSION OF TENDERS

17 Sealing and Marking of Tenders

17.1 The tenderer shall seal the original and copy of the tender in separated envelopes, duly marking the envelopes as "ORIGINAL" and "COPY". The envelopes shall then be sealed in an outer envelope.

17.2 The inner and outer envelopes shall be addressed to the Employer at the address stated in the Appendix to Instructions to Tenderers and bear the name and identification of the Sub-Contract stated in the said Appendix with a warning not to open before the date and time for opening of tenders stated in the said Appendix.

17.3 The inner envelopes shall each indicate the name and address of the tenderer to enable the tender to be returned unopened in case it is declared "late", while the outer envelope shall bear no mark indicating the identity of the tenderer.

17.4 If the outer envelope is not sealed and marked as instructed above, the Employer will assume no responsibility for the misplacement or premature opening of the tender. A tender opened prematurely for this cause will be rejected by the Employer and returned to the tenderer.

18. Deadline for Submission of Tenders

18.1 Tenders must be received by the Employer at the address specified in clause 17.2 and on the date and time specified in the Letter of Invitation, subject to the provisions of clause 7.4, 18.2 and 18.3.

Tenders delivered by hand must be placed in the "tender box" provided in the office of the Employer.

Proof of posting will not be accepted as proof of delivery and any tender delivered after the above stipulated time, from whatever cause arising will not be considered.

18.2 The Employer may, at his discretion, extend the deadline for the submission of tenders through the issue of an Addendum in accordance with clause 7, in which case all rights and obligations of the Employer and the tenderers previously subject to the original deadline shall thereafter be subject to the new deadline as extended.

18.3 Any tender received by the Employer after the prescribed deadline for submission of tender will be returned unopened to the tenderer.

Modification and Withdrawal of Tenders

18.4 The tenderer may modify or withdraw his tender after tender submission, provided that written notice of the modification or withdrawal is received by the Employer prior to prescribed deadline for submission of tenders.

18.5 The Tenderer's modification or withdrawal notice shall be prepared, sealed, marked and dispatched in accordance with the provisions for the submission of tenders, with the inner and outer envelopes additionally marked "MODIFICATION" or "WITHDRAWAL" as appropriate.

18.6 No tender may be modified subsequent to the deadline for submission of tenders.

18.7 No tender may be withdrawn in the interval between the deadline for submission of tenders and the period of tender validity specified on the tender form. Withdrawal of a tender during this interval will result in the forfeiture of the Tender Surety.

18.8 Subsequent to the expiration of the period of tender validity prescribed by the Employer, and the tenderer having not been notified by the Employer of the award of the Sub-Contract or the tenderer does not intend to conform with the request of the Employer to extend the prior of tender validity, the tenderer may withdraw his tender without risk of forfeiture of the Tender Surety.

TENDER OPENING AND EVALUATION

19 Tender Opening

19.1 The Employer will open the tenders in the presence of the tenderers' representatives who choose to attend at the time and location indicated in the Letter of Invitation to Tender. The tenderers' representatives who are present shall sign a register evidencing their attendance.

19.2 Tenders for which an acceptable notice of withdrawal has been submitted, pursuant to clause 19, will not be opened. The Employer will examine the tenders to determine whether they are complete, whether the requisite Tender Sureties have been furnished, whether the documents have been properly signed and whether the tenders are generally in order.

19.3 At the tender opening, the Employer will announce the Tenderer's names, total tender price, tender price modifications and tender withdrawals, if any, the presence of the requisite Tender Surety and such other details as the Employer, at his discretion, may consider appropriate. No tender shall be rejected at the tender opening except for late tenders.

19.4 The Employer shall prepare minutes of the tender opening including the information disclosed to those present.

19.5 Tenders not opened and read out at tender opening shall not be considered further for evaluation, irrespective of the circumstances.

20 Process to be Confidential

20.1 After the public opening of tenders, information relating to the examination, clarification, evaluation and comparisons of tenders and recommendations concerning the award of Sub-Contract shall not be disclosed to tenderers or other persons not officially concerned with such process until the award of Sub-Contract is announced.

21.2 Any effort by a tenderer to influence the Employer in the process of examination, evaluation and comparison of tenders and decisions concerning award of Sub-Contract may result in the rejection of the Tenderer's tender.

21 Clarification Tenders

21.1 To assist in the examination, evaluation and comparison of tenders, the Employer may ask tenderers individually for clarification of their tenders, including breakdown of unit prices. The request for clarification and the response shall be in writing or by cable, facsimile or telex, but no change in the price or substance of the tender shall be sought, offered or permitted except as required to confirm the correction of arithmetical errors discovered by the employer during the evaluation of the tenders in accordance with clause 24.

21.2 No Tenderer shall contact the Employer on any matter relating to his tender from the time of the tender opening to the time the Sub-Contract is awarded. If the tenderer wishes to bring additional information to the notice of the Employer, he shall do so in writing.

22 Determination of Responsiveness

22.1 Prior to the detailed evaluation of tenders, the Employer will determine whether each tender is substantially responsive to the requirements of the tender documents.

22.2 For the purpose of this clause, a substantially responsive tender is one, which conforms to all the terms, conditions and specifications of the tender documents without material deviation or reservation and has a valid bank guarantee. A material deviation or reservation is one which affects in any substantial way the scope, quality, completion timing or administration of the Works to be undertaken by the tenderer under the Sub-Contract, or which limits in any substantial way, inconsistent with the tender documents, the Employer's rights or the tenderers obligations under the Sub-Contract and the rectification of which would affect unfairly the competitive position of other tenderers who have presented substantially responsive tenders.

22.3 Each price or unit rate inserted in the Bills of Quantities shall be a realistic estimate of the cost of completing the works described under the particular item including allowance for overheads, profits and the like. Should a tender be seriously unbalanced in relation to the Employer's estimate of the works to be performed under any item or groups of items, the tender shall be deemed not responsive.

22.4 A tender determined to be not substantially responsive will be rejected by the Employer and may not subsequently be made responsive by the tenderer by correction of the non-conforming deviation or reservation.

23 Correction of Errors

Tenders determined to be substantially responsive shall be checked by the Employer for any arithmetic errors in the computations and summations. Errors will be corrected by the Employer as follows:

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

(b) Where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will prevail, unless in the opinion of the Employer, there is an obvious typographical error, in which case adjustment will be made to the entry containing that error.

(c) The amount stated in the tender will be adjusted in accordance with the above procedure for the correction of errors and, with concurrence of the tenderer, shall be considered as binding upon the tenderer. If the tenderer does not accept the corrected amount, the tender may be rejected and the Tender Security may be forfeited in accordance with clause 13.

24 Conversion to Single Currency

24.1 For compensation of tenders, the tender price shall first be broken down into the respective amounts payable in various currencies by using the selling rate or rates of the Central Bank of Kenya ruling on the date seven (7) days before the final date for the submission of tenders.

24.2 The Employer will convert the amounts in various currencies in which the tender is payable (excluding provisional sums but including Day-works where priced competitively) to Kenya Shillings at the selling rates stated in clause 25.1.

25 Evaluation and Comparison of Tenders

25.1 The Employer will evaluate only tenders determined to be substantially responsive to the requirements of the tender documents in accordance with clause 23.

25.2 In evaluating tenders, the Employer will determine for each tender the evaluated tender price by adjusting the tender price as follows:

(a) Making any correction for errors pursuant to clause 24.

(b) Excluding Provisional Sums and provision, if any, for Contingencies in the Bills of Quantities, but including Day works where priced competitively.

25.3 The Employer reserves the right to accept any variation, deviation or alternative offer. Variations, deviations, alternative offers and other factors which are in excess of the requirements of the tender documents or otherwise result in the accrual of unsolicited benefits to the Employer, shall not be taken into account in tender evaluation.

25.4 Price adjustment provisions in the Conditions of Contract applied over the period of execution of the Sub-Contract shall not be taken into account in tender evaluation.

25.5 If the lowest evaluated tender is seriously unbalanced or front loaded in relation to the Employer's estimate of the items of work to be performed under the Sub-Contract, the Employer may require the tenderer to produce detailed price analyses for any or all items of the Bills of Quantities, to demonstrate the relationship between those prices, proposed construction methods and schedules. After evaluation of the price analyses, the Employer may require that the amount of the Performance Security set forth in clause 29 be increased at the expense of the successful tenderer to a level sufficient to protect the Employer against financial loss in the event of subsequent default of the successful tenderer under the Sub-Contract.

25.6 Firms incorporated in Kenya where indigenous Kenyans own 51% or more of the share capital shall be allowed a 10% preferential bias provided that they do not sub-contract work valued at more than 50% of the Sub-Contract Price excluding Provisional Sums to a non-indigenous sub-contractor.

AWARD OF SUB-CONTRACT

26 Award

26.1 Subject to clause 27.2, the Employer will award the Sub-Contract to the tenderer whose tender is determined to be substantially responsive to the tender documents and who has offered the lowest evaluated tender price subject to possessing the capability and resources to effectively carry out the Sub-Contract Works.

26.2 The Employer reserves the right to accept or reject any tender, and to annual the tendering process and reject all tenders, at any time prior to award of Sub-Contract, without thereby incurring any liability to the affected tenderers or any obligation to inform the affected tenderers of the grounds for the Employer's action.

27 Notification of Award

27.1 Prior to the expiration of the period of tender validity prescribed by the Employer, the Employer will notify the successful tenderer by cable, telefax or telex and confirmed in writing by registered letter that his tender has been accepted. This letter (hereinafter and in all Sub-Contract documents called "Letter of Acceptance") shall name the sum (hereinafter and in all Sub-Contract documents called "the Sub-Contract Price") which the Employer will pay to the Sub-Contractor in consideration of the execution and completion of the Works as prescribed by the Sub-Contract.

27.2 Notification of award will constitute the formation of the Sub-Contract.

27.3 Upon the furnishing of a Performance Security by the successful tenderer, the unsuccessful tenderers will promptly be notified that their tenders have been unsuccessful.

27.4 Within Fourteen [14] days of receipt of the form of Sub-Contract Agreement from the Employer, the successful tenderer shall sign the form and return it to the Employer together with the required Performance Security.

28 Performance Guarantee

28.1 Within Fourteen [14] days of receipt of the notification of award from the Employer, the successful tenderer shall furnish the Employer with a Performance Security in an amount stated in the Appendix to Instructions to Tenderers.

28.2 The Performance Security to be provided by the successful tenderer shall be an unconditional Bank Guarantee issued at the Tenderer's option by an established and a reputable Bank approved by the Employer and located in the Republic of Kenya and shall be divided into two elements namely, a performance security payable in foreign currencies and a performance security payable in Kenya Shillings. The value of the two securities shall be in the same proportions of foreign and local currencies as requested in the form of foreign currency requirements.

28.3 Failure of the successful tenderer to lodge the required Performance Security shall constitute a breach of Sub-Contract and sufficient grounds for the annulment of the award and forfeiture of the Tender Security and any other remedy under the Sub-Contract. The Employer may award the Sub-Contract to the next ranked tenderer.

29 Advance Payment

An advance payment, if approved by the Employer, shall be made under the Sub-Contract, if requested by the Sub-Contractor. The Advance Payment Guarantee shall be denominated in the proportion and currencies named in the form of foreign currency requirements. For each currency, a separate guarantee shall be issued. The guarantee shall be issued by a bank located in the Republic of Kenya, or a foreign bank through a correspondent bank located in the Republic of Kenya, in either case subject to the approval of the Employer.

APPENDIX TO INSTRUCTIONS TO TENDERERS

1.CLAUSE 2.1

Change to read "This invitation Tender is open to all tenderers in the Category Specified".

2. OMIT

Clauses 2.3, 4.3, 5.1, 11.2, 11.4, 25, 14.1, 13.1, 13.3, 13.4, 13.5, 15.1, 15.2

3. ADD TO CLAUSE 13.1 and 13.2

Tender surety will be required and the Tender Security shall be **2% of the sub-contract sum**.

4. CLAUSES 16.1 and 16.2

Only one set of tender document shall be submitted.

5. CLAUSES 6.1 AND 10.2

Change to 7 days (1 week)

6. CLAUSE 9.1

Appendix to Form of Tender to be omitted.

7. CLAUSE 19.2

Only the single tender document should be marked "WITHDRAWAL" OR "MODIFICATION"

8. CLAUSES 20.2, 20.3, AND 24(C)

Tender surety will be required.

9. CLAUSE 30

The Advance Payment Guarantee shall be in Kenya Shillings Only.

10. CLAUSE 16.1, 16.2, 17.1, and 17.2

Only one set of tender documents, filled in INK, shall be submitted.

11. ADD TO CLAUSE 28.1

Amount of performance security will be TEN per cent (10%) of sub-contract sum and bound to the appointed Main-contractor

12. ADD TO CLAUSE 28.2

Performance security shall not be divided in two elements and shall be payable in Kenya Shillings Only.

13. TENDER EVALUATION CRITERIA

The following information for procurement of services shall complement or amend the provisions of the instructions to tenderers. Wherever there is a conflict between the provisions of the instructions to tenderers and the provisions of the Appendix, the provisions of the Appendix herein shall prevail over those of the instructions to tenderers.

After tender opening, the tenders will be evaluated in 4 stages, namely:

1. Determination of Responsiveness (Mandatory Requirements)
2. Detailed Technical Examination
3. Financial Evaluation.
4. Recommendation for Tender Award

STAGE 1- DETERMINATION OF RESPONSIVENESS

This stage of evaluation shall involve examination of the pre-qualification conditions as set out in the Tender Advertisement Notice or Letter of Invitation to Tender and any other conditions stated in the bid document.

These conditions **MUST** include the following:

i) Registration with Ministry of Public Works (Category" **A**" Minimum)/National Construction Authority.

ii) Certificate of Registration under Company's Act.

iii) Class A1 registration as an electrical contractor with the Energy Regulatory Commission/ Ministry of Energy and other Licenses with the relevant statutory bodies.

iv) Provision of Bid Security of Ksh. 200,000(Two Hundred Thousand Shillings Only). Submitted in form of a Bank Guarantee or insurance bond from an Insurance company approved by the Public Procurement Oversight Authority (PPOA) and Valid beyond the Tender Validity Period.

v) Completed Company Profile using the Qualification Information, Tender Questionnaire and Confident Business provide in the Standard Forms.

vi) Copy of current Tax Compliant Certificate issued by the Kenya Revenue Authority (KRA) and valid beyond the tender closing date.

vii) Provide signed copies of Audited Company Accounts for the Last 3(three) Years.

TECHNICAL EVALUATION CRITERIA

The detailed scoring plan shall be as shown in table 1 below: -

TABLE 1

Item	Description (This includes Evaluation of Company Profile, Qualification Information, Tender Questionnaire and Confidential Business Questionnaire.	Point Scored	Max. Point	
i	**Key Personnel (Attach evidence)** in the company relevant to the building construction industry who will actively be involved in the proposed project (**MUST** *provide detailed CV accompanied by relevant academic and professional certificates from institutions recognized by the Commission for Higher Education in Kenya Telephone contacts MUST be provided*)			**30**
	Director of the firm o Holder of Degree/ Diploma/HND in relevant Engineering field-5 o Holder of certificate in relevant Engineering field----------3 o Holder of trade test certificate in relevant Engineering field----2 o No relevant certificate ----------0		**5**	
	At least 1No. degree/diploma of key personnel in relevant Engineering field o With over 10 years relevant experience ----------10 o With Between 5-9years relevant experience ---------- 5 o With under 5 years relevant experience ---------- 1		**10**	
	At least 1No certificate holder of key personnel in relevant Engineering field o With over 10 years relevant experience ---------- 10 o With Between 5-9years relevant experience ---------- 5 o With under 5 years relevant experience ----------1		**10**	
	At least 2No artisan (trade test certificate in relevant Engineering field) o Artisan with over 10 years relevant experience ---------- 5 o Artisan with Between 4-9 years relevant experience ---------- 3 o Artisan with Below 4years relevant experience ---------- 1 o Non skilled worker with over 10 years relevant experience ----1		**5**	
ii	**Contract completed in the last five (5) years (Max of 5 No. Projects**) o Project of Similar nature Valued at Kshs. 75 Million and Above --4 o Project of Similar nature valued between Kshs. 50Million-74Million---------- 2 o Project of Similar nature valued below Kshs. 50Million---------- 0 o No completed project of similar nature ---------- 0		**20**	**40**
iii	**On-going projects (Max of 5 No. Projects)** o Project of Similar nature Valued at Kshs. 75 Million and Above --4 o Project of Similar nature valued between Kshs. 50Million-74Million---------- 2 o Project of Similar nature valued below Kshs. 50Million---------- 0 o No ongoing project of similar nature - ----------0		**20**	

iv	**Financial report**			**15**
	Audited financial report (last three (3) years)			
	Financial Stability (15 Marks) a) Profitability Margin	A margin above : 30% will score **7.5 marks;** 10-29 % 3 marks and below 10% 1 mark		
	b) Liquidity Ratio	2:1 – **7.5 marks;** 1:1 –3 marks; less than 1:1 1 mark		
v	**Evidence of Financial Resources (Cash in hand or Lines of Credit or Over Draft facility etc) as evidence by recent bank reference letters.** o Has financial resources equal to Kshs. 80 Million or above ------ 15 o Has financial resources between Kshs.50million- 79 Million ----10 o Has financial resources below Kshs. 50million ----------0 o Has not given evidence of any of financial resources ----------0			**15**
	TOTAL			**100**

Note:

i) Only Tenderers scoring 75% and above SHALL be considered for Financial Evaluation.
ii) Tenderers scoring below 75% SHALL be automatically disqualified and will not proceed to financial evaluation.
iii) Responsive and prospective tenderers SHALL be subjected to due diligence after both Technical and Financial evaluations to confirm genuity of data and information submitted before consideration for Award of Contract.
iv) The pre – bid minutes shall be an addendum to the tender.

PART B:

CONDITIONS OF CONTRACT

PART B: CONDITIONS OF CONTRACT

PART B: CONDITIONS OF CONTRACT

1. Definitions

1.1 In this Contract, except where context otherwise requires, the following terms shall be interpreted as indicated;

"Bills of Quantities" means the priced and completed Bill of Quantities forming part of the tender [where applicable].

"Schedule of Rates" means the priced Schedule of Rates forming part of the tender [where applicable].

"The Completion Date" means the date of completion of the Works as certified by the Employer's Representative.

"The Contract" means the agreement entered into by the Employer and the Contractor as recorded in the Agreement Form and signed by the parties.

"The Contractor" refers to the person or corporate body whose tender to carry out the Works has been accepted by the Employer.

"The Contractor's Tender" is the completed tendering document submitted by the Contractor to the Employer.

"The Contract Price" is the price stated in the Letter of Acceptance.

"Days" are calendar days; **"Months"** are calendar months.

"A Defect" is any part of the Works not completed in accordance with the Contract.

"The Defects Liability Certificate" is the certificate issued by Employer's Representative upon correction of defects by the Contractor.

"The Defects Liability Period" is the period named in the Appendix to Conditions of Contract and calculated from the Completion Date.

"Drawings" include calculations and other information provided or approved by the Employer's Representative for the execution of the Contract.

"Employer" includes Central or Local Government administration, Universities, Public Institutions and Corporations and is the party who employs the Contractor to carry out the Works.

"Equipment" is the Contractor's machinery and vehicles brought temporarily to the Site for the execution of the Works.

"Site" means the place or places where the permanent Works are to be carried out including workshops where the same is being prepared.

"Materials" are all supplies, including consumables, used by the Contractor for incorporation in the Works.

"Employer's Representative" is the person appointed by the Employer and notified to the Contractor for the purpose of supervision of the Works.

"Specification" means the Specification of the Works included in the Contract.

"Start Date" is the date when the Contractor shall commence execution of the Works.

"A Sub-contractor" is a person or corporate body who has a Contract with the Contractor to carry out a part of the Work in the Contract, which includes Work on the Site.

"Temporary works" are works designed, constructed, installed, and removed by the Contractor which are needed for construction or installation of the Works.

"A Variation" is an instruction given by the Employer's Representative which varies the Works.

"The Works" are what the Contract requires the Contractor to construct, install, and turnover to the Employer.

2. Contract Documents

2.1 The following documents shall constitute the Contract documents and shall be interpreted in the following order of priority;
(1) Agreement,
(2) Letter of Acceptance,
(3) Contractor's Tender,
(4) Conditions of Contract,
(5) Specifications,
(6) Drawings,
(7) Bills of Quantities or Schedule of Rates [whichever is applicable]

3. Employer's Representative's Decisions

3.1 Except where otherwise specifically stated, the Employer's Representative will decide contractual matters between the Employer and the Contractor in the role representing the Employer.

4. Works, Language and Law of Contract

4.1 The Contractor shall construct and install the Works in accordance with the Contract documents. The Works may commence on the Start Date and shall be carried out in accordance with the Programme submitted by the Contractor, as updated with the approval of the Employer's Representative, and complete them by the Intended Completion Date.

4.2 The ruling language of the Contract shall be English language and the law governing the Contract shall be the law of the Republic of Kenya.

5. Safety, Temporary Works and Discoveries

5.1 The Contractor shall be responsible for design of temporary works and shall obtain approval of third parties to the design of the temporary works where required.

5.2 The Contractor shall be responsible for the safety of all activities on the Site.

5.3 Any thing of historical or other interest or significant value unexpectedly discovered on the Site shall be the property of the Employer. The Contractor shall notify the Employer's Representative of such discoveries and carry out the Employer's Representative's instructions for dealing with them.

6. Work Programme and Sub-Contracting

6.1 Within seven days after Site possession date, the Contractor shall submit to the Employer's Representative for approval a programme showing the general methods, arrangements, order and timing for all the activities in the Works.

6.2 The Contractor may sub-contract the Works (but only to a maximum of 25 percent of the Contract Price) with the approval of the Employer's Representative. However, he shall not assign the Contract without the approval of the Employer in writing. Sub-contracting shall not alter the Contractor's obligations.

7. The Site

7.1 The Employer shall give possession of all parts of the Site to the Contractor.

7.2 The Contractor shall allow the Employer's Representative and any other person authorized by the Employer's Representative, access to the Site and to any place where work in connection with the Contract is being carried out or is intended to be carried out.

8. Instructions

8.1 The Contractor shall carry out all instructions of the Employer's Representative which are in accordance with the Contract.

9. Extension of Completion Date

9.1 The Employer's Representative shall extend the Completion Date if an occurrence arises which makes it impossible for completion to be achieved by the Intended Completion Date. The Employer's Representative shall decide whether and by how much to extend the Completion Date.

9.2 For the purposes of this Clause, the following occurrences shall be valid for consideration;

Delay by: -

(a) force majeure, or

(b) reason of any exceptionally adverse weather conditions, or

(c) reason of civil commotion, strike or lockout affecting any of the trades employed upon the Works or any of the trades engaged in the preparation, manufacture or transportation of any of the goods or materials required for the Works, or

(d) reason of the Employer's Representative's instructions issued under these Conditions, or

(e) reason of the contractor not having received in due time necessary instructions, drawings, details or levels from the Employer's Representative for which he specifically applied in writing on a date which having regard to the date for Completion stated in the appendix to these Conditions or to any extension of time then fixed under this Clause was neither unreasonably distant from nor unreasonably close to the date on which it was necessary for him to receive the same, or

(f) delay on the part of artists, tradesmen or others engaged by the Employer in executing work not forming part of this Contract, or

(g) reason of delay by statutory or other services providers or similar bodies engaged directly by the Employer, or

(h) reason of opening up for inspection of any Work covered up or of the testing or any of the Work, materials or goods in accordance with these conditions unless the inspection or test showed that the Work, materials or goods were not in accordance with this Contract, or

(i) reason of delay in appointing a replacement Employer's Representative, or

(j) reason of delay caused by the late supply of goods or materials or in executing Work for which the Employer or his agents are contractually obliged to supply or to execute as the case may be, or

(k) delay in receiving possession of or access to the Site.

10. Management Meetings

10.1 A Contract management meeting shall be held regularly and attended by the Employer's Representative and the Contractor. Its business shall be to review the plans for the remaining Work. The Employer's Representative shall record the business of management meetings and provide copies of the record to those attending the meeting and the Employer. The responsibility of the parties for actions to be taken shall be decided by the Employer's Representative either at the management meeting or after the management meeting and stated in writing to all who attend the meeting.

10.2 Communication between parties shall be effective only when in writing.

11. Defects

11.1 The Employer's Representative shall inspect the Contractor's work and notify the Contractor of any defects that are found. Such inspection shall not affect the Contractor's responsibilities. The Employer's Representative may instruct the Contractor to search for a defect and to uncover and test any Work that the Employer's Representative considers may have a defect. Should the defect be found, the cost of uncovering and making good shall be borne by the Contractor. However, if there is no defect found, the cost of uncovering and making good shall be treated as a variation and added to the Contract Price.

11.2 The Employer's Representative shall give notice to the Contractor of any defects before the end of the Defects Liability Period, which begins at Completion, and is defined in the Appendix to Conditions of Contract.

11.3 Every time notice of a defect is given, the Contractor shall correct the notified defect within the length of time specified by the Employer's Representative's notice. If the Contractor has not corrected a defect within the time specified in the Employer's Representative's notice, the Employer's Representative will assess the cost of having the defect corrected by other parties and such cost shall be treated as a variation and be deducted from the Contract Price.

12. Bills of Quantities/Schedule of Rates

12.1 The Bills of Quantities/Schedule of Rates shall contain items for the construction, installation, testing and commissioning of the Work to be done by the Contractor. The Contractor will be paid for the quantity of the Work done at the rates in the Bills of Quantities/Schedule of Rates for each item. Items against which no rate is entered by the Tenderer will not be paid for when executed and shall be deemed covered by the rates for other items in the Bills of Quantities/Schedule of Rates.

12.2 Where Bills of Quantities do not form part of the Contract, the Contract Price shall be a lump sum (which shall be deemed to have been based on the rates in the Schedule of Rates forming part of the tender) and shall be subject to re-measurement after each stage.

13. Variations

13.1 The Contractor shall provide the Employer's Representative with a quotation for carrying out the variations when requested to do so. The Employer's Representative shall assess the quotation and shall obtain the necessary authority from the Employer before the variation is ordered.

13.2 If the Work in the variation corresponds with an item description in the Bill of Quantities/Schedule of Rates, the rate in the Bill of Quantities/Schedule of Rates shall be used to calculate the value of the variation. If the nature of the Work in the variation does not correspond with items in the Bill of Quantities/Schedule of Rates, the quotation by the Contractor shall be in the form of new rates for the relevant items of Work.

13.3 If the Contractor's quotation is unreasonable, the Employer's Representative may order the variation and make a change to the Contract Price, which shall be based on the Employer's Representative's own forecast of the effects of the variation on the Contractor's costs.

14. Payment Certificates and Final Account

14.1 The Contractor shall be paid after each of the following stages of Work listed herebelow (subject to re-measurement by the Employer's
Representative of the Work done in each stage before payment is made). In case of lump sum Contracts, the valuation for each stage shall be based on the quantities so obtained in the re-measurement and the rates in the Schedule of Rates.

(i) Advance payment [after Contract execution] **NIL** (*percent of Contract Price, to be inserted by the Employer).*

(ii) First stage (*define stage)* ***AS PER PROGRESS***

(iii) Second stage *(define stage*) ***AS PER PROGRESS***

(iv) Third stage (*define stage)* ***AS PER PROGRESS***

(v) After defects liability period.

14.2 Upon deciding that Works included in a particular stage are complete, the Contractor shall submit to the Employer's Representative his application for payment. The Employer's Representative shall check, adjust if necessary and certify the amount to be paid to the Contractor within 21 days of receipt of the Contractor's application. The Employer shall pay the Contractor the amounts so certified within 30 days of the date of issue of each Interim Certificate.

14.3 The Contractor shall supply the Employer's Representative with a detailed final account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Employer's Representative shall issue a Defect Liability Certificate and certify any final payment that is due to the Contractor within 30 days of receiving the Contractor's account if it is correct and complete. If it is not, the Employer's Representative shall issue within 21 days a schedule that states the scope of the corrections or additions that are necessary. If the final account is still unsatisfactory after it has been resubmitted, the Employer's Representative shall decide on the amount payable to the Contractor and issue a Final Payment Certificate.

The Employer shall pay the Contractor the amount so certified within 60 days of the issue of the Final Payment Certificate.

14.4 If the period laid down for payment to the Contractor upon each of the Employer's Representative's Certificate by the Employer has been exceeded, the Contractor shall be entitled to claim simple interest calculated pro-rata on the basis of the number of days delayed at the Central Bank of Kenya's average base lending rate prevailing on the first day the payment becomes overdue. The Contractor will be required to notify the Employer within 15 days of receipt of delayed payments of his intentions to claim interest.

15. Insurance

The Contractor shall be responsible for and shall take out appropriate cover against, among other risks, personal injury; loss of or damage to the Works, materials and plant; and loss of or damage to property.

16. Liquidated Damages

16.1 The Contractor shall pay liquidated damages to the Employer at the rate 0.01 per cent of the Contract price per day for each day that the actual Completion Date is later than the Intended Completion Date except in the case of any of the occurrences listed under Clause 9.2. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages shall not affect the Contractor's liabilities.

17. Completion and Taking Over

17.1 Upon deciding that the Work is complete the Contractor shall request the Employer's Representative to issue a Certificate of Completion of the Works, upon deciding that the Work is completed.
The Employer shall take over the Site and the Works within seven days of the Employer's Representative issuing a Certificate of Completion.

18. Termination

18.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract. These fundamental breaches of Contract shall include, but shall not be limited to, the following;

(a) the Contractor stops Work for 30 days continuously without reasonable cause or authority from the Employer's Representative;

(b) the Contractor is declared bankrupt or goes into liquidation other than for a reconstruction or amalgamation;

(c) a payment certified by the Employer's Representative is not paid by the Employer to the Contractor within 30 days after the expiry of the payment periods stated in Sub-Clauses

14.2 and 14.3 hereabove.

(d) the Employer's Representative gives notice that failure to correct a particular defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time.

18.2 If the Contract is terminated, the Contractor shall stop Work immediately, and leave the Site as soon as reasonably possible. The Employer's Representative shall immediately thereafter arrange for a meeting for the purpose of taking record of the Works executed and materials, goods, equipment and temporary buildings on Site.

19. Payment Upon Termination

19.1 The Employer may employ and pay other persons to carry out and complete the Works and to rectify any defects and may enter upon the Works and use all materials on Site, plant, equipment and temporary works.

19.2 The Contractor shall, during the execution or after the completion of the Works under this Clause, remove from the Site as and when required within such reasonable time as the Employer's Representative may in writing specify, any temporary buildings, plant, machinery, appliances, goods or materials belonging to him, and in default thereof, the Employer may (without being responsible for any loss or damage) remove and sell any such property of the Contractor, holding the proceeds less all costs incurred to the credit of the Contractor.

19.3 Until after completion of the Works under this Clause, the Employer shall not be bound by any other provision of this Contract to make any payment to the Contractor, but upon such completion as aforesaid and the verification within a reasonable time of the accounts therefore the Employer's Representative shall certify the amount of expenses properly incurred by the Employer and, if such amount added to the money paid to the Contractor before such determination exceeds the total amount which would have been payable on due completion in accordance with this Contract, the difference shall be a debt payable to the Employer by the Contractor; and if the said amount added to the said money be less than the said total amount, the difference shall be a debt payable by the Employer to the Contractor.

20 Corrupt Gifts and Payments of Commission

20.1 The Contractor shall not:

(a) Offer or give or agree to give to any person in the service of the Employer any gifts or consideration of any kind as an inducement or reward for doing or forbearing to do or for having done or forborne to do any act in relation to the obtaining or execution of this or any other contract with the Employer or for showing or forbearing to show favour or disfavour to any person in relation to this or any other contract with the Employer.

(b) Any breach of this Condition by the Contractor or by anyone employed by him or acting on his behalf (whether with or without the knowledge of the Contractor) shall be an offence under the Laws of Kenya.

21. Settlement of Disputes

21.1 Any dispute arising out of the Contract which cannot be amicably settled between the parties shall be referred by either party to the arbitration and final decision of a person to be agreed between the parties. Failing agreement to concur in the appointment of an Arbitrator, the Arbitrator shall be appointed by the chairman of the Chartered Institute of Arbitrators, Kenya branch, on the request of the

applying party.

22. APPENDIX TO CONDITIONS OF CONTRACT

THE EMPLOYER IS

Name: **Central Bank of Kenya**

Address: **P.O. Box 60000-00200, NAIROBI**

Name of Employer's Representative: **Director, Department of Estates, Supplies and Transport**

Address: **P.O. Box 60000-00200, NAIROBI**

The Works consist of **Supply, Delivery and Installation of Electrical Systems**

The Start Date shall be **as stated in the Letter of Acceptance**

The Intended Completion Date for the whole of the Works shall be **as stated in the letter of acceptance.**

The following documents also form part of the Contract: **(Only as listed in Clause 2)**

The Site Possession Date shall be as **stated in the letter of acceptance**.

The Site is located **along Haile Selassie Avenue.**

The Defects Liability period is **6 Months**

Amount of Tender Security: **2% of the Sub-contract sum**

The name and Address of the Employer's representative for the purposes of submission of tenders is the **Project Architect, Edon Consultants International Ltd., P. O. Box 19684-00200, Nairobi.**

The tender opening date and time is **as per invitation letter.**

The amount of performance security is **10 percent** bank guarantee of the Sub-Contract Price.

Period of final measurement : **3 months after practical completion**

Liquidated and Ascertained damages: **Will be calculated pro rat to the main contract agreement**

Prime cost sums for which the Contractor desires to tender : **NIL**

Period of honouring certificate : **30 Days**

Percentage of certified value retained: **10%**

Limit of retention fund : **5%**

PART C:

AGREEMENT AND CONDITIONS

OF SUB-CONTRACT FOR

BUILDING WORKS

PART C: AGREEMENT AND CONDITIONS OF SUB-CONTRACT FOR BUILDING WORKS

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1.0 AGREEMENT

1.1 This agreement is made on **……...**

between**……..**

of (or whose registered office is situated at**)……..**

……

(hereinafter called "the Contractor") of the one part**…….**

and**…….**

of (or whose registered office is situated at**)……..**

……

(hereinafter called "the Sub-Contractor") of the other part:

1.2 **SUPPLEMENTAL** to an agreement (hereinafter referred to as "the main contract")

made on**……..**

between**……**

……

(hereinafter called "the Employer") of the one part and the Contractor of the other part based on the Agreement and Conditions of Contract for Building Works, published by the joint Building Council, Kenya**…….** edition.

1.3 **WHEREAS** the Contractor is desirous of sub-letting to the Sub-Contractor**……...**

……

……

……

Hereinafter called "the sub-contract works" at**…….**

On Land Reference No**…….** being part of the main contract works.

1.4 And whereas the Sub-Contractor has supplied the Contractor with a priced copy of the bills of quantities (hereinafter referred to as "the sub-contract bills"), where applicable, which together with the drawings numbered**……...**

……

(hereinafter referred to as "the sub-contract drawings"), the specifications and the conditions of sub-contract have been signed by or on behalf of the parties thereto.

And whereas the Sub-Contractor has had reasonable opportunity of inspecting the main contract or a copy thereof except the detailed prices of the Contractor included in the bills of quantities or schedule of rates.

1.5 And whereas the Architect, with the approval of the Employer, has nominated the Sub-Contractor to carry out the works described at clause 1.3 herein:

NOW IT IS HEREBY AGREED AS FOLLOWS:

1.6 For the consideration herein stated, the Sub-Contractor shall upon and subject to the conditions annexed hereto carry out and complete the sub-contract works shown upon the sub-contract drawings and described by or referred to in the sub-contract bills, specifications and in the said conditions.

1.7 The Contractor shall pay the Sub-Contractor the sum of the Kshs (in words)…….. **……**

……. Kshs**……**)
(hereinafter referred to as "the sub-contract price") or such sum as shall become payable hereinafter at the times and in the manner specified in the said conditions.

1.8 The term 'Architect', 'Quantity Surveyor' and 'Engineer', where applicable, shall refer to the persons appointed by the Employer to administer the sub-contract in accordance with the main contract agreement. Where applicable, reference to the Architect shall be deemed to include reference to the Engineer.

1.9 In the event of the need to appoint a replacement Architect, Quantity Surveyor, Engineer of other specialist (whether named in this agreement or not) the Employer shall make such appointment as soon as practicable after the need for such appointment arises and shall communicate the appointment to the Sub-Contractor through the Contractor.

1.10 Where the sub-contract does not incorporate bills of quantities, the term "sub-contract bills" and "bills of quantities" wherever appearing shall be deemed deleted and replaced with the term "schedule of rates" as applicable.

1.11 The terms defined in clause 1.0 of the main contract shall have the same meaning in this sub-contract as that assigned to them therein.

1.12 AS WITNESS the hands of the said parties;

Signed by the said

……(Contractor)

In the presence of

Name**……**

Address**……..**

Signed by the said

……(Sub-Contractor)

In the presence of

Name**…….**

Address**……..**

CONDITIONS OF SUB-CONTRACT

2.0 General Obligations of the Contractor

The Contractor shall:

2.1 Timeously obtain from the Architect on behalf of the Sub-Contractor all drawings, necessary details, instructions and other information required by the Sub-Contractor for the proper carrying out of the sub-contract works.

2.2 Provide all such facilities and attend upon the Sub-Contractor as required and as provided in the specifications, bills of quantities and these conditions to the extent compatible with the provisions of the main contract.

2.3 Observe, perform and comply with all the provisions of the main contract and of this sub-contract on the part of the Contractor to be observed, performed and complied with to ensure satisfactory completion of the sub-contract works.

3.0 General Obligation of the Sub-Contractor

3.1 The sub-Contractor shall be deemed to have notice of all the provisions of the main contract except the detailed prices of the Contractor included in the bills of quantities or in the schedule of rates

3.2 The Sub-Contractor shall carry out and complete the sub-contract works in accordance with this sub-contract and in all respects to the reasonable satisfaction of the Contractor and of the Architect and in conformity with all reasonable directions and requirements of the Contractor regulating the due carrying out of the contract works.

3.3 The Sub-Contractor shall observe, perform and comply with all the provisions of the main contract on the part of the Sub-Contractor to be observed, performed and complied with so far as they relate and apply to the sub-contract works or any portion thereof and are not inconsistent with the express provisions of this sub-contract as if all the same were set out herein.

3.4 Without prejudice to the generality of the foregoing requirements, the Sub-Contractor shall especially observe perform and comply with the provisions of clauses 9.0, 18.0, 19.0, 22.0, 30.0, 31.0, 34.0, and 36.0 of the main contract as they apply to the sub-contract works.

4.0 Sub-Contract Documents

4.1 The sub-contract documents for use in the carrying out of the sub-contract works shall be:-

4.1.1 The agreement and these conditions.

4.1.2 The sub-contract drawings as listed in the agreement

4.1.3 The sub-contract bill of quantities or schedule of rates as applicable.

4.1.4 The specifications as separately supplied or as contained in the sub-contract bills.

4.2 Upon the execution of the sub-contract, the Contractor shall register the agreement with the relevant statutory authority and pay all fees, charges, taxes, duties and all costs arising therefrom.

4.3 The manner of supplying contract documents, their custody, display on site and their interpretation in the event of discrepancies shall be as provided in the main contract in respect of the main contract documents with the necessary amendments made to refer to the sub-contract.

5.0 General Liability of the Sub-Contractor

5.1 The Sub-Contractor shall be liable for and shall indemnify the Contractor against and from:

5.1.1 Any breach, non-observance or non-performance by the Sub-Contractor, his servants or agents of any of the said provisions of the main contract and of this sub-contract.

5.1.2 Any act or omission of the Sub-Contractor, his servants or agents which involve the Contractor in any liability to the Employer under the main contract.

5.1.3 Any claim, damage, loss or expense due to or resulting from any negligence or breach of duty on the part of the Sub-Contractor, his servants or agents.

5.1.4 Any loss or damage resulting from any claim under any statute or common law by an employee of the Sub-Contractor in respect of personal injury or death arising out of or in the course of his employment.

5.2 Provided that nothing contained in this sub-contract shall impose any liability on the Sub-Contractor in respect of any negligence or breach of duty on the part of the Employer, the Contractor, other sub-contractors or their respective servants or agents nor create any privity of contract between the Sub-Contractor and the Employer or any other sub-contractor.

6.0 Insurance Against Injury to Persons and Property

6.1 Without prejudice to his liability to indemnify the Contractor under clause 5.0 above, the Sub-Contractor shall maintain:

6.1.1 Such insurances as are necessary to cover the liability of the Sub-Contractor in respect of injury or damage or death arising out of or in the course of or caused by the carrying out of the sub-contract works.

6.1.2 Such insurances as are necessary to cover the liability of the Sub-Contractor in respect of injury or damage to property including damage to the works arising out of or in the course of or by reason of the carrying out of the sub-contract works except for liability against the contingencies specified at clause 6.3 herein.

6.1.3 The insurances required under sub clause 6.1.1 and 6.1.2 above shall be placed with insurers approved by the Contractor and the Architect.

6.2 Notwithstanding the provisions of clause 23.0 of these conditions, the Contractor shall not be obliged to make payments to the Sub-Contractor before the said policies have been provided.

6.3 Where clause 13.0 of the main contract applies, the sub-contract works, including materials and goods of the Sub-Contractor delivered to the works, shall as regards loss or damage by the contingencies stated at clause 13.0 therein, namely, fire, earthquake, fire following earthquake, lightning, explosion, storm, tempest, flood, bursting or overflowing of water tanks, apparatus or pipes, aircraft and other aerial devices or articles dropped therefrom, riot and civil commotion, be at the sole risk of the Contractor. The Contractor shall cover his liability for the works by procuring insurances as required in the said clause.

6.4 Where clause 14.0 or 15.0 of the main contract applies, the sub-contract works, including materials and goods of the Sub-Contractor delivered to the works shall, as regards loss or damage by the contingencies stated therein be at the sole risk of the Employer. The Employer shall cover his liability for the works by procuring insurances as required in the said clauses.

6.5 The Sub-Contractor shall observe and comply with the conditions contained in the policy or policies of insurance of the Contractor or of the Employer, as the case may be, as regards loss or damage which may be caused by the stated contingencies. For this purpose, the Contractor or the Employer, as the case may be, shall avail the said policies to the Sub-Contractor for his perusal.

6.6 If any loss or damage affecting the sub-contract works or any part thereof or any unfixed goods or materials is occasioned by any one or more of the said contingencies, then

6.6.1 The occurrence of such loss or damage shall be disregarded in computing any amounts payable to the Sub-Contractor under the sub-contract, and

6.6.2 The Sub-Contractor shall, with due diligence, restore the work damaged, replace or repair any unfixed materials or goods which have been destroyed or damaged, remove and dispose of any debris and proceed with the carrying out and completion of the sub-contract works.

6.6.3 The restoration of work damaged, the replacement and repair of unfixed materials and goods and the removal of debris shall be deemed to be a variation required by the Architect. Such work shall be paid for in accordance with clause 30.0 of the main contract.

7.0 Performance Bond

Before commencing the works, the Sub-Contractor shall provide one surety who must be an established bank to the approval of the Contractor and who will be bound to the Contractor in the sum equivalent to ten per cent (10%) of the sub-contract price for the due performance of the sub-contract until the certified date of practical completion. Notwithstanding the provisions of clause 23.0 of these conditions, no payments shall be made to the Sub-Contractor before the said bond is provided.

8.0 Possession of Site and Commencement of Works

8.1 Within the period stated in the appendix to these conditions, the Contractor shall give possession of the site of the works to the Sub-Contractor and such access as may be necessary to enable the Sub-Contractor to commence and proceed with the sub-contract works in accordance with the sub-contract.

8.2 On or before the date for commencement of works stated in the appendix to these conditions, the Sub-Contractor shall commence the carrying out of the sub-contract works and shall proceed regularly and diligently with the same in accordance with the sub-contract programme, the main contract programme and or with the progress of the main contract works and complete on or before the date stated in the appendix to these conditions as the date for practical completion or within any extended time granted under clause 25.0 of these conditions.

9.0 Architect's Instructions

9.1 The Sub-Contractor shall forthwith comply with all the instructions issued to him by the Architect, either directly or through the Contractor, in regard to any matter in respect of which the Architect is expressly empowered by the main contract conditions to issue instructions.

9.2 The manner of complying with or querying the validity of an Architect's instruction shall be as provided in clause 22.0 of the main contract. The Sub-Contractor shall not be obliged to carry out instructions not issued in the manner provided therein.

10.0 Variations

10.1 The term "variation" shall have the meaning assigned to it at clause 30.0 of the main contract.

10.2 The valuation of variations shall be made by the Quantity Surveyor in accordance with sub-clause 30.6 of the main contract.

10.3 Effect shall be given to the measurement and valuation of variations in interim certificates and by the adjustments of the sub-contract price.

11.0 Liability for Own Equipment

The construction equipment and other property belonging to or provided by the Sub-Contractor and brought onto the site for carrying out the works shall be at the sole risk of the Sub-Contractor. Any loss or damage to the same or caused by the same shall, except for any loss or damage due to any negligence, omission or default of the Contractor, be at the sole risk of the Sub-Contractor who shall indemnify the Contractor against loss, damage or claims in respect thereof. Insurance against any such loss, damages or claims shall be the sole responsibility of the Sub-Contractor.

12.0 Provision of Facilities by the Contractor

12.1 Where provided in the main contract, the Contractor shall supply at his own cost all necessary water, lighting, electric power, telephones and security required for the sub-contract works. Where not so provided, the Sub-Contractor shall provide the said services at his own cost.

12.2 Except as otherwise provided in the main contract, the Sub-Contractor shall construct at his own expense all necessary workshops, stores, offices, workers' accommodation and other temporary buildings required for the carrying out of the works at such places on site as the Contractor shall identify. The Contractor undertakes to give the Sub-Contractor the required space and all reasonable facilities for such construction. Upon practical completion of the works, the Sub-Contractor shall remove the said facilities and reinstate disturbed surfaces to the satisfaction of the Contractor.

12.3 The contractor shall provide, without charge, general attendance to the Sub-Contractor to facilitate the carrying out of the works which attendance shall include facilities for access to and movement within the site and sections or parts of the building or buildings where the subcontract works are being carried out, the use of temporary roads, paths and access ways, sanitary and welfare facilities.

12.4 The Contractor shall permit the Sub-Contractor to use, without charge, at all reasonable times, any scaffolding and hoisting equipment belonging to or provided by the Contractor while it remains so erected upon the site. The use by the Sub-Contractor of any other equipment, facilities or services provided by the Contractor for the works shall be subject to private arrangements between the parties hereto and shall not be regulated by these conditions.

12.5 Provided that such use of the scaffolding and hoisting equipment shall be on the express condition that no warranty or other liability on the part of the Contractor shall be created or implied in regard to fitness, condition or suitability for the intended purpose except that the Sub-Contractor shall be liable for any damage caused thereto or thereby.

12.6 Where required, the Contractor shall provide the facilities, equipment and the like and carry out any necessary builders' work within a reasonable time of the request by the Sub-Contractor to enable timely performance of the sub-contract.

13.0 Liability for Own Work

13.1 The Contractor and the Sub-Contractor shall be liable for the due carrying out of their respective works in accordance with their respective contracts without causing damage or injury to the works of the other or of other sub-contractors, and in particular:

13.2 Should the carrying out of the subcontract works cause injury or damage to the main contract works, or to the work of other sub-contractors, the Sub-Contractor shall rectify the damages so caused at his own cost.

13.3 Should the carrying out of the main contract works cause damage or injury to the sub-contract works, the Contractor shall rectify the damage at his own cost.

13.4 If in the course of carrying out the sub-contract works, the Sub-Contractor is required to carry out work not included in his sub-contract by reason of any materials or workmanship not being in accordance with the main contract or with other sub-contracts, the Contractor shall reimburse the Sub-Contractor the expenses incurred therein.

14.0 Co-Operation in Use of Facilities

14.1 The Contractor and the Sub-Contractor undertake to co-operate with each other and co-ordinate work arrangements and procedures required in carrying out their respective operations and in the use of site facilities and services to prevent interference, disruption or disturbance to the progress of the works or to the activities of other sub-contractors.

14.2 The Contractor and the Sub-Contractor undertake not to wrongfully use or interfere with the equipment, scaffolding, appliances, passage ways, temporary works, temporary buildings and other property belonging to or provided by the other party or by other sub-contractors.

14.3 Provided that nothing contained in this clause shall prejudice or limit the rights of the Contractor or of the Sub-Contractor in carrying out their respective statutory and or contractual duties under this sub-contract or under the main contract.

15.0 Assignment and Subletting

15.1 Neither the Contractor nor the Sub-Contractor shall, without the written consent of the other and the Employer, assign this sub-contract

15.2 The Sub-Contractor shall not sub-let the whole of the works without the written consent of the Contractor and the Architect

15.3 Provided that any assignment and any sub-contracts as well as this sub-contract shall terminate immediately upon termination (for whatever reason) of the main contract.

16.0 Work Prior To Appointment of Contractor.

16.1 Where the Sub-Contractor is appointed before the Contractor is appointed, any work done by the Sub-Contractor prior to the said appointment shall be treated as a separate contract between the Employer and the Sub-Contractor and shall be valued by the Quantity Surveyor and paid for directly by the Employer without the involvement of the Contractor.

16.2 Where the Sub-Contractor is appointed before the Contractor is appointed, the Sub-Contractor shall be permitted, when the identity of the Contractor is known and within 30 days thereof, to raise objections (on reasonable grounds) against entering into a sub-contract with the Contractor. If the Architect finds merit in the grounds raised, ha shall direct that the Sub-Contractor be paid for work done in accordance with sub-clause 16.1 herein. Thereupon, the Sub-Contractor shall be relieved of further liability as regards the sub-contract works.

16.3 Where work which is outside the sub-contract is ordered directly by the Employer or the Architect, that work shall be treated as a separate contract between the Sub-Contractor and the Employer and shall be valued and paid for directly to the Sub-Contractor in accordance with sub-clause 16.1 herein without the involvement of the Contractor. The cost of equipment, facilities and the like provided by the Contractor to the Sub-Contractor and any builders' work carried out by the Contractor with regard to such work shall be paid directly by the Sub-Contractor to the Contractor.

17.0 Sub-Contractor Design

Where the sub-contract includes a design component by the Sub-Contractor, the design shall be to the approval of the Architect and the Employer. Notwithstanding any approvals, the Sub-Contractor shall be liable directly to the Employer for any consequences of failure or to be fit or suitable for the purposes for which the sub-contract works or the relevant part thereof were intended.

18.0 Specification of Goods, Materials And Workmanship

18.1 All materials, goods and workmanship shall, so far as procurable, be of the respective kinds and standards described in the sub-contract bills, specifications and drawings.

18.2 The provisions of clause 23.0 of the main contract regulating the procurement, specification and quality assurance of materials, processes and workmanship and the requirements of clause 24.0 therein dealing with the provision of samples and the carrying out of specified tests shall apply to the sub-contract in the same manner as they apply to the main contract.

19.0 Compliance with Statutory and Other Regulations.

The Sub-Contractor shall comply with all statutory and other regulations of competent authorities regulating the carrying out of the works in accordance with the provisions of clause 17.0 of the main contract, as applicable.

20.0 Royalties and Patent Rights

20.1 All royalties or other sums payable in respect of the supply and use of any patented articles, processes or inventions in carrying out the works as described by or referred to in the sub-contract bills, specifications or drawings shall be deemed to have been included in the sub-contract price.

20.2 The provisions of clause 25.0 of the main contract dealing with the same shall apply to the sub-contract in the same manner as they apply to the main contract.

21.0 Antiquities and Other Objects of Value

All fossils, antiquities and other objects of interest or value which may be found on the site or in excavating the same during the progress of the sub-contract shall be dealt with in accordance with the provisions of clause 44.0 of the main contract.

22.0 Suspension of Works

22.1 An instruction by the Architect to postpone or suspend the works under clause 28.0 of the main contract shall have the same effect on the sub-contract works as it has on the main contract works.

22.2 If the suspension arises due to default by the Contractor and the sub-contract works are adversely affected by the suspension, the Sub-Contractor shall be entitled to reimbursement by the Contractor of all expenses arising therefrom.

22.3 If the suspension arises due to default by the Sub-Contractor, the Sub-Contractor shall be liable to the Contractor for all expenses arising therefrom

22.4 A notice by the Contractor to suspend the works under clause 29.0 of the main contract shall have the same effect on the sub-contract works as it has on the main contract works.

22.5 Should the sub-contract works be adversely affected by suspension under clause 29.0 of the main contract, the Sub-Contractor shall be entitled to the remedies provided for at clause 25.0 and 26.0 of this sub-contract.

23.0 Payments

23.1 Procedures for originating and processing applications for payments and payment certificates as regards the sub-contract works shall be the same as those prescribed for the Contractor in the main contract at clause 34.0. All references therein to the Contractor shall be deemed to include references to the Sub-Contractor.

23.2 Before submitting an application for payment to the Quantity Surveyor in accordance with clause 34.1 of the main contract, the Contractor shall give the Sub-Contractor a notice of not less than 7 days to submit the details of the amounts which the Sub-Contractor considers himself entitled to for the relevant period. Such details, when received, shall be annexed to the said Contractor's application.

23.3 Where it is necessary to measure the sub-contract works for purposes of interim valuations or for the preparation of the final account, the Quantity Surveyor shall give the Sub-Contractor a reasonable opportunity to be present at the times of the measurements and to take notes and measurements as he may require.

23.4 Neither the Quantity Surveyor nor the Architect shall be bound to issue a valuation or a payment certificate in respect of the sub-contract works, as the case may be, whose value is less than the amount stated in the appendix to these conditions as the minimum amount of a payment certificate before the issue of the certificate of practical completion of the main contract or of the sub-contract, as applicable.

23.5 Provided that where the minimum amount of a certificate inserted in the appendix to these conditions has been achieved but the corresponding minimum inserted in the appendix to the main contract in respect of the Contractor's work has not been achieved, or the Contractor has not applied for payment within the stated period, the Architect may with the consent of the Contractor, issue a payment certificate directly to the Sub-Contractor for payment by the Employer.

23.6 Within 7 days of receipt by the Contractor of payment by the Employer, the Contractor shall notify and pay to the Sub-Contractor the total value certified therein in respect of the sub-contract works less the portion of the retention money attributable to the sub-contract works and less amounts previously paid to the Sub-Contractor.

23.7 Where certificates are not paid by the Employer within the prescribed period, the Sub-Contractor shall be entitled to be paid by the Contractor, upon receipt of payment from the Employer, the interest certified for the delay in accordance with sub-clause 34.6 of the main contract in respect of the portion of the sub-contract works included in the certificate.

23.8 Where the Contractor has received payment from the Employer but has not released the appropriate amount to the Sub-Contractor within the stated period, the Contractor shall pay to the Sub-Contractor in addition to the amount not paid, simple interest on the unpaid amount for the period it remains unpaid at the commercial bank lending rate in force during the period of default.

23.9 If, upon application by the Sub-Contractor and Architect agree, or if the Contractor fails to make payment to the Sub-Contractor in accordance with sub-clause 23.6 herein and continues such default for 14 days thereafter, the Architect may issue a payment certificate directly to the Sub-Contractor for payment by the Employer, where applicable, and deduct the amount from subsequent payments to the Contractor.

23.10 Upon the issue of the certificate of practical completion and the release of one half of the total amount of the retention money to the Contractor, the Contractor shall pay the portion attributable to the sub-contract to the Sub-Contractor within 7 days of receipt of the payment.

23.11 Upon the issue of the certificate of rectification of defects and receipt of the balance of the retention money by the Contractor, the Contractor shall pay the balance of the portion of the retention money attributable to the sub-contract to the Sub-Contractor within 7 days of receipt of the payment.

23.12 The sub-contract final account shall be agreed between the Sub-Contractor, the Contractor , the Quantity Surveyor and the architect and shall be annexed to the Contractor's final accounts which shall be agreed as provided for in the main contract. For purposes of finalizing the accounts, the Quantity Surveyor may request the Sub-Contract to submit further documents as he may deem necessary.

23.13 The final certificate issued under sub-clause 34.21 of the main contract shall be final and binding on the Sub-Contract in the same manner that it is binding on the Contractor.

23.14 If the Architect desires to secure final payment to the Sub-Contractor before final payment is due to the Contractor, the provisions of sub-clause 31.10 of the main contract shall apply.

23.15 The Contractor shall be entitled to deduct from or set off against any money due from him to the Sub-Contractor in interim certificates any sum or sums which the Sub-Contractor is liable to pay to the Contractor arising under or in connection with the sub-contract.

24.0 Practical Completion and Defects Liability

24.1 The Sub-Contractor shall proceed with the works regularly and diligently and complete the same within the period stated in the appendix to this sub-contractor or within such extended period as may be granted under clause 25.0 of this sub-contract.

24.2 Where the sub-contract works are to be completed in sections or where the sub-contract works are to be completed in advance of the main contract works, the provisions of clause 42.0 of the main contract shall apply, as appropriate, to the sub-contract in the same manner as they apply to the main contract.

24.3 The procedures for certifying practical completion and for dealing with defects in the sub-contract works as well as the main contract works are as prescribed at clause 41.0 of the main contract. Upon the issue of the certificate of practical completion of the whole of the works or of the sub-contract works, as applicable, the Sub-Contractor shall be entitled to release of one half of the retention money attributable to the sub-contract works within 7 days after the Contractor has received payment.

24.4 The balance of the retention money shall be released to the Sub-Contractor after the defects appearing in the works have been rectified in accordance with sub-clause 41.6 and 41.7 of the main contract and after the Contractor has received the said payment as provided for in sub-clause 34.16.3 of the main contract.

25.0 Extension of Time

25.1 Upon it becoming reasonably apparent that the progress of the sub-contract works is or will be delayed, the Sub-Contractor shall forthwith give written notice of the cause of the delay to the Contractor and to the Architect with supporting details showing the extent of delay caused or likely to be caused. Thereafter, the Architect shall evaluate the information supplied by the Sub-Contractor and if in his opinion the completion of the works is likely to be or has been delayed beyond the date for practical completion stated in the appendix to these conditions or beyond any extended time previously fixed under this clause, by any of the reasons entitling the Contractor to extension of time under sub-clause 36.1 of the main contract, then the Architect shall, so soon as he is able to estimate the length of the delay beyond the date or time aforesaid, recommend to the Contractor a fair and reasonable extension of time to be granted for the completion of the sub-contract works.

25.2 Thereupon, the Contractor shall grant in writing to the Sub-Contractor the recommended time. Provided that the Contractor shall not grant any extension of time to the Sub-Contractor without the written recommendation of the Architect. And provided that the Sub-Contractor shall constantly use his best endeavours to prevent delay and shall do all that may be reasonably required to proceed with the works.

25.3 The procedures for dealing with requests for extension of time and the observance of time limits prescribed at clause 36.0 of the main contract shall apply to the sub-contract in the same manner as they apply to the main contract.

26.0 Loss and Expense Caused by Disturbance of Regular Progress

26.1 If upon written application being made to the Sub-Contractor to the Contractor and to the Architect, the Architect is of the opinion that the Sub-Contractor has been involved in direct loss and or expense, for which he would not be reimbursed by a payment made under any other provision in this sub-contract, by reasons of the regular progress of the sub-contract works or any part thereof having been materially affected by any of the reasons which would entitle the Contractor to reimbursement under clause 37.0 of the main contract, the Quantity Surveyor shall assess the amount of such loss and or expense.

26.2 Any amount so assessed shall be added to the sub-contract price and if an interim certificate is issued after the date of assessment, any such amount shall be added to the amount which would otherwise be stated as due in such certificate as regards the Sub-Contractor’s entitlement.

26.3 The procedure for dealing with loss and or expense claims prescribed at clause 37.0 of the main contract shall apply, to the sub-contract in the same manner as they apply to the main contract, as appropriate.

27.0 Damages For Delay In Completion

27.1 If the Sub-Contractor fails to complete the sub-contract works by the date for practical completion stated in the appendix to these conditions or within any extended time fixed under clause 25.0 herein, and the Architect certifies in writing that in his opinion the same ought reasonably so to have been completed, then the Sub-Contractor shall pay or allow to the Contractor a sum calculated at the rate stated in the said appendix as liquidated damages for the period during which the works shall so remain or have remained incomplete.

27.2 The Contractor may deduct such sum from any money due or to become due to the Sub-Contractor under the sub-contract or recover the same from the Sub-Contractor as a debt. Provided that the Contractor shall not be entitled to recover any liquidated damages from the Sub-Contractor without first obtaining the Architect's certificate of delay prescribed herein.

28.0 Fluctuations

28.1 Unless otherwise stated in the sub-contract bills or specifications, the sub-contract price shall be deemed to have been calculated to include all duties and taxes imposed by statutory and other competent authorities in the country where the works are being carried out, and

28.2 The sub-contract price shall be deemed to be based on currency exchange rates current at the date of tender as regards materials or goods to be specifically imported for permanent incorporation in the works.

28.3 Should duties and taxes vary during the period of the contract, compensation thereof shall be calculated in accordance with sub-clause 35.1 and 35.2 of the main contract.

28.4 Compensation for change in prices of goods and materials incorporated in the works and in the rates of wages provided for at sub-clause 35.3, 35.4 and 35.5 of the main contract shall not apply to the sub-contract unless specifically provided for in the bills of quantities or specifications.

29.0 Termination of Main Contract

29.1 If, for any reason, the Contractor's employment is terminated either under clause 38.0, 39.0 or 40.0 of the main contract, this sub-contract shall thereupon also terminate.

29.2 Upon termination, the Sub-Contractor shall cease all work and vacate the site. He shall not remove any equipment or any materials brought onto the site for the carrying out of the works without the written approval of the Contractor and the Architect.

29.3 Where the termination of the main contract occurs without the default of the Sub-Contractor, the Sub-Contractor shall be paid by the Contractor for work done in the like manner as the Contractor is paid at clause 39.5 of the main contract.

29.4 Where the termination of the main contract arises fro a default by the Sub-Contractor, the adjustment of the sub-contract accounts shall be performed in the like manner as is provided at sub-clause 38.8 of the main contract regarding the main contract accounts.

30.0 Termination of Sub-Contract.

30.1 Without prejudice to any other rights and remedies which the Contractor may possess, if the Sub-Contractor shall make default in any one or more of the respects which would entitle the Employer to terminate the main contract under clause 38.0 therein, the Contractor shall give the Sub-Contractor a notice, with a copy to the Architect and to the Employer by registered post or recorded delivery specifying the default. Should the Sub-Contractor continue the default for 14 days after receipt of such notice or at any time thereafter repeat such default, and should the Architect certify that the Sub-Contractor is in default, the Contractor may terminate the sub-contract forthwith after the expiry of the notice provided that the notice is not given unreasonably or vexatiously. The termination letter shall be copied to the Architect and to the Employer.

30.2 Where the sub-contract is terminated due to the default of the Sub-Contract as in sub-clause 30.1 herein, the adjustment of sub-contract accounts shall be performed in the like manner as is provided at sub-clause 38.8 of the main contract regarding the main contract accounts.

30.3 Without prejudice to any other rights and remedies which the Sub-Contractor may possess, if, the Contractor shall make default in one or more of the respects which, if committed by the Employer, would entitle the Contractor to terminate the main contract under clause 39.0 therein, the Sub-Contractor shall give the Contractor a notice, with a copy to the Architect and to the Employer, by registered post or recorded delivery specifying the default. Should the Contractor continue the default for 14 days after receipt of such notice or at any time thereafter repeat such default, and should the Architect certify that the Contractor is in default, the Sub-Contractor may terminate the sub-contract forthwith after expiry of the notice, provided that the notice is not given unreasonably or vexatiously. The termination letter shall be copied to the Architect and to the Employer.

30.4 If the sub-contract is terminated due to the default of the Contractor as in sub-clause 30.3 herein, the Contractor shall pay the Sub-Contractor for work done in the like manner as the Contractor would be paid at sub-clause 39.5 of the main contract where the termination is done by the Contractor.

30.5 Where the sub-contract is terminated due to the default of the Contractor, all expenses arising from the termination shall be done wholly by the Contractor and the termination shall not create any liability on the Employer.

30.6 Where the sub-contract is terminated due to the default of the Sub-Contractor, the Sub-Contractor shall be liable to the Contractor for all expenses arising therefrom.

31.0 Settlement of Disputes

31.1 In case any dispute or difference shall arise between the Contractor and the Sub-Contractor, either during the progress or after the completion or abandonment of the sub-contract works, such disputes shall be notified in writing by either party to the other with a request to submit it to arbitration and to concur in the appointment of an Arbitrator within 30 days of the notice.

31.2 The dispute shall be referred to the arbitration and final decision of a person to be agreed by the parties. Failing agreement to concur in the appointment of an Arbitrator, the Arbitrator shall be appointed by the Chairman or Vice Chairman of The Architectural Association of Kenya or the Chairman or Vice Chairman of The Chartered Institute of Arbitrators, Kenya Branch, at the request of the applying party.

31.3 The arbitration may be on the construction of this sub-contract or on any matter or thing of whatsoever nature arising thereunder or in connection therewith including the rights and liabilities of the parties during the currency of the sub-contract and subsequent to the termination of the sub-contract.

31.4 Where the Sub-Contractor is aggrieved by the manner in which the Architect has exercised or failed to exercise his powers stipulated in the main contract, or in the sub-contract or by any action or inaction of the Employer, and in particular, if he is aggrieved by:

31.4.1 The failure or refusal of the Architect to recommend to the Contractor an extension of sub-contract time, or

31.4.2 The extent of the recommended time, or

31.4.3 The amount certified to the Sub-Contractor either in an interim or in a final certificate, or

31.4.4 The issue of an instruction which the Sub-Contractor contends is not authorized by the main contract or the sub-contract, or

31.4.5 Any other matter left to the discretion of the Architect in the main contract or in the sub-contract, then;-

31.5 Subject to the Sub-Contractor giving the Contractor such indemnity and security as the Contractor may reasonably require, the Contractor shall allow the Sub-Contractor to use the Contractor's name and, if necessary, shall join the Sub-Contractor in arbitration proceedings against the Employer to decide the matters in dispute or in difference.

31.6 Provided that no arbitration proceedings shall be commenced on any dispute or difference where notice of a dispute or difference has not been given by the applying party within 90 days of the occurrence or discovery of the matter or issue giving rise to the dispute or difference.

31.7 Notwithstanding the issue of a notice as stated above, the arbitration of such a dispute or difference shall not commence unless an attempt has in the first instance been made by the parties to settle such dispute or difference amicably with or without the assistance of third parties.

31.8 In any event, no arbitration shall commence earlier than 90 days after the service of the notice of a dispute or difference, except as provided for at sub-clause 31.9 herein.

31.9 Notwithstanding anything stated herein, the following matters may be referred to arbitration before the practical completion of the works or abandonment of the works or termination of the sub-contract without having to comply with sub-clause 31.8 herein.

31.9.1 Whether or not the issue of an instruction by the Architect is authorized by the main contract or these conditions, and

31.9.2 Whether or not a payment certificate has been improperly withheld or is not in accordance with the main contract or these conditions or though issued, it has not been honoured.

31.10 All other matters in dispute shall only be referred to arbitration after the practical completion or alleged practical completion of the works or abandonment of the works or termination or alleged termination of the sub-contract, unless the Architect the Contractor and the Sub-Contractor agree otherwise in writing.

31.11 The Arbitrator shall, without prejudice to the generality of his powers, have power to direct such measurements, computations, tests, or valuations as may in his opinion be desirable in order to determine the rights of the parties and assess and award any sums which ought to have been the subject of or included in any payment certificate.

31.12 The Arbitrator shall, without prejudice to the generality of his powers, have power to open up, review and revise any certificate, opinion, decision, requirement or notice and to determine all matters in dispute which shall be submitted to him in the same manner as if no such certificate, opinion, decision, requirement or notice had been given.

31.13 Provided that any decision of the Architect which is final and binding on the Contractor under the main contract shall be final and binding between the Contractor and the Sub-Contractor.

31.14 The award of such Arbitrator shall be final and binding upon the parties.

APPENDIX	**Clause**
Name of Sub-Contractor's insurers	6.0……
Name of Sub-Contractor's surety	7.0…….
Amount of surety	7.0……..
Period of possession of site	8.1……
Sub-Contract period	8.2……..
Date of commencement of works	8.2……...
Date for practical completion	8.2……...
Interval for application of payment certificates	23.1……
Minimum amount of payment certificate	23.4…….
Percentage of certified value retained	23.6…….
Limit of retention fund, if any	23.6…….
Name of the Sub-Contractor's bank for purpose of interest calculation.	23.7, 23.8……
Period of final measurement and valuation	23.12……...
Damages for delay in completion	27.1 – At the rate of Ksh……
	……

Signed by the said:

……..	……
CONTRACTOR	**SUB-CONTRACTOR**

PART D:

PRELIMINARIES
AND
GENERAL CONDITIONS

PART D - PRELIMINARIES AND GENERAL CONDITIONS

CONTENTS

PART D

CONTRACT PRELIMINARIES AND GENERAL CONDITIONS

1.01 **Examination of Tender Documents**

The tenderer is required to check the number of pages of this document and should he find any missing or indistinct, he must inform the Engineer at once and have the same rectified.

All tenderers shall be deemed to have carefully examined the following:

a) Work detailed in the Specification and in the Contract Drawings.

b) The Republic of Kenya Document "General Conditions of Contract for Electrical and Mechanical Works".

c) Other documents to which reference is made.

He shall also be deemed to have included for any expenditure which may be incurred in conforming with the above items (a), (b), (c) and observe this expense as being attached to the contract placed for the whole or any part of the work.

The tenderer shall ensure that all ambiguities, doubts or obscure points of detail, are clarified with the Engineer before submission of his tender, as no claims for alleged deficiencies in the information given shall be considered after this date.

1.02 **Discrepancies**

The Sub-contractor shall include all work either shown on the Contract Drawings or detailed in the specification. No claim or extra cost shall be considered for works, which has been shown on the drawings or in the specification alone.

Should the drawing and the specification appear to conflict, the Sub-contractor shall query the points at the time of tendering and satisfy himself that he has included for the work intended, as no claim for extra payment on this account shall be considered after the contract is awarded.

1.03 **Conditions of Sub-contract Agreement**

The Sub-contractor shall be required to enter into a Sub-contract with the Main Contractor.

The Conditions of the Contract between the Main Contractor and the Sub-contractor as hereinafter defined shall be the latest edition of the Agreement and Schedule of Conditions of Kenya Association of Building and Civil Engineering Contractors as particularly modified and amended hereinafter.

For the purpose of this contract the Agreement and Schedule of Conditions and any such modifications and amendments shall read and construed together. In any event of discrepancy the modifications and amendments shall prevail.

1.04 **Payment**

Payment will be made through certificates to the Main Contractor, unless he specifically agrees to forego this right, in which case direct payment can be made to the Sub-contractor. All payments will be less retention as specified in the Main Contract. No payment will become due until materials are delivered to site.

1.05 **Definition of Terms**

Throughout these Sub-contract documents units of measurements, terms and expressions are abbreviated and wherever used hereinafter and in all other documents they shall be interpreted as follows:

i) **Employer:** The term "**Employer"** shall mean **Central Bank of Kenya**

ii) **Architect:** The term **"Architect"** shall mean **Edon Consultants International Ltd.**

iii) **Electrical Engineer:** The term **"Electrical Engineer"** shall mean **Feradon Associates Ltd.**

iv) **Mechanical Engineer:** The term **"Mechanical Engineer"** shall mean **Feradon Associates Ltd.**

v) **Quantity Surveyor:** The term **"Quantity Surveyor"** shall mean **Quanti-Bill Consultants**

vi) **Main Contractor:** The term **"Main Contractor"** shall mean the firm or company appointed to carry out the Building Works and shall include his or their heir, executors, assigns, administrators, successors, and duly appointed representatives.

vii) **Sub-contractor:** The term **"Sub-contractor"** shall mean the persons or person, firm or Company whose tender for this work has been accepted, and who has entered into a contract agreement with the Contractor for the execution of the Sub-contract Works, and shall include his or their heirs, executors, administrators, assigns, successors and duly appointed representatives.

viii) **Sub-contract Works:** The term **"Sub-contract Works"** shall mean all or any portion of the work, materials and articles, whether the same are being manufactured or prepared, which are to be used in the execution of this Sub-contract and whether the same may be on site or not.

ix) **Contract Drawings:** The term **"Contract Drawings"** shall mean those drawings required or referred to herein and forming part of the Bills of Quantities.

x) **Working Drawings:** The term **"Working Drawings"** shall mean those drawings required to be prepared by the Sub-contractor as hereinafter described.

xi) **Record Drawings:** The term **"Record Drawings"** shall mean those drawings required to be prepared by the Sub-contractor showing "as installed" and other records for the Sub-contract Works.

xii) **Abbreviations:**

CM shall mean **Cubic Metre**
SM shall mean **Square Metre**
LM shall mean **Linear Metre**
LS shall mean **Lump Sum**
mm shall mean **Millimetres**
No. Shall mean **Number**
Kg. shall mean **Kilogram**
BS shall mean. **Current standard British Standard Specification published by the British Standard Institution, 2 Park Street, London W1, England**

"Ditto" shall mean the whole of the preceding description in which it occurs. Where it occurs in description of succeeding item it shall mean the same as in the first description of the series in which it occurs except as qualified in the description concerned. Where it occurs in brackets it shall mean the whole of the preceding description which is contained within the appropriate brackets.

1.06 **Site Location**

The site of the Sub-contract Works is situated at **Central Bank Building along Haile Selassie Avenue, Nairobi.**

The tenderer is recommended to visit the site and shall be deemed to have satisfied himself with regard to access, possible conditions, the risk of injury or damage to property on/or adjacent to the site, and the conditions under which the Sub-contract Works shall have to be carried out and no claims for extras will be considered on account of lack of knowledge in this respect.

1.07 **Duration of Contract**

The Sub-contractor shall be required to phase his work in accordance with the Main Contractor's programme (or its revision). The programme is to be agreed with the Main Contractor.

1.08 **Scope of Sub-contract Works**

The Sub-contractor shall supply, deliver, unload, hoist, fix, test, commission and hand-over in satisfactory working order the complete installations specified hereinafter and/or as shown on the Contract Drawings attached hereto, including the provision of labour, transport and plant for unloading material and storage, and handling into position and fixing, also the supply of ladders, scaffolding the other mechanical devices to plant, installation, painting, testing, setting to work, the removal from site from time to time of all superfluous material and rubbish caused by the works.

The Sub-contractor shall supply all accessories, whether of items or equipment supplied by the Main Contractor but to be fixed and commissioned under this Sub-contract

1.09 **Extent of the Sub-contractor's Duties**

At the commencement of the works, the Sub-contractor shall investigate and report to the Engineer if all materials and equipment to be used in the work and not specified as supplied by the others are available locally. If these materials and equipment are not available locally, the Sub-contractor shall at this stage place orders for the materials in question and copy the orders to the Engineer. Failure to do so shall in no way relieve the Sub-contractor from supplying the specified materials and equipment in time.

Materials supplied by others for installation and/or connection by the Subcontractor shall be carefully examined in the presence of the supplier before installation and connection. Any defects noted shall immediately be reported to the Engineer.

The Sub-contractor shall be responsible for verifying all dimensions relative to his work by actual measurements taken on site.

The Sub-contractor shall mark accurately on one set of drawings and indicate all alterations and/or modifications carried out to the designed system during the construction period. This information must be made available on site for inspection by the Engineer.

1.10 **Execution of the Works**

The works shall be carried out strictly in accordance with:

a) All relevant Kenya Bureau of Standards Specifications.

b) All relevant British Standard Specifications and Codes of Practice (Hereinafter referred to as B.S. and C.P. respectively).

c) This Specification.

d) The Contract Drawings.

e) The Bye-laws of the Local Authority.

f) The Architect's and/or Engineer's Instructions.

The Contract Drawings and Specifications to be read and construed together.

1.11 **Validity of Tender**

The tender shall remain valid for acceptance within 120 days from the final date of submission of the tender, and this has to be confirmed by signing the Tender Bond. The tenderer shall be exempted from this Bond if the tender was previously withdrawn in writing to the Employer before the official opening.

1.12 **Firm – Price Sub-contract**

Unless specifically stated in the documents or the invitation to tender, this is a firm-price Contract and the Sub-contractor must allow in his tender for the increase in the cost of labour and/or materials during the duration of the contract. No claims will be allowed for increased costs arising from the fluctuations in duties and/or day to day currency fluctuations. The Sub-contractor will be deemed to have allowed in his tender for any increase in the cost of materials which may arise as a result of currency fluctuation during the contract period.

1.13 **Variation**

No alteration to the Sub-contract Works shall be carried out until receipt by the Sub-contractor of written instructions from the Employer's Representative

Any variation from the contract price in respect of any extra work, alteration or omission requested or sanctioned by the Architect or Engineer shall be agreed and confirmed in writing at the same time such variations are decided and shall not affect the validity of the Contract. Schedule of Unit Rates shall be used to assess the value of such variations. No allowance shall be made for loss of profit on omitted works.

Where the Architect requires additional work to be performed, the Sub-contractor, if he considers it necessary, will give notice within seven (7) days to the Main Contractor of the length of time he (the Sub-contractor) requires over and above that allotted for completion of the Sub-contract.

If the Sub-contractor fails to give such notice he will be deemed responsible for the claims arising from the delay occasioned by reason of such extension of time.

1.14 **Prime Cost and Provisional Sums**

A specialist Sub-contractor may be nominated by the Architect to supply and/or install any equipment covered by the Prime Cost or Provisional Sums contained within the Sub-contract documents.

The work covered by Prime Cost and Provisional Sums may or may not be carried out at the discretion of the Architect.

The whole or any part of these sums utilized by the Sub-contractor shall be deducted from the value of the Sub-contract price when calculating the final account.

1.15 **Bond**

The tenderer must submit with his tender the name of one Surety who must be an established Bank only who will be willing to be bound to the Main Contractor for an amount equal to 10% of the Sub-contract amount as Clause 31 of the Main Contract.

1.16 **Government Legislation and Regulations**

The Sub-contractor's attention is called to the provision of the Factory Act 1972 and subsequent amendments and revisions, and allowance must be made in his tender for compliance therewith, in so far as they are applicable.

The Sub-contractor must also make himself acquainted with current legislation and any Government regulations regarding the movement, housing, security and control of labour, labour camps, passes for transport, etc.

The Sub-contractor shall allow for providing holidays and transport for work people, and for complying with Legislation, Regulations and Union Agreements.

1.17 **Import Duty and Value Added Tax**

The Sub-contractor will be required to pay full Import Duty and Value Added Tax on all items of equipment, fittings and plant, whether imported or locally manufactured. The tenderer shall make full allowance in his tender for all such taxes.

1.18 **Insurance Company Fees**

Attention is drawn to the tenderers to allow for all necessary fees, where known, that may be payable in respect of any fees imposed by Insurance Companies or statutory authorities for testing or inspection.

No allowance shall be made to the Sub-contractor with respect to fees should these have been omitted by the tenderer due to his negligence in this respect.

1.19 **Provision of Services by the Main Contractor**

In accordance with Clause 1.08 of this Specification the Main Contractor shall make the following facilities available to the Sub-contractor:

a) Attendance on the Sub-contractor and the carrying out of all work affecting the structure of the building which may be necessary, including all chasing, cutting away and making good brickwork, etc., except that all plugging for fixing, fittings, machinery, fan ducting, etc., and all drilling and tapping of steel work shall be the responsibility of the Sub-contractor. Any purpose made fixing brackets shall not constitute Builder's Work and shall be provided and installed by the Sub-contractor unless stated hereinafter otherwise.

b) The provision of temporary water, lighting and power: All these services utilized shall be paid for by the Main Contractor. The Sub-contractor shall, however, allow for additional connections/extensions required for his purposes.

c) Fixing of anchorage and pipe supports in the shuttering, except that all anchorage shall be supplied by the Sub-contractor who shall also supply the Main Contractor with fully dimensioned drawings detailing the exact locations.

d) i) Provision of scaffolding, cranes, etc. but only in so far as it is required for the Main Contract Works. It shall be the Sub-contractor's responsibility to liaise with the Main Contractor to ensure that there is maximum co-operation with other Sub-contractors in the use of scaffolding, cranes, etc.

ii) Any specialist scaffolding, cranes, etc. by the Sub-contractor for his own exclusive use shall be paid for by the Sub-contractor.

1.20 **Suppliers**

The Sub-contractor shall submit names of any supplier for the materials to be incorporated, to the Engineer for approval. The information regarding the names of the suppliers may be submitted at different times, as may be convenient, but no sources of supply will be changed without prior approval.
Each supplier must be willing to admit the Engineer or his representative to his premises during working hours for the purpose of examining or obtaining samples of the materials in question.

1.21 **Samples and Materials Generally**

The Sub-contractor shall, when required, provide for approval at no extra cost, samples of all materials to be incorporated in the works. Such samples, when approved, shall be retained by the Engineer and shall form the standard for all such materials incorporated.

1.22 **Administrative Procedure and Contractual Responsibility**

Wherever within the Specification it is mentioned or implied that the Sub-contractor shall deal direct with the Employer or Engineer, it shall mean "through the Contractor" who is responsible to the Employer for the whole of the works including the Sub-contract Works.

1.23 **Bills of Quantities**

The Bills of Quantities have been prepared in accordance with the standard method of measurement of Building Works for East Africa, first Edition, Metric, 1970. All the Quantities are based on the Contract Drawings and are provisional and they shall not be held to gauge or to limit the amount or description of the work to be executed by the Sub-contractor but the value thereof shall be deducted from the Sub-contract Sum and the value of the work ordered by the Engineer and executed thereunder shall be measured and valued by the Engineer in accordance with the conditions of the Sub-contract.

All work liable to adjustment under this Sub-contract shall be left uncovered for a reasonable time to allow measurements needed for such adjustment to be taken by the Quantity Surveyor or Engineer. Immediately the work is ready for measuring the Sub-contractor shall give notice to the Quantity Surveyor or Engineer to carry out measurements before covering up. If the Sub-contractor shall make default in these respects he shall, if the Architect so directs, uncover the work to enable the necessary measurements to be taken and afterwards reinstate at his own expense.

1.24 **Sub-contractor's Office in Kenya**

The Sub-contractor shall maintain (after first establishing if necessary) in Kenya an office staffed with competent Engineer Manager and such supporting technical and clerical staff as necessary to control and coordinate the execution and completion of the Sub-contract Works.

The Engineer Manager and his staff shall be empowered by the Sub-contractor to represent him at meetings and in discussions with the Main Contractor, the Engineer and other parties who may be concerned and any liaison with the Sub-contractor's Head Office on matters relating to the design, execution and completion of the Sub-contract Works shall be effected through his office in Kenya.

It shall be the Sub-contractor's responsibility to procure work permits, entry permits, licenses, registration, etc., in respect of all expatriate staff.

The Sub-contractor shall prepare a substantial proportion of his Working Drawings at his office in Kenya. No reasons for delays in the preparation or submission for approval or otherwise of such drawings or proposals will be accepted on the grounds that the Sub-contractor's Head Office is remote from his office in Nairobi or the site of the Sub-contract Works or otherwise.

1.25 **Builder's Work**

All chasing, cutting away and making good will be done by the Main Contractor but the Sub-contractor shall mark out in advance and shall be responsible for accuracy of the size and position of all holes and chases required.

The Sub-contractor shall drill and plug holes in floors, walls, ceiling and roof for securing services and equipment requiring screw or bolt fixings.

Any purpose made fixing brackets shall not constitute builder's work and shall be provided and installed by the Sub-contractor unless stated hereinafter to the contrary.

1.26 **Structural Provision for the Works**

Preliminary major structural provision has been made for the Sub-contract Works based on outline information ascertained during the preparation of the Specification.

The preliminary major structural provision made will be deemed as adequate unless the Sub-contractor stated otherwise when submitting his tender.

Any major structural provision or alteration to major structural provisions required by the Sub-contractor shall be shown on Working Drawings to be submitted to the Engineer within 30 days of being appointed.

No requests for alterations to preliminary major structural provisions will be approved except where they are considered unavoidable by the Engineer. In no case will they be approved if building work is so far advanced as to cause additional costs or delays in the work of the Main Contractor.

1.27 **Position of Services, Plant, Equipment, Fittings and Apparatus**

The Contract Drawings give a general indication of the intended layout. The position of the equipment and apparatus, and also the exact routes of the ducts, main and distribution pipework shall be confirmed before installation is commenced. The exact siting of appliances, pipework, etc., may vary from that indicated.

The routes of services and positions of apparatus shall be determined by the approved dimensions detailed in the Working Drawings or on site by the Engineer in consultation with the Sub-contractor or the Main Contractor.

Services throughout the ducts shall be arranged to allow maximum access along the ducts and the services shall be readily accessible for maintenance. Any work, which has to be re-done due to negligence in this respect, shall be the Sub-contractor's responsibility.

The Sub-contractor shall be deemed to have allowed in his Sub-contract Sum for locating terminal points of services (e.g. lighting, switches, socket outlets, lighting points, control switches, thermostats and other initiating devices, taps, stop cocks) in positions plus or minus 1.2m horizontally and vertically from the locations shown on Contract Drawings. Within these limits no variations in the Sub-contract Sum will be made unless the work has already been executed in accordance with previously approved Working Drawings and with the approval of the Engineer.

1.28 **Checking of Work**

The Sub-contractor shall satisfy himself to the correctness of the connections he makes to all items of equipment supplied under the Sub-contract agreement and equipment supplied under other contracts before it is put into operation. Details of operation, working pressures, temperatures, voltages, phases, power rating, etc., shall be confirmed to others and confirmation received before the system is first operated.

1.29 **Setting to Work and Regulating System**

The Sub-contractor shall carry out such tests of the Sub-contract Works as required by British Standard Specifications, or equal and approved codes as specified hereinafter and as customary.

No testing or commissioning shall be undertaken except in the presence of and to the satisfaction of the Engineer unless otherwise stated by him (Sub-contractor's own preliminary and proving tests excepted).

It will be deemed that the Sub-contractor has included in the Sub-contract Sum for the costs of all fuel, power, water and the like, for testing and commissioning as required as part of the Sub-contract Works. He shall submit for approval to the Engineer a suitable programme for testing and commissioning. The Engineer and Employer shall be given ample warning in writing, as to the date on which testing and commissioning will take place.

The Sub-contractor shall commission the Sub-contract Works and provide attendance during the commissioning of all services, plant and apparatus connected under the Sub-contract Agreement or other Sub-contract Agreements, related to the project.

Each system shall be properly balanced, graded and regulated to ensure that correct distribution is achieved and where existing installations are affected, the Sub-contractor shall also regulate these systems to ensure that their performance is maintained.

The proving of any system of plant or equipment as to compliance with the Specification shall not be approved by the Engineer, except at his discretion, until tests have been carried out under operating conditions pertaining to the most onerous conditions specified except where the time taken to obtain such conditions is unreasonable or exceeds 12 months after practical completion of the Sub-contract Works.

1.30 **Identification of Plant Components**

The Sub-contractor shall supply and fix identification labels to all plant, starters, switches and items of control equipment including valves, with white traffolyte or equal labels engraved in red lettering denoting its name, function and section controlled. The labels shall be mounted on equipment and in the most convenient positions. Care shall be taken to ensure the labels can be read without difficulty. This requirement shall apply also to major components of items of control equipment.

Details of the lettering of the labels and the method of mounting or supporting shall be forwarded to the Engineer for approval prior to manufacture.

1.31 **Contract Drawings**

The Contract Drawings when read in conjunction with the text of the Specification have been completed in such detail as was considered necessary to enable competitive tenders to be obtained for the execution and completion of the Sub-contract works.

The Contract Drawings are not intended to be Working Drawings and shall not be used unless exceptionally they are released for this purpose.

1.32 **Working Drawings**

The Sub-contractor shall prepare such Working Drawings as may be necessary. The Working Drawings shall be complete in such detail not only that the Sub-contract Works can be executed on site but also that the Engineer can approve the Sub-contractor's proposals, detailed designs and intentions in the execution of the Sub-contract Works.

If the Sub-contractor requires any further instructions, details, Contract Drawings or information drawings to enable him to prepare his Working Drawings or proposals, the Sub-contractor shall accept at his own cost, the risk that any work, commenced or which he intends to commence at site may be rejected.

The Engineer, in giving his approval to the Working Drawings, will presume that any necessary action has been, or shall be taken by the Sub-contractor to ensure that the installations shown on the Working Drawings have been cleared with the Main Contractor and any other Sub-contractors whose installations and works might be affected.

If the Sub-contractor submits his Working Drawings to the Engineer without first liaising and obtaining clearance for his installations from the Main Contractor and other Sub-contractors whose installations and works might be affected, then he shall be liable to pay for any alterations or modification to his own, the Main Contractor's or other Sub-contractor's installations and works, which are incurred, notwithstanding any technical or other approval received from the Engineer.

Working Drawings to be prepared by the Sub-contractor shall include but not be restricted to the following:

a) Any drawings required by the Main Contractor, or Engineer to enable structural provisions
to be made including Builder's Working Drawings or Schedules and those for the detailing of holes, fixings, foundations, cables and paperwork ducting below or above ground or in or outside or below buildings.

b) General Arrangement Drawings of all plant, control boards, fittings and apparatus or any part thereof and of installation layout arrangement of such plant and apparatus.

c) Schematic Layout Drawings of services and of control equipment.

d) Layout Drawings of all embedded and non-embedded paperwork, ducts and electrical conduits.

e) Complete circuit drawings of the equipment, together with associated circuit description.

f) Such other drawings as are called for in the text of the Specification or Schedules or as the Engineer may reasonably require.

Three copies of all Working Drawings shall be submitted to the Engineer for approval. One copy of the Working Drawings submitted to the Engineer for approval shall be returned to the Sub-contractor indicating approval or amendment therein.

Six copies of the approved Working Drawings shall be given to the Main Contractor by the Sub-contractor for information and distribution to other Sub-contractors carrying out work associated with or in close proximity to or which might be affected by the Sub-contract Works.

Approved Working Drawings shall not be departed from except as may be approved or directed by the Engineer.

Approval by the Engineer of Working Drawings shall neither relieve the Sub-contractor of any of his obligations under the Sub-contract nor relieve him from correcting any errors found subsequently in the Approved Working Drawings or other Working Drawings and in the Sub-contract Works on site or elsewhere associated therewith.

The Sub-contractor shall ensure that the Working Drawings are submitted to the Architect for approval at a time not unreasonably close to the date when such approval is required. Late submission of his Working Drawings will not relieve the Sub-contractor of his obligation to complete the Sub-contract Works within the agreed Contract Period and in a manner that would receive the approval of the Architect.

1.33 **Record Drawings (As Installed) and Instructions**

During the execution of the Sub-contract Works the Sub-contractor shall, in a manner approved by the Engineer record on Working or other Drawings at site all information necessary for preparing Record Drawings of the installed Sub-contract Works. Marked-up Working or other Drawings and other documents shall be made available to the Engineer as he may require for inspection and checking.

Record Drawings, may, subject to the approval of the Engineer, include approved Working Drawings adjusted as necessary and certified by the Sub-contractor as a correct record of the installation of the Sub-contract Works.

They shall include but not restricted to the following drawings or information:

a) Working Drawings amended as necessary but titled “Record Drawings” and certified as a true record of the “As Installed” Sub-contract Works. Subject to the approval of the Engineer such Working Drawings as may be inappropriate may be omitted.

b) Fully dimensioned drawings of all plant and apparatus

c) General arrangement drawings of equipment, other areas containing plant forming part of the Sub-contract Works and the like, indicating the accurate size and location of the plant and apparatus suitability cross-referenced to the drawings mentioned in (b) above and hereinafter.

d) Routes, types, sizes and arrangement of all pipework and ductwork including dates of installation of underground pipework.

e) Relay adjustment charts and manuals.

f) Routes, types, sizes and arrangement of all electric cables, conduits, ducts and wiring including the dates of installation of buried works.

g) System schematic and trunking diagrams showing all salient information relating to control and instrumentation.

h) Grading Charts.

i) Valve schedules and locations suitability cross-referenced.

j) Wiring and piping diagrams of plant and apparatus.

k) Schematic diagrams of individual plant, apparatus and switch and control boards. These diagrams to include those peculiar to individual plant or apparatus and also those applicable to system operation as a whole.

l) Operating Instruction

Schematic and wiring diagrams shall not be manufacturer’s multipurpose general issue drawings. They shall be prepared specially for the Sub-contract Works and shall contain no spurious or irrelevant information.

Marked-up drawings of the installation of the Sub-contract Works shall be kept to date and completed by the date of practical or section completion. Two copies of the Record Drawings of Sub-contract Works and two sets of the relay adjustment and grading charts and schematic diagrams on stiff backing shall be provided not later than one month later.

The Sub-contractor shall supply for fixing in sub-stations, switch-rooms, boiler houses, plant rooms, pump houses, the office of the Maintenance Engineer and other places, suitable valve and instructions charts, schematic diagrams of instrumentation and of the electrical reticulation as may be requested by the Engineer providing that the charts, diagrams, etc., relate to installations forming part of the Sub-contract Works. All such charts and diagrams shall be of suitable plastic material on a stiff backing and must be approved by the Engineer before final printing.

Notwithstanding the Sub-contractor's obligations referred to above, if the Sub-contractor fails to produce to the Engineer's approval, either:-

a) The Marked-up Drawings during the execution of the Sub-contract Works or

b) The Record Drawings, etc., within one month of the Section or Practical Completion

The Engineer shall have these drawings produced by others. The cost of obtaining the necessary information and preparing such drawings, etc., will be recovered from the Sub-contractor.

1.34 **Maintenance Manual**

Upon Practical Completion of the Sub-contract Works, the Sub-contractor shall furnish the Engineer four copies of a Maintenance Manual relating to the installation forming part of all of the Sub-contract Works.

The manual shall be loose-leaf type, International A4 size with stiff covers and cloth bound. It may be in several volumes and shall be sub-divided into sections, each section covering one Engineering service system. It shall have a ready means of reference and a detailed index.

There shall be a separate volume dealing with Air Conditioning and Mechanical Ventilation installation where such installations are included in the Sub-contract Works.

The manual shall contain full operating and maintenance instructions for each item of equipment, plant and apparatus set out in a form dealing systematically with each system. It shall include as may be applicable to the Sub-contract Works the following and any other items listed in the text of the Specifications:

a) System Description.

b) Plant

c) Valve Operation

d) Switch Operation

e) Procedure of Fault Finding

f) Emergency Procedures

g) Lubrication Requirements

h) Maintenance and Servicing Periods and Procedures

i) Colour Coding Legend for all Services

j) Schematic and Writing Diagrams of Plant and Apparatus

k) Record Drawings, true to scale, folded to International A4 size

l) Lists of Primary and Secondary Spares.

The manual is to be specially prepared for the Sub-contract Works and manufacturer's standard descriptive literature and plant operating instruction cards will not be accepted for inclusion unless exceptionally approved by the Engineer. The Sub-contractor shall, however, affix such cards, if suitable, adjacent to plant and apparatus. One spare set of all such cards shall be furnished to the Engineer.

1.35 **Hand-over**

The Sub-contract Works shall be considered complete and the Maintenance and Defects Liability Period shall commence only when the Sub-contract Works and supporting services have been tested, commissioned and operated to the satisfaction of the Engineer and officially approved and accepted by the Employer, provided always that the handing over of the Sub-contract Works shall be coincident with the handing over of the Main Contract Works.

The procedure to be followed will be as follows:

a) On the completion of the Sub-contract Works to the satisfaction of the Engineer and the Employer, the Sub-contractor shall request the Engineer, at site to arrange for handing over.

b) The Engineer shall arrange a Hand-over Meeting or a series thereof, at site.

c) The Sub-contractor shall arrange with the Engineer and Employer for a complete demonstration of each and every service to be carried out and for instruction to be given to the relevant operation staff and other representatives of the Employer.

d) In the presence of the Employer and the Engineer, Hand-over will take place, subject to Agreement of the Hand-over Certificates and associated check lists.

1.36 **Painting**

It will be deemed that the Sub-contractor allowed for all protective and finish painting in the Sub-contract Sum for the Sub-contract Works, including colour coding of service pipework to the approval of the Engineer. Any special requirements are described in the text of the Specifications.

1.37 **Spares**

The Sub-contractor shall supply and deliver such spares suitably protected and boxed to the Engineer's approval as are called for in the Specifications or in the Price Schedules.

1.38 **Testing and Inspection – Manufactured Plant**

The Engineer reserves the right to inspect and test or witness of all manufactured plant equipment and materials.

The right of the Engineer relating to the inspection, examination and testing of plant during manufacture shall be applicable to Insurance companies and inspection authorities so nominated by the Engineer.

The Sub-contractor shall give two week's notice to the Engineer of his intention to carry out any inspection or tests and the Engineer or his representative shall be entitled to witness such tests and inspections.

Six copies of all test certificates and performance curves shall be submitted as soon as possible after the completion of such tests, to the Engineer for his approval.

Plant or equipment which is shipped before the relevant test certificate has been approved by the Engineer shall be shipped at the Sub-contractor's own risk and should the test certificate not be approved new tests may be ordered by the Engineer at the Sub-contractor's expense.

The foregoing provisions relate to tests at manufacturer's works and as appropriate to those carried out at site.

1.39 **Testing and Inspection -Installation**

Allow for testing each section of the Sub-contract Works installation as described hereinafter to the satisfaction of the Engineer.

1.40 **Labour Camps**

The Sub-contractor shall provide the necessary temporary workshop and mess-room in position to be approved by the Architect.

The work people employed by the Sub-contractor shall occupy or be about only that part of the site necessary for the performance of the work and the Sub-contractor shall instruct his employees accordingly.

If practicable, W.C. accommodation shall be allocated for the sole use of the Sub-contractor's workmen and the Sub-contractor will be required to keep the same clean and disinfected, to make good any damage thereto and leave in good condition.

1.41 **Storage of Materials**

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 or 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.

1.42 **Initial Maintenance**

The Sub-contractor shall make routine maintenance once a month during the liability for the Defects Period and shall carry out all necessary adjustments and repairs, cleaning and oiling of moving parts. A monthly report of the inspection and any works done upon the installation shall be supplied to the Engineer.

The Sub-contractor shall also provide a 24 -hour break-down service to attend to faults on or malfunctioning of the installation between the routine visits of inspection.

The Sub-contractor shall allow in the Sub-contract Sum of the initial maintenance, inspection and break-down service and shall provide for all tools, instruments, plant and scaffolding and the transportation thereof, as required for the correct and full execution of these obligations and the provision, use or installation of all materials as oils, greases, sandpaper, etc., or parts which are periodically renewed such as brake linings etc., or parts which are faulty for any reason whatsoever excepting always Acts of God such as storm, tempest, flood, earthquake and civil revolt, acts of war and vandalism.

1.43 **Maintenance and Servicing After Completion of the Initial Maintenance**

The Sub-contractor shall, if required, enter into a maintenance and service agreement with the employer for the installation for a period of up to five years from the day following the last day of the liability for Defects Period which offers the same facilities as specified in Clause 1.41 (Initial Maintenance).

The terms of any such agreement shall not be less beneficial to the employer than the terms of Agreements for either similar installation.

The Sub-contractor shall submit with his tender for the works, a firm quotation for the maintenance and service of the installation as specified herein, which shall be based upon the present day costs and may be varied only to take into account increases in material and labour unit rate costs between the time of tendering and the signing of the formal maintenance and service agreement and which shall remain valid and open for acceptance by the Employer to and including the last day of the fifth complete calendar month following the end of the liability for Defects Period.

1.44 **Trade Names**

Where trade names of manufacturer's catalogue numbers are mentioned in the Specification or the Bills of Quantities, the reference is intended as a guide to the type of article or quality of material required. Alternate brands of equal and approved quality will be acceptable.

1.45 **Water and Electricity for the Works**

These will be made available by the Main Contractor. The Sub-contractor shall be liable for the cost of any water or electric current used and for any installation provided especially for their own use by the Main Contractor.

1.46 **Protection**

The Sub-contractor shall adequately cover up and protect his own work to prevent injury and also to cover up and protect from damage all parts of the building or premises where work is performed by him under the Contract.

1.47 **Defects After Completion**

The defects liability period will be six months from the date of completion of the Main Contract as certified by the Engineer.

1.48 **Damages for Delay**

Liquidated and ascertained damages as stated in the Main Contract Agreement will be claimed against the Main Contract for any unauthorized delay in completion. The Sub-contractor shall be held liable for the whole or a portion of these damages should he cause delay in completion.

1.49 **Clear Away on Completion**

The Sub-contractor shall, upon completion of the works, at his own expense, remove and clear away all plant, equipment, rubbish and unused materials, and shall leave the whole of the works in a clean and tidy state, to the satisfaction of the Engineer. On completion, the whole of the works shall be delivered up clean, complete and perfect in every respect to the satisfaction of the Engineer.

1.50 **Final Account**

On completion of the works the Sub-contractor shall agree with the Engineer the value of any variations outstanding and as soon as possible thereafter submit to the Engineer his final statement of account showing the total sum claimed sub-divided as follows:

Statement A - detailing the tender amounts less the Prime Cost and Provisional Sums, included therein.

Statement B - detailing all the variation orders issued on the contract.

Statement C - Summarizing statement A and B giving the net grand total due to the Sub-contractor for the execution of the Sub-contract.

1.51 **Fair Wages**

The Sub-contractor shall in respect of all persons employed anywhere by him in the execution of the Sub-contract, in every factory, workshop or place occupied or used by him for execution of the Sub-contract, observe and fulfill the following conditions:

a) The Sub-contractor shall pay rates of the wages and observe hours and conditions of labour not less favourable than those established for the trade or industry in the district where work is carried out.

b) In the absence of any rates of wages, hours or conditions of labour so established the Sub-contractor shall pay rates and observe hours and conditions of labour are not less favourable than the general level of wages, hours and conditions observed by other employers whose general circumstances in the trade or industry in which the Sub-contractor is engaged are similar.

1.52 **Supervision**

During the progress of the works, the Sub-contractor shall provide and keep constantly available for consultation on site experienced English - speaking Supervisor and shall provide reasonable office facilities, attendance, etc., for the Supervisor.

In addition, during the whole of the time the works are under construction, the Sub-contractor shall maintain on site one experienced foreman or charge-hand and an adequate number of fitters, etc., for the work covered by the Specification. The number of this staff shall not be reduced without the prior written approval of the Architect or Engineer.

Any instructions given to the Supervisor on site shall be deemed to have been given to the Sub-contractor.

Depending on the scope of coordination works required onsite, the Engineer shall recommend the appointment of a Resident Electrical Engineer, who will be required to be based on site. The Resident Engineer shall be appointed and paid by the Engineer. Provision to be made for the appointment of the Resident Engineer.

One copy of this Specification and one copy of each of the Contract Drawings (latest issue) must be retained on site at all times, and available for reference by the Engineer or Sub-contractor.

1.53 **Test Certificates**

The Sub-contractor shall provide the Engineer with three copies of all test reports or certificates that are or may be required by this Specification.

1.54 **Labour**

The Sub-contractor shall provide skilled and unskilled labour as may be necessary for completion of the contract.

1.55 **Discount to the Main Contractor**

No discount to the Main Contractor will be included in the tender for this installation.

1.56 **Guarantee**

The whole of the work will be guaranteed for a period of twelve (12) months from the date of the Architect’s certification of completion and under such guarantee the Sub-contractor shall remedy at his expense all defects in materials and apparatus due to faulty design, construction or workmanship which may develop in that period.

PART E:

GENERAL SPECIFICATIONS

FOR ELECTRICAL INSTALLATIONS

PART E: GENERAL SPECIFICATIONS FOR ELECTRICAL INSTALLATIONS

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PART E:

GENERAL ELECTRICAL SPECIFICATION

1 GENERAL

This section specifies the general requirement for plant, equipment and materials forming part of the Sub-contract Works and shall apply except where specifically stated elsewhere in the Specification or on the Contract Drawings.

1.1 Quality of Materials

All plant, equipment and materials supplied as part of the Sub-contract Works shall be new and of first class commercial quality, shall be free from defects and imperfections and where indicated shall be of grades and classifications designated herein.

All products or materials not manufactured by the Sub-contractor shall be products of reputable manufacturers and so far as the provisions of the Specification is concerned shall be as if they had been manufactured by the Sub-contractor.

Materials and apparatus required for the complete installation as called for by the Specification and Contract Drawings shall be supplied by the Sub-contractor unless mention is made otherwise.

Materials and apparatus supplied by others for installation and connection by the Sub-contractor shall be carefully examined on receipt. Should any defects be noted, the Sub-contractor shall immediately notify the Engineer.

Defective equipment or that damaged in the course of installation or tests shall be replaced as required to the approval of the Engineer.

1.2 Regulations and Standards

The Sub-contract Works shall comply with the current editions of the following:

a) The Kenya Government Regulations.

b) The United Kingdom Institution of Electrical Engineers (IEE) Regulations for the Electrical Equipment of Buildings.

a) The United Kingdom Chartered Institute of Building Services Engineers (CIBSE) Guides.

d) British Standard and Codes of Practice as published by the British Standards Institution (BSI)

e) The Local Council By-laws.

f) The Electricity Supply Authority By-laws.

g) Local Authority By-laws.

h) The Kenya Building Code Regulations.

i) The Kenya Bureau of Standards

1.03 Power Supply on Site

The supply voltage will be 240 volts single phase of 415 volts 3 phase 50 Hz. TN-S system, viz. separate neutral and protective conductor throughout the system.

2. INSTALLATION OF CABLES

2.01 **General**

Bending of cables shall be in accordance with table 52c of the IEE Regulations and no cable shall be bent to radius less than that specified by the cable manufacturers.

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

(i) Voltage drop 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.

2.02 **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, 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 Regulation 529-7 and Appendix 12.

No cable with a cross-section area of less than 1.5mm^2 shall be used. All cables installed in a conduit or trunking system shall be PVC single insulated conductors and shall be colour coded in accordance with the IEE Regulation 524-3 and Table 52A.

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.

2.03 **PVC/SWA/PVC Cable**

These cables shall comprise copper conductors unless specifically detailed otherwise, laid up with PVC fillers bedded with an extruded inner PVC sheath, armoured with a single layer of galvanized steel wires, aluminium or strip as specified, and covered overall with PVC sheath.

Cables shall be manufactured to BS 6346 "PVC insulated cables for electrical supply" with conductor dimensions and resistances in accordance with BS 6360 1969, "copper conductors in insulated cables and cords", Armouring shall be galvanised steel to BS 1442.

Attention is drawn to Chapter 52 of the IEE Regulations and Appendix 9. Where the armour wires of cables are used to provide protective conductor they shall comply with the requirements of Chapter 54 of the IEE Regulations, particularly section 543; alternatively, additional cables with copper conductors shall be installed to reduce the impedance to a level which ensures compliance with Section 543 of the IEE Regulations.

Unless permission is given by the Engineer, no joints will be allowed. In the event of joints being authorized, they shall be made using plastic boxes of approved design filled with an approved cold pouring plastic or resin compound. The cable box shall incorporate suitable copper tapes and clamps to bond the armouring of the jointed cables.

The PVC/SWA/PVC cables should be terminated in the cable manufacture's approved glands. These shall be of the compression type providing controlled radial compression of the sheath seal. The gland shall incorporate an armour clamping ring and earthing ring and, where used outdoors, a lead washer shall be used to ensure a watertight joint between the gland and the unit to which it is fitted. The earthing ring shall be rigidly fixed to the item of equipment and terminated using brass nuts, bolts and washers. All gland terminations shall be protected by a PVC shroud which shall fit tightly over the cables.

The electrical Sub-Sub-Contractor is responsible for determining the true nature and extent of cable routes. No claim on the grounds of lack of knowledge will be entertained. All cable routes shall be agreed with the Engineer. After the cables have been installed and terminated, but prior to putting into service, they shall be subjected to an insulation test of 500 volts and the results of these tests (recorded on test sheets) forwarded to the Engineer.

3. CONDUIT AND CONDUIT FACILITIES - MILD STEEL CONDUIT SYSTEM

3.01 Conduits

Conduits shall be installed as required by the IEE Regulations and as detailed in this specification. All metal conduits must be heavy gauge, seam welded, steel tube screwed conduits manufactured to BS 31, "steel tube screwed conduits and fittings for electrical wiring", Class B, BS 4568, "Steel conduit and fittings with thread of ISO form for electrical installation", for metric conduit, unless specified otherwise. Conduits shall be finished black stove enamelled, except in positions exposed to water (other than water used in construction), steam condensation or the action of weather, where hot galvanised conduits shall be used.

Any conduits work rejected by the Engineer shall be replaced at no extra cost. No conduit smaller than 20 mm in diameter or longer than 50mm diameter shall be used.

All bends in conduit shall be in accordance with the IEE Regulation 529-5, and made in a conduit bending machine fitted with a former of the correct radius for each conduit size.

Conduits shall be secured in an efficient pipe vice whilst being screwed. Conduit system shall be installed so as to ensure compliance with requirements of IEE Regulations 529-7. Attention is drawn to Appendix 12 of the IEE Regulations.

3.02 Conduit Fittings

Conduit fittings shall have same finish as the conduits being used and shall comply with BS 31 or BS 4586. All conduit fittings shall be screwed or loop-in malleable iron circular type, fitted with covers secured by brass screws. Rectangular adaptable steel boxes may be used on multi-conduit runs.

All circular type boxes must be fitted with long screwed spout conduit entries with the screwed thread terminating within the spout and the edges of the internal orifice of the box rounded and smoothed to act as a bush except for the adaptable steel rectangular boxes and loop-in conduit boxes, in which case male bush and coupling must be used for conduit connections. In concealed installation, boxes shall be fixed with the rims flush with the finished surface, but when, for any reason whatsoever, the rims are below the surface, suitable extension rings of the required depth shall be provided and installed to finish flash with the surrounding surfaces and with the lids of sufficient oversize (7.5 mm minimum all round) to cover the junction between box and plaster. In no case will the use of site-manufactured bends, sets, elbows, inspection elbows or tees be permitted.

3.03 Fixing of Conduits

All conduits must be firmly and rigidly fixed to be entirely without whip or movement. Space-bar saddles, or strap saddles, must be used on the timbers in roof spaces and will be allowed when the conduits are run on the underside of exposed unsealed floor or ceiling joints. Pipe hooks or crumpets will not be allowed except for security conduits in chases, or screeds, when the top of the hook must at least be 10 mm below the finished surface of the wall, or 25 mm below the floor finish. Pipe hooks shall be galvanised.

The finish of the saddles must in all cases conform to the finish of the supported conduits. Galvanised, sherardised or cadmium plated screws shall be used in all cases where galvanised conduits are installed.

The standard cast iron distance saddle, (single fixing base and two-screw fixing top), must be used for all conduits run on the surface of walls and ceilings etc., fixed at intervals of not more than 1.2 metres.

3.04 **Conduit Runs and Concealment**

The routes of the conduit installation shall be agreed with the Engineer prior to commencing the installation. Conduits shall be installed atleast 150 mm from, and preferably under, any hot water pipes and atleast 50 mm from other surface pipes and cables. Conduits shall be bonded to other surfaces in accordance with the requirements of IEE Regulations 413-2 and 547-4 to 547-7 inclusive.

Each continuity test shall be applied to the system before plastering, screeding, or casting of concrete is commenced. Surface work will be allowed where certain pre-fabricated methods of construction preclude the concealment of the runs, and or fair-faced brickwork or block work or other unplastered walls.

Conduit runs shall be planned to obviate the need for draw-in boxes, but where the use of such boxes is unavoidable they shall be accessible at all times and be fitted with covers. When Conduits are specified as being installed on the surface the runs must be arranged to render the whole system as neat and inconspicuous as possible, having regard to the existing architectural features. All vertical and horizontal runs must be taken where conduits converge and run together near distribution centres to obtain a symmetrical layout. The distance between the conduits shall be maintained through bends and sets and shall not vary noticeably.

3.05 **Flexible Metallic Conduit**

Flexible Conduit shall comply with the BS 731 part 1. "Flexible steel conduit and adaptors for the protection of electrical cables." It shall be used for the final connection from a rigid conduit installation to the terminal boxes of all the equipment provided with a means of positional adjustment and /or where vibration may reasonably be expected to occur.

Flexible conduits shall be PVC sheathed and shall be terminated using approved glands. In all instances a separate PVC insulated green and yellow coloured protective conductor complying with table 41A1 or 41A2 and section 543 of the IEE Regulations shall be installed, terminating at each end into purpose-made earthing terminals.

Under no circumstances will flexible conduits be accepted in lieu of sets and bends in a rigid conduit installation.

In normal circumstances flexible conduits shall have a minimum length of 300 mm and a maximum unstretched length of 800mm. It shall permit a full range of withdrawal, adjustment or movement of the equipment.

3.06 **Locking, Bushing and Coupling**

All conduit ends must be filed square and rearmed before erection to ensure freedom from internal burrs and roughness.

Running couplings shall only be used on black enamelled steel conduit installations, and the use of this shall be kept to the minimum. All running couplings shall be secured by means of the lock nuts or lock rings, and the exposed thread painted after installation.

Every conduit connection to the equipment, boxes, distribution boards, loop-in boxes, cable trunking etc, shall be made by means of a screw coupling and a male hexagonal headed smooth bore brass bush. The smooth bore shall be fitted to secure the conduit to the item connected via a purpose-made clear hole to be closed by the bush and coupling when fitted. Paint must be removed from the surface of the item connected to allow it to be covered by the end of the coupling which shall be filed, clean and square, to ensure a good mechanical and electrical metal to metal joint. Any exposed area of metal from which paint has been removed must be made good in a matching paint. Bushes shall be fitted and tightened by means of correctly fitting spanners. Mutilated bushes damaged whilst being fitted must be removed and replaced.

Conduits connecting via couplings shall be connected by a means of 15 mm long threaded section and shall have a gap of approximately 2 mm between them. No thread shall be exposed except running couplings.

3.07 **Continuity and Earthing**

The whole of the conduit installations shall be mechanically and electrically sound and continuous throughout their length in accordance with the IEE Regulations.

Where the conduit system 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 conduit to comply with Section 543 of the IEE regulations.

4. CABLE TRUNKING-SHEET STEEL

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 underfloor (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, and Appendix 9: 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, pinracks, 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 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 suitable 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 plasterwork.

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 provide and fitted inside the trunking, in accordance with the IEE Regulations 528-1. 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 523-6.

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

5 CABLE TRAYS

Cable trays shall be formed from perforated steel of not less than 0.9 mm thickness up to and including 100 mm width - 1.25 mm thickness from 150 mm up to and including 300 mm width - and 2.00 mm thickness above 300 mm width. They shall be galvanised unless otherwise specified. Tray shall be adequately sized to support the cable without bunching.

Support shall be by means of steel brackets installed at intervals necessary to provide a rigid fixing and ensure that no undue deflection occurs in the complete installation. The brackets shall be galvanised prior to fixing. Dome-headed bolts, nuts and washers of finish suitable to the tray shall be used between tray and brackets.

Fixing to the surfaces of walls, ceilings, etc. shall be by means of expansion-type masonry plugs or bolts. Fixings shall be galvanised unless otherwise stated. Cable trays shall be installed using factory-formed bends, elbows, tees, couplers and risers etc. Site fabrication of elbows etc., will only be permitted with prior approval of the Engineer and where it is not possible to obtain the necessary factory-made item.

Where cuts have been made, the try shall be painted with zinc rich paint.

Holes which have been cut to allow cables to pass through shall be suitably bushed.

Suspension sets shall comprise threaded M12 cadmium plated hanger roads together with nuts and locking washers, verticle hanger brackets, support channel, tray hold-down clips etc., all of which shall have a galvanised finish.

All cables shall be securely fixed to traywork and the complete installation must be carries out in a neat and workmanlike manner without crossovers. A 25% reserve margin in size and weight shall be allowed for all cable tray works.

Cables of 30 mm diameter and above shall be fixed using the appropriate size cable straps of approved manufacture.

On light duty multi-cable runs, cable straps of plastic coated metal shall be used to secure cables.

Bunching of cables will not be permitted.

Cables shall be clipped by means of copper or brass saddles and clips where high temperature or humid conditions are likely to be experiences. In all cases, saddles, clips, straps, etc., shall be fixed to the tray by means of brass screws or bolts and nuts.

6. PROTECTION OF PVC/SWA/PVC CABLES

6.01 General

Cable routing shall be such that the maximum degree of protection against accidental damage is obtained by running cables along the inside of channels and beams, etc.

Cables shall be laid in performed trenches or duct throughout all paved areas. Ducts shall be installed for underground cables before the paving is constructed.

Cable ducts shall be sealed at both ends using materials which are resistant to any likely corrosive and insect attack in the area concerned.

All cables rising through floors and trench covers, except in switch rooms, shall be protected by a length of steel pipe which shall project at least 150 mm above the finished surface level.

The open end of the pipe shall be sealed with a suitable compound. Care must be taken that all phases of single core cables pass through the same protective steel duct.

6.02 Cables Direct in Ground

All excavation and backfilling of cable trenches will be carried out by the main Sub-Contractor unless otherwise specified, but the electrical Sub-Sub-Contractor shall in any case make sure that trenches are made to a depth as specified.
The electrical Sub-Sub-Contractor shall lay cables direct in the ground in the following manner:-

75 mm (3 inches) of dry fine sand shall be placed to form a bed for the cables. After cables have been laid they shall be covered with additional dry fine sand well punned over and around the cables to a level of 75 mm above the top of the uppermost cable. Mechanical punners shall not be used for this work. The electrical Sub-Sub-Contractor shall supply and install concrete cable tiles which shall be carefully placed over the cable forming each circuit.

Until all the cables have been laid in the trench and have been covered with their protective tiles, no sharp metal tools such as spades or fencing stakes, shall be used in the trench. Rollers used during laying of cables shall have no sharp projecting parts liable to damage the cables.

6.03 **Cables above Ground**

For main cable runs the cable shall be run on approved tray or ladder rack, and secured to it at intervals of not more than 400 mm horizontally and 600 mm vertically.

Cables shall be dressed together and fixed with a common saddle. If the number of cables is such as to require the tiering of cables, the number of tiers shall generally be two.

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:-

(i) The cable conductors shall be sweated into lugs of the appropriate size for the cable and equipment terminal.
(ii) The cable conductors shall be secured by compression type lugs of the correct size for the cable and equipment terminal.
(iii) The cable conductors shall be secured in pinch screw terminals.
(iv) 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 purchase 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 Sub-Sub-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.

8 SEGREGATION 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.

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 cables 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.

10. EARTHING

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 lighting protection system or other points specified.

The installation shall be earthed in accordance with the Sixteenth 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 Sub-Sub-Contractor's attention is drawn to Chapter 54 of the IEE Regulations.

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 insulated PVC sheathed cables, coloured green and yellow and sized in accordance with Tables 41A1 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 sheathed cable, coloured green and yellow, and sized in accordance with the Table 41A1 or 41A2 and Section 543 of the IEE Regulations, connecting all items to the earth terminal.

All items of switchgear, accessories, luminaries, conduits, and the outer sheaths of MICS cables, the armouring of all PVC/SWA/PVC cables together with all other items of electrical plant and equipment shall be effectively earthed by means of a protective conductor in accordance with Table 41A1 and 41A2 and section 543 of the IEE Regulations.

At every terminal point on the fixed wiring an integral earth terminal shall be provide 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 multi-way 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, metal wastes and piped services at sinks, baths and showers etc., shall be bonded to the earth terminal in accordance with the IEE Regulations 413-2.

A 50mm 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 Table 41A1 and 41A2 and 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 unobstructive as possible where practicable shall be made in service ducts or accessible voids and shall be readily 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 four(4) ohms for electrical equipment, seven (7) ohms for lighting protection. 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 sub-Sub-Contractor not being able to establish a suitable earth connection to the electricity supply cable, earth electrodes shall be installed which shall be galvanised 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 Sub-Contractor's relevant drawings, with the facility to disconnect the earth ring while measuring the electrode earth resistance.

11 LIGHTNING PROTECTION

Lighting protection shall be provided on high buildings/structures more than 10 m in height. such protection shall be effected by bonding each individual building/structures direct to the earthing system, in accordance with the BS CP 326, by a minimum size of 170mm^2 conductor.

12 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.

13 CONTROL PANELS AND CUBICLES

The details specified in clause 4.11 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 letter 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.

14 DISTRIBUTION BOARDS

14.1 General

All distribution boards, unless stated otherwise, shall be miniature Circuit Breaker Distribution Boards and shall be of surface or flush type, as specified. 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.

14.2 Fused Distribution Boards

All fuse boards shall be of 500 volt rating to BS. 5486 part 11 "Particular requirements for Fuse boards". The details specified in clause 4.12 shall apply as far as cabinet and construction, cabling arrangements, bus bars, neutral bars, earthing and isolating switches are connected.

Fuse banks shall be spaced so as to obviate the necessity for insulating barriers, but protection shall be provided by means of insulating shields to prevent accidental contact with the main bus bars and connections.

All fuses lighting and heating circuits shall be of the HRC cartridge type, ASTA certified, for compliance with BS. 88, category of Duty 440 A.C 5 class 01.

14.3 Miniature Circuit-Beaker 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 shake proof 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 MCBs 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.

14.4 **Miniature Circuits Breaker (MCB)**

All MCBs 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 Sub-Sub-Contractor shall fix blanking plates in the vacant MCB housings. All MCBs shall be rated at 500 volts minimum, and comply with BS 3871. "Miniature and moulded case circuits breakers" and 4752 part 1, "Circuit breakers".

14.5 **Moulded Case Circuit Breakers (MCCB)**

Where specified, MCCBs shall be of the thermal/magnetic type, having a quick make, quick break, trip free mechanism which prevents the MCCB from being closed or held against short circuits or overloads. Tripping of every multi-pole MCCB shall be such that operation ensures simultaneous action in all phases.

Clear indication shall be provide for the three positions of operation of the mechanism - 'ON', 'OFF' and 'TRIPPED'. The operation shall be such that the MCCB shall trip automatically under fault conditions and, to reset, the dolly shall require first moving through the 'off' position. All MCCBs shall be provided with facilities for locking the breaker in 'OFF' position.

All MCCBs shall be rated at 500 volts minimum, be ASTA certified for this operational duty, and comply with BS. 3871 and BS. 4752 Part 1.

15 LABELLING AND ENGRAVING

15.1 Labelling

All fused-switch units, switch-fuses, switches, bus-bars 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, 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 colourings 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.

5.2 Engraving

The electrical Sub-Sub-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.

16 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: -

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

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

17 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 Sub-Sub-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 Sub-Sub-Contractor shall deliver to site store, install, commission and set to work.

Unless otherwise stated, 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 Sub-Sub-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 523-32.

The minimum cross-section area flexible core to the employed shall be 0.75mm^2.

Specified attention shall be given to Chapter 52 of the IEE Regulations, particularly Regulation 521-5 and 521-6, Appendices 9 and 10.

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 multicore 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 cable 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 sleaves from the connection point within the luminaire for a distance of 300 mm.

All flourescent 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 mm^2 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 Sub-Sub-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 Sub-Sub-Contractor shall be responsible for mounting and fixing arrangements.

Break joint rings of approved colour shall be provided for all suspended luminaires and fluorescent battery 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 cable 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.

18. CEILING ROSES

Surface mounted ceiling roses shall be of all insulated, high impact moulded plastic construction complying with BS. 67 and shall be suitable for direct attachment to conduit outlet boxes. Recessed or semi-recessed ceiling roses shall be manufactured from porcelain. Break joint rings shall be provided when used on flush conduit outlet boxes.

Ceiling roses shall not be connected to fixed wiring in such a manner that one of the terminals remains 'live' when the associated switch is in the 'off' position, unless that terminal is inaccessible to touch when the ceiling rose cover is removed, e.g. for replacement flexible cord.

Terminals shall be provided for switched live, neutral and protective conductors. Loop-in facilities shall also be provided.

19 LAMPS

Lamps shall be compatible with the luminaire for which they are intended and shall be of the wattage, type and colour specified. Lamps shall be of the correct voltage rating for the particular electricity supply concerned.

Tungsten filament lamps, unless otherwise specified, shall be of the 'PEARL' type and of the long-life type giving 2000 hours average life.

Luminaires designed to accommodate lamps with reduced physical dimensions shall be fitted with lamps of the mushroom type of approved equal.

20 EXTERNAL LIGHTING

External lighting system shall comprise the lighting points at the position shown on the Drawings and shall include the provision, erection and connection of all lighting columns, bollards, wall and ceiling luminaires and the provision and connection of all control gear together with the laying, jointing and connection of all necessary cables.

All excavation, trenching, backfilling etc., will be undertaken by the main Sub-Contractor.

All lighting columns shall be of the type specified, suitable for looping in and out three No.2 Core PVC/SWA/PVC cables of the specified size.

Where discharge lamps are specified the associated controlgear shall be mounted in the base of the column above the fused 'cut out', all on a timber board housed within the base of the column.

Each lighting column/bollard shall be completed with all adaptors, spigots, mounting brackets, luminaires, controlgear and lamps and shall be provided with a base compartment and locking door.

All column/bollards shall be fixed in the position specified.

Cable routes are shown on the relevant drawings and the electric Sub-Sub-Contractor shall lay the lighting cables in the trenches.

All connections shall be made in an approved manner, and the installations shall be finished complete and handed over in working order to the full satisfaction of the Engineer.

21 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 20 amp 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 covers 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 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.

22 SOCKETS 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, 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 mm^2, 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 Appendix 5, Table 5A of the IEE Regulations.

All plugs shall be of mounded 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 Sub-Sub-Contractor's cost, to the satisfaction of the Engineer.

23 INSPECTION AND TESTING

A visual inspection shall be made in accordance with IEE Regulations 612-1. References shall be made to appendix 14 of the IEE Regulations, which is a checklist for initial inspection of installations.

The electrical installation shall be inspected and tested by the electrical Sub-Sub-Contractor in accordance with part 6 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 Sub-Sub-Contractor and the instruments shall be correctly calibrated and certified for the limits of accuracy required and shall be operated by 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 15 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 Sub-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 154 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.

24 AS BUILT DRAWINGS, AND DOCUMENTATION

Within one month of the date of completion the electrical Sub-Contractor shall provide 3 prints of all electrical drawings showing the electrical installations "As built". In case the electrical Sub-Contractor fails to provide "As Built" drawings as required, these will be prepared by others at the expense of the electrical Sub-Contractor.

APPENDIX 1

SUPPLEMENTARY SPECIFICATION FOR PVC INSULATED CABLES

AND NON-METALLIC CONDUITS WIRING SYSTEM.

1. **PVC 1 CABLE**

The wiring shall be carried out in 250-volt grade or 440 volt grade for 3-phase PVC Insulated cable, as specified elsewhere run in non-metallic conduit. The cable shall be of the sizes specified on the drawing.

2. **INSTALLATION OF WIRING**

Cable 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 cable into an incomplete section of the conduit installation.

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 boxes unless approved.

4. **CAPACITY OF CONDUITS**

The cable shall run in the conduit so as not to exceed the capacities as set out in Table 10 of the IEE Regulations (13^{th} Edition with current amendments).

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

Conduit of sizes less than 20 mm shall not be used without the written authority of the D.R.

5. **BENDING**

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

i) Small size, 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. Conduit badly formed or bent or damaged in any way, shall not be used.

6. **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.

7. **CONDUIT FITTINGS**

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 D.R.'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 D.R.'s approval.

8. FIXING OF CONDUITS

Conduit 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 conduit shall be subjected to the approval of the D.R.

Sunken conduit 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 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 D.R. 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.

Conduit 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.

Conduit 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 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 rawlbolts, shall be used for fixing to other materials as approved by the D.R.

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

9. CIRCULAR 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 a lighting fitting, care shall be taken to ensure that the temperature of the box does not exceed 60 degrees c. The weight suspended from the box shall not exceed 3 kg.

Where wiring system incorporates galvanised conduit and trunking, the trunking shall be deemed to be galvanised 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.

Conduit and trunking shall be mechanically and electrically continuous. Conduit 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 substance 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 point 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.

Conduit 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 D.R.

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 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 conduit installed within this area shall be solid drawn galvanised, 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 Code of Practice 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 galvanised 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 D.R. and covered by suitable floor straps, with non-ferrous tray and covers.

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

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

10. **SWITCH AND SOCKET OUTLET BOXES**

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

11. **STOPPING PLUGS**

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

12. **EARTHING**

Where fittings and accessories require earthing, an earth continuity conductor be run through the conduit. The earth continuity conductor shall be a green coloured PVC 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 switch, socket outlet, ceiling boxes etc., shall be supplied with an earth terminal.

13. **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 any particular final sub-circuit.

PART F:

PARTICULAR SPECIFICATION

FOR ELECTRICAL INSTALLATIONS

PART F:

PARTICULAR SPECIFICATIONS FOR ELECTRICAL INSTALLATIONS

CONTENTS

PART B:

PARTICULAR SPECIFICATIONS

SECTION 1: GENERAL

1.01 The electrical Sub-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 to the satisfaction of the Consulting Engineer/Architect.

1.02 **Exclusions**

Excluded from this Sub-contract is:-

i) Control panels for motor-starters and internal wiring between control-panels, motor thermostat. etc.

SECTION 2

SUPPLY AND DISTRIBUTION

2.01 **Supply and Distribution system**

The power supply shall be from a ground mounted transformer located in the transformer room. The external distribution shall be effected through underground cables to run in a ducted distribution system

2.02 **Main Switch Board**

Mains power distribution is through riser ducts and mainly cable trays

The schematic for main switchboard are shown on drawings, together with Transformer room details, including trenching.

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

Unless specifically stated otherwise, vertical power distribution shall be via riser (bus-bar) trunking. All incoming circuit breakers in the Main Switchboard to be motorized and set at different timings to allow for sequential loading of the standby generator. Exact trunking details to be given at the time of approving shop drawings for the main switchboard.

SECTION 3

LIGHTING AND SMALL POWER INSTALLATIONS

3.01 **INSTALLATION SYSTEM**

With the exception of where otherwise noted on the drawings, the installation shall throughout be carried out in PVC insulated copper cables of not less than 1.5 mm^2 copper drawn in high grade PVC conduit.

3.02 **LIGHTING CONTROL SYSTEM**

Indoor Lighting

3.03 Types of accessories and fixed apparatus to be used shall be as manufacture MK or Crabtree. Subject to the approval of the Engineer equivalent makes may be used. All light fittings to be of manufacture shown on the detailed descriptions, or approved equivalent.

3.04 **CONNECTIONS TO FIXED APPLIANCES**

The Sub-contractor shall supply and interconnect flexible cords between spur units/outlets boxes and the appliances where the symbol for flex connections are shown.

All connections shall be made by white heat-resisting PVC flexible cords having fuse rating in accordance with the respective circuits subjected to a minimum of 0.75mm^2.

3.05 **MOUNTING HEIGHTS AND LOCATIONS**

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

Each mounting heights for wall fixtures shall, however, be re-confirmed on site.

Lighting control Switches

1400 mm above floor level and 100 mm away from architrave. If mounted in a column they shall be located in the centre.

Sockets Outlets

300 mm above finished floor except for areas that are otherwise stated.

Connection Units and Outlets

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

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 centre. Where installed between beams they shall be in between two beams. All boxes shall be with covers.

3.06 **WALL AND CEILING FINISHINGS**

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

3.07 **LIGHTING FITTINGS**

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

The tenderer may submit an alternative schedule of equal makes of fittings with the tender where applicable.

Where appliances fittings shall be supplied complete with bulbs or tubes, the tubes shall be as Thorn Manufactures. The bulbs shall also be Thorn make. Equivalent makes may be substituted subject to due approval of the Engineers, and the sub-contractor proving that what is specified is not available.

3.08 **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 rawplugs (no wooden plugs) at the fixing centres.

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

3.09 All switch panels shall be as MK manufacture or equivalent subject to the Engineer's approval. Each 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.

3.10 **POWER INSTALLATIONS**

The sub-Contractor shall include for all installations shown on the drawings.

The sub-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.

3.11 **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 2.5 mm^2 for ring main circuits.

SECTION 4

4. FIRE ALARM SYSTEMS

4.01 INSTALLATION

The installation for the above shall be carried out using PVC 1.5mm^2 copper cables in high impact grade PVC conduit. All cables for fire alarm installations to be fire-resistant. Tests for fire resistance will be performed as part of this sub-contract.

The sub-contractor shall ensure continuous link-up between individual break-glass call units, detectors, bells and panels.

SECTION 5

INSTALLATION FOR COMMUNICATION AND SECURITY SERVICES

5.01 INSTALLATION SYSTEM

In the tender for electrical installations supports for all cables in the communications and security services shall be included. The electrical tender shall include for trunking, conduits etc. to ensure a continuous supply system from the telephone switchroom to any individual outlet.

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.

5.02 MOUNTING HEIGHTS AND LOCATIONS

Mounting heights shall be as for socket outlets.

5.03 BLANK-OFF PLATES

As MK list No. 3827 white.

PART G:

TECHNICAL SPECIFICATIONS

FOR STRUCTURAL

LIGHTNING PROTECTION

PART G: TECHNICAL SPECIFICATIONS FOR STRUCTURAL LIGHTNING PROTECTION

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PART G:

TECHNICAL SPECIFICATIONS FOR STRUCTURAL LIGHTNING PROTECTION

1.0 DESIGN CONSIDERATIONS

This consideration is based on the provisions of BS 6651.

If it has been established that a structure requires lightning protection, certain general design considerations need to be made.

Could, for instance, any of the metallic components in or on the structure be incorporated into the lightning protection scheme? Could the metal in and on the roof be used? Should window cleaning rails, window frames, handrails surrounding the structure be incorporated in the protection network? The reinforcing bars or the steel frame of a structure may well provide a conductive path within the lightning protection system.

If metallic components in a building are not used, then the structure will require externally fitted conductors. A Lightning Protection System can incorporate all natural conductors, all externally fitted conductors, or a combination of both. BS 6651 does not, however recommend the routing of conductors inside the structure.

2.0 MAJOR COMPONENTS

The principle components of a lightning protection system should comprise the following:

- Air termination networks
- Down conductors
- Earth termination networks
- Bonding to prevent side flashing

2.1 Air Termination Networks

It is now accepted that lightning can strike the upper part of tall structures. BS 6651 now introduces the concept of air termination networks on all sides of tall buildings (ie, vertical air termination networks). No part of the roof within the air termination network should be more than 5m from a conductor. For large flat roofs, this will be achieved typically by a network mesh of 10m x 20m. For high risk structures, ie, explosive factories, etc. the air termination mesh is reduced to 5m x 10m.

If a building's metal reinforcing bars are to be used as down conductors, these should be connected to the air termination network in the correct number of positions.

BS 6651 advises the use of a rolling sphere to determine zones of protection. To minimize the likelihood of a lightning strike damaging the side of the buildings, it is suggested that the rolling sphere method be applied to identify those areas where an extension of the air termination network should be considered. This recommendation could be summarized as follows:-

Where there is a risk that a lightning strike to the sides of a structure may cause masonry to be dislodged, then an extension of the air termination network should be considered.

To ensure complete continuity of the lightning protection system BS 6651 recommends that:

Where structures vary in height and have more than one roof termination network, the lower roof network should not only be joined to its down conductors, but also joined to the down conductors of the taller portions of the structure. This will ensure that a lightning strike to a lower portion of the structure will not lead to side-flashing to other 'remote' down conductors and will provide a multi down conductor path for the lightning current to disperse.

The protective systems of churches and similar non-conducting structures should include air termination networks, down conductors and earth termination networks. It is, however, very difficult to design protective systems for these structures collectively. BS 6651, therefore, advises that such structures should be treated as special cases: that the presence of a tower or spire should be disregarded when designing the protection of the lower parts of the structure.

For less complex tall structures of varying heights, the 'rolling sphere method' as described should be employed. The rolling sphere method is a simple means of determining where the zones of protection should be located. Wherever the sphere touches the structure determines the extent of the air termination network.

There is a reference in BS 6651 to the use of covered conductors for air termination networks. Although it advocates that, wherever possible, bare conductors should be used, it permits the use of PVC covered or painted conductors.

2.2 Down Conductors

The function of a down conductor is to provide a low impedance path from the air termination network to the earth termination network, to0 allow the lightning current to be safely conducted to earth.

BS6651 advocates the use of various types of down conductors. A combination of strip and rod conductors, reinforcing bars, structural steel stanchions, etc. can be used as all or part of the down conductor system-providing they are appropriately connected to the air and earth termination networks, and are known to offer good electrical conductivity.

The code suggests there is no advantage in using 'shielded' coaxial cables as down conductors. In fact there is thought to be the disadvantage that potentials up to hundreds of kilo-volts can occur between the inner and outer conductor (shield) at the top of the down conductors so triggering a side flash.

Down conductor systems should, where possible, take the most direct route from the air termination network to the earth termination network. Ideally they should be symmetrically installed around the outside walls of the structure starting from the corners. Routing to avoid side-flashing should always be given particular attention in designing any installation.

Down conductors should be positioned no more than 20m apart around the perimeter at roof or ground level, whichever is the greater. If the structure is over 20m in height, then the spacing is reduced to every 10m or part thereof.

Sharp bends in down conductors at the edge of the roofs are unavoidable and are permitted in BS 6651; however, re-entrant loops in a conductor can produce high inductive voltage drops which could lead to the lightning discharge jumping across the side of the loop. To minimize this problem BS 6651 recommends that the length of the conductor forming the loop should not exceed eight times the width of the open side of the loop.

2.3 Earthing – General

Earthing plays a vital role in all electrical systems. The main reasons for earthing are:-

- To protect people and livestock
- To protect equipment
- To permit the equipment to function correctly
- To ensure the reliability of electrical services.

A good earth connection should possess the following characteristics:-

- Low electrical resistance between the electrode and the earth. The lower the earth electrode resistance the more likely the lightning or fault current will choose to flow down that path in preference to any other, allowing the current to be conducted safely to and dissipated in the earth.

- Good corrosion resistance. The choice of material for the earth electrode and its connections is of vital importance. It will be buried in soil for many years so has to be totally dependable.

- Ability to carry high currents repeatedly.

- Ability to perform the above functions for a minimum of 30 years.

2.4 Soil Conditions

Achieving a good earth will depend on local soil conditions. A low soil resistivity is the main aim, and factors that affect this are:

- Moisture content of the soil.
- Chemical composition of the soil, eg. Salt content.
- Temperature of the soil.

Note: It is now deemed bad practice to use salt as a chemical means of reducing soil resistivity, because of its very corrosive nature. Salt along with other chemicals, has the disadvantage of leaching out of the surrounding soil after a period of time, thus returning the soil to its original resistivity.

Once the soil resistivity has been calculated from the local soil measurements, the appropriate earth electrode system can be chosen by using typical formulae listed below:

Horizontal Strips (Rectangular Section)

$R = \rho/275L \text{ Log10 } 200L^2/wD$

Horizontal Strips (Circular Section)

$R = \rho/275L \text{ Log10 } 100L^2/dD$

Vertical Strips (Rectangular Section)

$R = \rho/275L \text{ Log10 } 800L/w$

Vertical Strips (Circular Section)

$R = \rho/275L \text{ Log10 } 400L/d$

Where:
R= Apparent earth electrode resistance in ohms.
ρ= Soil resistivity in ohm.cm
D= Depth of electrode in metres.
d= Diameter of electrode in centimeters.
L= Length of electrode in metres.
W= Width of electrode in centimeters.

Assume we use a standard 5/8” diameter rod (nominal diameter 14mm) Actual shank diameter 14.2mm

Thus d = 1.42cm
L = ?

If we let L = 6m and substitute to see what value of R is obtained

$R = 10{,}000/275 \times 6 \times \text{Log10 } 400 \times 6/1.42$

$= 6.0606 \times 3.228$
$= 19.56$ ohms
Thus 6m of extensible rods (5x1.2m) can be used to obtain the desired resistance value of 20 ohms.

The above example illustrates the importance of the accuracy of the soil resistivity figure. If the survey is inaccurate, then the calculated apparent elecvtrode resistance R will be inaccurate and misleading.

2.5 Solid Plates or Mats

Earth plates or mats can be buried instead of driving rod electrodes but installation is expensive and time consuming.

2.6 Reinforcing bars in foundations as natural earths

This is an economical method of using the mass of metal already underground in the form of the re-inforcing bars, within the structure's foundations. Precautions should be taken to ensure there is electrical continuity between these re-inforcing bars and the earth/lightning protection connections above ground.

2.7 Underground Pipe Work System

Buried water pipes were previously considered to be a reliable method of earthing but he increasing use of plastic pipes or replacing metal joints with plastic ones now makes this method unreliable.

Other forms of earth electrode can be used, including ring conductors or radial strips emanating from a particular point, or a combination of conductors with earth rods.

2.8 Voltage Gradient

A further factor affecting the choice of an electrode system is the electrical considerations.

Step and touch voltages on the surface of the ground in the vicinity of earth electrodes must be restricted to safe values.

This can be achieved by using electrodes to form a ring around the area to be protected. The electrodes must be buried sufficiently deep to reduce surface potential.

An effective method of reducing the voltage gradient of rod electrodes is to install them with the top of the electrode some distance beneath the surface of the soil. The connection between the electrode and down conductor being made with insulated conductor.

An example of how effective this can be is illustrated by tests which gave the following results.

The maximum voltage gradient over a two metre span adjacent to a 25mm diameter earth electrode was 85% of the total electrode potential when the top of the assembly was at ground level. This electrode potential was reduced to 20% when the electrode was buried 0.3 m below ground level and 5% when buried 1.0 m below ground level.

One of the biggest problems for the installation contractor is of obtaining an earth resistance of, say, one ohm or less in an area of high soil resistivity. Unfortunately, there is no magical solution. However, several options are available to the contractor in the form of soil conditioning agents.

2.9 Soil-Conditioning Agents

Introducing a soil conditioning agent into the ground can reduce the soil resistivity and hence reduce the earth resistance.

There are various agents available, the choice of any particular one will depend on the type of earth required – temporary or permanent; the locality; the condition of the soil, etc.

As previously mentioned moisture forms an important part in obtaining a low soil resistivity value and it is the impurities in the water that produce this. One way of reducing the soil resistivity is to pour chemical solutions i.e.: copper sulphate; sodium carbonate; calcium sulphate, over the local area and allow it to migrate through the soil. The disadvantage of this is the large volume of solutions required, which makes it a cumbersome and time-consuming exercise. Also chemicals will eventually leach out of the local soil, returning it to its original high resistivity. Dissolving chemicals into the soil is also likely to encourage corrosion of the earth electrode. Hence the reason for the British Standard Code of Practice 7430 on Earthing and BS6651 Protection of Structures against Lightning – not recommending the use of a salt as a means of reducing the soil resistivity.

Other soil-conditioning are available including Bentonite and Marconite.

Bentonite is used as an earth-electrode back-fill to reduce soil resistivity by retaining moisture. The clay consists largely of sodium montmorillonite, which when mixed with water sells to many times its dry volume. It has the ability to hold its moisture content for a considerable period of time and to absorb moisture from the surrounding soil (e.g. from rainfall).

Marconite is a conductive carbonaceous aggregate which when mixed with conventional cement, effectively increases the surface area of the earth-electrode, thus lowering its earth resistance. Ideal for use on sub-stations and transmission/distribution networks or in hot, dry climates, and also has electromagnetic screening and anti-static flooring applications.

Both products have applications with deep-driven electrodes. The ground/soil in question can be drilled using a portable drill rig, transported to the site. Significant depths can be reached depending on the type of ground.

The electrode assembly can then be inserted into the pre-drilled hole and back-filled with Bentonite or Marconite, or any other appropriate conditioning agent.

It is vital with any earthing system that regular inspection is carried out for possible damage. Regular checks on earth electrode resistance to ensure optimum protection are advised.

The key to arriving at a successful earthing electrode system is not to sacrifice quality for cost. Many products currently on the market fall far short of the recommended standards. BS 7430: 1991 Code or Practice for Earthing contains recommendations for material specification to ensure components are corrosion-resistant and provide adequate mechanical strength.

The correct choice of material and installation should ensure a life span of 30 years for the earth electrode.

2.10 Earthing – Lightning Protection Systems

There are two stages in testing an earth network for satisfactory resistance.

1) An earth electrode should be connected to each down conductor with a test link incorporate into every down conductor path.

   With the test link removed and without any bonding to other services, etc, the earth resistance of each individual earth electrode should be measured. The resistance, in ohms, should not exceed ten times the number of down conductors on the structure. For example, if there are fifteen down conductors equally spaced around a building, then the resistance of each electrode with the test link removed should not exceed 10 x 15 = 150 ohms.

2) With the test links replaced the resistance to earth of the complete lightning protection system is measured at any point on the system. The reading from this test should not exceed ten ohms. This is still without any bonding to other services.

BS 6651 provides a guide to the minimum dimensional requirements of various electrode systems. For example, where earth rods are chosen, the minimum combined rod length to complete an earth electrode system should be 9 metres – therefore a small structure with only two down conductors would have a minimum requirement of 4.5 metres for each electrode. Each local earth rod electrode should be a minimum length of 1.5 metres.

It must be remembered that this dimensional requirement does not effect, in any way, the need to obtain the satisfactory earth resistance values mentioned in (1) and (2) above.

3.0 BONDING

All metal work on or around a structure must be bonded to the lightning protection system if side-flashing is to be avoided. When a lightning protection system is struck, its electrical potential with respect to earth is significantly raised and, unless suitable precautions are taken, the discharge may seek alternative paths to earth by side-flashing to other metal-work in or on the structure.

Typically, water pipes, gas pipes, metal sheaths and electrical installations which are in contact with earth, remain at earth potential during a lightning discharge. Even metal parts that are not in contact with earth will see a potential difference between them and the lightning protection system during a discharge, even if this potential is smaller in magnitude to the metal parts in direct contact with earth.

It is vital that all exposed metal work is bonded into the lightning protection installation.

There are two ways of preventing side-flashing. The first is to isolate nearby metal from the lightning protection system. So, even if a strike occurs, the clearance distance between the metalwork and the lightning protection system would be so great that the strike would prefer to follow the lightning protection path rather than jump across to the metal work. Obviously, this will not be practical for certain fixed metal installations, for example central heating systems or metal windows. In these cases, the second method of preventing side-flashing has to be considered, that of connecting the metal work to the lightning protection system with an appropriate bond.

To determine whether the distance between the suspect metal work and the lightning protection system is large enough for the metal work to be considered ‘isolated’ or close enough to be ‘bonded’ BS 6651 provides a mathematical means of determining the minimum isolation distance for a given set of parameters.

Simple formulae are used in conjunction with two curves to evaluate the minimum isolation distance required between the suspect metalwork and the lightning protection system. If the figure obtained, with the given set of parameters, results in, say, a separation distance, of 2m, then if the actual gap is less than 2m, bonding is required. If the gap is greater then 2m, then isolation is sufficient, and no bonding is required.

BS6651 also provides specific recommendations for protecting buildings which contain explosives or highly flammable contents, dwelling houses/domestic properties, fences, trees and structures near trees, structures with radio and television aerials and a whole range of other miscellaneous structures including tents, sports stadiums, bridges, etc.

The code also mentions that internal bonds can be half the cross sectional area of external bonds as they are, at most, only likely to carry a proportion of the total lightning current.

3.1 Corrosion

As mentioned earlier the correct choice of materials for a lightning protection system is vital. Metal fittings must be compatible with the metal or metals used externally on the structure over which the system passes or with which it may be in contact.

Aluminium and copper, the two metals most commonly used in lightning, protection systems, are not compatible, so great care must be taken when both are used in a system – particularly where they come into contact with each other.

If aluminium is selected as the material for air termination networks and down conductors, it has to be connected to copper at or around the test clamp. This connection should be positioned at he beginning of the earth termination network. This is because both BS 6651 and the Earthing Code BS 7430 do not permit aluminium to be buried underground.

Simple and effective means of joining aluminium and copper conductors in one connector do exist. Ingots of high purity copper and aluminium are friction welded together forming an effective electrical and mechanically robust joint. This termination, if used in conjunction with contax inhibitor grease minimises the effect of corrosion.

The contact surfaces of dissimilar metals should be kept completely dry and protected against the ingress of moisture, otherwise corrosion will occur. A particularly effective means of excluding moisture is to use inhibitor pastes, bitumastic paint, or approved protective wrappings.

As aluminium is prone to corrosion when in contact with Portland cement and mortar mixes, aluminium conductors need to be fixed away from the offending surface with an appropriate fixing.

Earth conductors between the test clamp(s) and earth electrodes should be protected against corrosion where they enter the ground for a distance of 0.3m above and below ground level. This can be achieved by using PVC protective sleeving.

4.0 LIGHTNING PROTECTION DESIGN

For a well-designed lightning protection system, the following information will be required:

1. Drawings of the structure requiring protection, showing the roof plan and at least two elevations. These drawings should be clear, precise and have the scale shown.

2. The materials used in the construction of the structure should be stated along with information on the type of fixings permissible (e.g. can the roof be drilled to take screw plugs).

3. For what purpose is the structure being used? (i.e. its use will determine the risk category of the structure).

4. The proximity of other structures, trees and its general locality.

5. Information regarding any unusual features such as aerial masts on the roof of buildings, which may not be shown on the drawings.

6. At what stage of construction is the structure (i.e. complete, partly built, etc).

7. Notification of code that the scheme is to be designed to e.g. BS 6651 (1992).

8. Is there any soil resistivity data available?

5.0 EARTHING SYSTEM DESIGN

General statements regarding earthing have been made earlier. This Section however is specifically aimed at assisting with earth electrode calculations – whether they be for a simple power earth, or for a more complex design, say a high voltage sub-station.

5.1 Why do we require an Earth?

The function of an earth system for an electrical installation can be split into three broad bands:

i) To limit the potential of any part of the installation to a pre-determined value with respect to the general mass of earth.

ii) To permit the flow of current in the event of a fault to earth so that the protective equipment has time to operate and thus isolate the faulty circuit.

iii) To ensure that, if a fault occurs, non current carrying metalwork associated with the equipment does not attain a dangerous potential respect to the general mass of earth.

Points (i) and (ii) are normally essential to the security of the system, and are generally known as system earthing.

Point (iii) is aimed at ensuring safety of humans, animals and property and is sometimes known as equipment earthing.

5.2 How do we choose our Earth Electrode System?

Having determined that there is an earthing requirement, how do we go about deciding what type of earth electrode we should use? The previous chapter elaborated the various types of earth termination networks available, and their differing properties are a major consideration. However, the most significant factor that will govern our choice is the ground itself. A borehole survey of the ground where the earthing is to be installed will indicate whether rock is present and at what depth, a factor that will not only affect the electrical consideration but will also have a direct bearing on installation costs. The information required by the earth electrode designer, however, is the resistivity of the soil: that value of "rho" that will enable him to calculate the earth resistance – i.e. the resistance of the soil to the passage of electric current.

Compared to a length of copper conductor the soil or earth could be regarded as a relatively poor conductor of electricity; for example, the resistivity of copper is 1.72×10^{-8} ohm metres, whereas chalk in Norfolk might register a value of 100 ohm metres. In reality, however, the earth's enormous mass, and, hence, its large cross-sectional area for the current path, gives it quite a low resistance, i.e. – the earth is, in fact, a good conductor. Since soil strata differs significantly from country to country, or even from site to site, it is not possible to be specific about the correct choice of earth electrode system without carrying out a detailed soil resistivity survey.

5.3 Soil Resistivity Measurements

A technique for measuring the earth's resistivity was proposed by the American, Dr. Frank Wenner, in a scientific paper published in 1915. Since that time it has been universally accepted as the most popular method to employ.

The Wenner method gives the average resistivity of the soil between ground level and a given depth. Using this method, Furse site surveys measure the soil resistivity of various depths up to a minimum of 20 metres. This enables the plotting of a soil resistivity v. depth graph to reveal the optimum earth electrode system and where in the soil-strata it should be located.

5.4 Earthing Design

If the objective is to achieve a desired resistance to earth for a particular installation, e.g. one ohm, then formulae given in BS 7430 (1991) can be used to calculate the required amount of electrodes. If the earthing requirements are more comprehensive, for instance achieving a stipulated resistance to earth and also addressing the problems associated with step and touch voltages, then an internationally accepted standard such as IEEE standard 80 (1986) – Guide for Safety in AC Substation Grounding, should be employed. Other nationally recognised standards on earthing may be used to calculate the earth electrode requirements, but most design efforts concentration BS7430 and IEEE80.

For BS 7430 systems the resistance values are calculated to allow the Designer simply to select the 'bill of quantities' which gives his required resistance. IEEE80 designs include a schematic drawings representing the earth grid layout; from this, accurate site installation drawings can then be produced.

PART H:

BILLS OF QUANTITIES AND SCHEDULE OF UNIT RATES

PART H: BILLS OF QUANTITIES AND SCHEDULE OF UNIT RATES

CONTENTS:

BILLS OF QUANTITIES

1. General Note to Tenderers

1.1 The total of the prices in the summary of prices shall include for the whole of the Contract works in accordance with the specifications as defined before and shall be carried forward to Form of Tender.

1.2 Any prices omitted from any item, section or part of the price schedule shall be deemed to have included in another item, section or part.

1.3 The prices shall include for all obligations under the Contract including and not limited to:

a) Supply of any materials, equipment, apparatus, fittings, spares and tools

b) Insurance

c) Clearing and forwarding

d) Delivery, handling and storage at site

e) Packing for storage

f) Replacing any defective or damaged item

g) Installation

h) Testing

i) Painting

j) Commissioning

k) Maintenance during the defects liability period

1.4 The unit rates shall include import duty and VAT where applicable, and shall be expressed in Kenya Shillings.

1.5 Any tenderer whose firm uses the title “Engineer” or “Engineering” must provide evidence of registration of at least one of the directors by the Engineers Registration Board of Kenya to avoid disqualification.

1.6 Any tenderer who fails to price the General items will be deemed to have allowed 5% of his tender price to cover these items, i.e. 5% of the total tender price will be deducted as preliminaries, if the tenderer does not enter specific prices against items of preliminary.

1.7 The Sub-contractor is instructed to read all the pages, and all the items of the Bills of Quantities very carefully. Should there be an apparent omission of words or figures, or should the sub-contractor be in doubt about the precise meaning of any word or figures, or for any reason whatsoever feel more clarification is necessary, either in the drawings or Bills of Quantities, to facilitate reasonable pricing of the tender document, he should inform the engineer at once so that the correct interpretation or clarification may be given before tendering. No liability will be accepted on mistakes and/or omissions which should have been corrected in the format above.

1.8 The specification should be priced in Kenya Currency i.e Shillings and cents.

1.9 The following meanings/interpretations shall be attached:-

. **Lighting Point:**	"Install a lighting point complete with concealed diameter 20mm H.G PVC conduit, conduit couplers, box, wiring in 3x1.5mm^2 SC-PVC-CU cables and all accessories, but excluding the light switch".
. **Socket Outlet:**	"Install 13A power outlet comprising concealed diameter 20mm H.G PVC conduit, conduit couplers, box, ring main wiring in 6x2.5mm^2 SC-PVC-CU cables and all accessories including 13A switched socket". All socket outlets must have safety shutters on both live and neutral.
. **Telephone Point:**	"Install telephone cord outlet point complete with telephone jack-plug, concealed diameter 25mm H.G PVC conduit box, and draw wire." All Telephone outlets must have continuous diameter 25mm links throughout respective buildings.
. **20A DP Outlet:**	"Install outlet for 20A DP switch comprising concealed diameter 25mm H.G PVC conduit, wiring in 3x4.0mm^2 SC-PVC-CU cables, box, 20A DP switch with neon light and all accessories".
. **Electric Door Lock:**	"Install an outlet for electric door lock comprising concealed diameter 20mm H.G PVC conduit box, wiring in 3x2.5mm^2 SC-PVC-CU cables, and all accessories including flush mounted electric door lock as YALE, or approved equivalent, (supplied with a key for use when power fails) complete with an integral transformer, and wired to, and complete with, a spring-loaded 5A switch marked “press”. The two electric door locks in the “Air-lock” shall be wired so that both CAN NOT be opened at the same time.
. **Fire Alarm Point:**	"Install outlet for fire alarm sensor/sounder comprising concealed 20mm H.G PVC conduit, box, wiring in 3x2.5mm^2 "Firetuff" cables and all accessories". All fire alarm points must be inter-linked with diameter 20mm conduits.
. **Consumer Unit:**	"Supply and install SP/N power consumers unit, complete with SP/N integral isolator".
. **Distribution Board:**	"Supply and install TP/N power distribution board, complete with TP/N integral isolator."
. **Main Switchboard:**	Supply and install main switchboard free standing complete with all switchgear, as per schematics shown.
. Meterboards:	Supply and install metal clad meterboards C/W all switchgear.
. **Earthing:**	"Protective multiple earthing to Kenya Power and Lighting Co. standards, comprising 1200mm deep-driven pure electrolytic copper earth electrode, electrode clamps, 16mm^2 yellow/green earth lead, earth pit complete with cover and all accessories".
. **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: 4x16mm^2 SOURCE: DB.1"

. **Blanking Plates:** "Supply and install blanking plates in all the spare ways."

. **Switched Spur Outlet:** Install 13A fused switched spur outlet with neon light and 5A integral fuse, complete with concealed diameter 20mm H.G PVC conduit, box, wiring in 6x2.5mm^2 ring main wiring for computer power supply and all accessories."

. **Cooker outlet:** Install 45A DP cooker control unit, complete with twin metal box, concealed 25mm H.G PVC conduit, box, wiring in 3x6.0mm^2 SC-PVC-CU cables and all accessories including 45A DP cooker control unit, with an integral socket, neon lights, and cooker connector unit.

1.10 Unless specifically stated otherwise, all light fittings will be as Thorn manufacture. All power accessories, sockets, telephone outlets, TV outlets, distribution boards/consumer units, switches, spur outlets etc must either be Crabtree, MK or Merlin Gerin. Approved equivalent makes may be accepted subject to the engineer's prior approval.

1.11 The Sub-contract is for supplying, delivering, fixing/installing, testing, commissioning and setting to work to the full satisfaction of the Engineer/Architect and the Sub-contractor's price must include all cost for the entire process.

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

1.13 The installation shall be carried out strictly in accordance with the provision of the 16th Edition of Wiring Regulation as published by the Institution of 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.

1.14 The Sub-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 Sub-contractors own cost.

1.15 The sub-contractors shall be solely responsible for the correct and accurate ordering of materials in accordance with the drawings and Bills of Quantities.

1.16 No claims on advance payment and/or materials off-site will be allowed unless the sub-contractor advances valid reasons acceptable to the employer. Should a claim on advance payment be allowed, the sub-contractor will be required to submit an Advance Payment Bond for the full value claimed.

1.17 The sub-contractor shall strictly follow the Main Contractor's programme of works and (the sub-contractor) must ensure that at no time does his activities cause delays to the Main Contractor.

1.18 This is a fixed price sub-contract, and the sub-contractor is expected to allow (in his unit rates) for generous fore-casts on fluctuations.

1.19 The Bills of Quantities shall be read in conjunction with Notes to All Tenderers, Preliminaries, General Specifications, Particular Specifications and all the relevant drawings.

1.20 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 sub-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.

1.21 The whole cost of complying with provisions of the sub-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.

1.22 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 sub-contract document shall be made before entering prices against each item in the priced Bills of Quantities.

1.23 Provisional sums and contingencies included and so designated in the Bills of Quantities shall be expended in whole or in part at the direction and discretion of the Engineer.

1.24 Errors in pricing will be corrected by the Employer for any arithmetic errors in computation or summarization as follows:-

a) Where there is a descrepancy between amounts in figures and amounts in words, the amount in words will govern.
b) Where there is discrepancy between the unit rate and the total amount derived from the multiplication of the unit price and the quantity, the unit rate quoted will govern unless in the opinion of the employer, 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.

1.25 Other than ceiling mounted fixtures, accessories, light fittings etc, all the other mounting heights will be re-confirmed with the Engineer/Architect on site.

1.26 All light fittings must be complete with appropriate lamps, bulbs, tubes, starters, control gear etc as applicable. Where a light fitting has multiple lamps, tubes, bulbs, each lamp/tube/bulb must have its own separate choke/starter/p.f. correction capacitor/control gear etc.

2 Statement of Compliance

a) I confirm compliance of all clauses of the General Conditions, General Specifications, Particular Specifications, Technical Specifications in this tender.

b) I confirm I have not made and will not make any payment to any person, which can be perceived as an inducement to win this tender.

Signed: …….for and on behalf of the Tenderer

Date: ……..

Official Rubber Stamp: ……

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 1 – BASEMENT AND GROUND FLOORS

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Supply, install, test, commission and set to work the following. All lighting fittings to be complete with lamp, control gear etc as applicable.				
1.1	**Lighting**				
1.1.1	Lighting point 1-way switched.	124	No.		
1.1.2a)	Lighting point 2-way switched.	44	No.		
1.1.2b)	Lighting point 2-way switched with intermediate switch.	12	No.		
1.1.3	10 A white moulded switch plates as MK or Crabtree: -				
	(a) 1-gang 1-way	8	No.		
	(b) 1-gang 2-way	6	No.		
	(c) 2-gang 1-way	4	No.		
	(d) 2-gang 2-way	6	No.		
	(e) 1-gang intermediate	1	No.		
1.1.4	Install permanent "DANGER" 415V labels where groups of switches have been fed by more than one phase.	3	No.		
1.1.5	Lighting fittings, complete with lamps of specified wattage and appropriate colour rendering: -				
1.1.5a)	600x600mm 4x18W HPF fully recessed fluorescent fitting with highly polished reflectors and lourvres as THORN Cat No EFQTS 418, or approved equivalent.	82	No.		
1.1.5b)	As item No. 1.1.5 (a) above but emergency version as THORN Cat No EFQTS 418.E, or approved equivalent.	40	No		
1.1.5c)	100W surface mounted Tungsten bulkhead fitting as Thorn Cat. No. OLG 1100, or approved equivalent, complete with a PL 26 "White" lamp.	1	No		
1.1.5d)	160mm diameter fully recessed downlighter as THORN Corsa160T Cat No COR160 2H126 Cat2, or approved equivalent.	12	No		
1.1.5e)	18 W opal glass finished with chrome trim detail decorative wall bracket as Thorn Venette.	2	No.		
1.1.5f)	2 x 36W 1200mm HPF fluorescent fitting with plastic diffuser to IP 65 as Thorn Cat. No. PPD236	12	No		
1.1.5g)	8W maintained Exit Emergency Light as Thorn Cat. No. EFVM3/ICEL, or approved equivalent. Minimum 3-hour autonomy	3	No		
	Total C/F to Page H9				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 1 – BASEMENT AND GROUND FLOORS

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total B/F from Page H8				
1.1.5h)	16W 2D shallow plastic light fitting as Thorn super club Cat. No. 2D CL16W complete with lamp	20	No.		
1.1.5i)	1 x 18W HPF fluorescent batten fitting with plastic diffuser as Thorn PPD 118 or approved equivalent.	8	No.		
1.2.0	**Power Supply**				
1.2.1a)	8-way TP/N power distribution board complete with 125A TP/N integral isolator and all accessories including lockable cover. The Distribution Board to be as Crabtree or Multi-9, or approved equivalent.	1	No		
1.2.1b)	4C 25mm^2 PVC/SWA/PVC cable, copper	60	m.		
1.2.1c)	Cable glands for the above	2	No.		
1.2.1d)	Cable lugs for the above complete with hydraulic crimping	8	No.		
1.2.2a)	SP MCB the boards above	21	No.		
1.2.2b)	Blanking plates for un-used spare ways.	3	No.		
1.2.2c)	Earthing for the boards above.	Lot			
1.3.1	300 x 50mm 3-compartment angle trunking to details shown, in 14-gauge galvanized steel sheet with cream powder coating finish to approved colour, complete with cover, screws, and all accessories.	120	m.		
1.3.2	300 x 50mm, factory-made corner-bends for the above trunking, in same material and colour finish.	20	No.		
1.3.3	Carry out bonding throughout the entire length of the above trunking in 6mm^2 green PVC insulated copper cable.		Item		
1.3.4	Twin-outlet plates on the trunking, same colour finish	32	No.		
1.3.5	Punched outlet plates on the trunking for data/telephone outlets.	16	No		
	Total C/F to Page H10				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 1 – BASEMENT AND GROUND FLOORS

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total B/F from Page H9				
1.3.6a)	Twin 13A non standard white socket outlets, with safety shutters on both live and neutral and with neon light for computer power supply, complete with wiring in 3x2.5mm^2 PVC-SC-CU cables inside the trunking. The socket outlets to be complete with unbreakable 13A fused non standard top plugs	16	No		
1.3.6b)	Additional non-standard top plugs for clients keeping	10	No		
1.3.6c)	Allow for terminating (flexible) computer power cables into non-standard top plugs	64	No		
1.3.6d)	Supply and install 5mm high permanent red trafollyte labels marked "UPS ONLY" for clean line power sockets	64	No		
1.3.7	Power pedestals complete with 4 No. twin normal socket outlets wiring in 6x2.5mm^2 PVC-SC-PVC cables, 4 No. twin nonstandard socket outlets for computer points with neon lights wiring in radial 3x2.5mm2 PVC-SC-PVC cables and 4 No. telephone/data outlet plates	12	No		
1.3.8	Twin standard 13A-socket outlet for normal power, wired in 6 x 2.5mm² SC-PVC-CU cables inside concealed conduits.	20	No		
1.3.9	As above but on trunking	14	No.		
1.3.10	Co-axial insulated TV outlet point complete with plate, and draw-wire.	1	No		
1.3.11	Complete TV aerial system to receive all local channels , comprising roof aerial roof with mounting, and 120m long coaxial cable for colour TV reception.(75 Ohms)	1	No		
1.4.0	Wall mounted purpose made MCCB type sub switchboard manufactured in 14SWG galvanised mild steel sheet and finished in cream (or appropriate colour) powder coating as shown on the schematic, complete with the following:				
(a)	1 No. 200A TP MCCB (adjustable in 150-200A range) main incomer.				
(b)	5 No. 250A TPN insulated copper bus bars of 40 x 10mm cross section.				
	Total C/F to Page H11				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 1 – BASEMENT AND GROUND FLOORS

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total B/F from Page H10				
(c)	5 No. 100A TPN MCCBs as shown, but adjustable in the range 80 –100A				
(d)	1 No. 63A TPN MCCBs as shown, but adjustable in the range 40 –63A				
(e)	3 No. spare capacity for future development all fitted with 100A MCCBs				
(f)	Sealable studs for all cover plate screws and all necessary accessories				
(g)	Carry out comprehensive labeling of all the bus bars, circuit breakers etc. of the board above, indicating the areas served, outgoing cable sizes etc.				
(h)	Comprehensive protective multiple earthing of the above board in 1200mm long 12mm diameter pure electrolytic copper earth rod deep driven to permanent moisture level, copper clamp. 50mm² green earth lead complete with all accessories. (Note: Use parallel rods if effective earthing cannot be achieved with 1 No. rod).	1	No		
1.4.1a)	Sub mains for the above board consisting 4C 95mm^2 PVC/SWA/PVC cable	80	m.		
1.4.1b)	Cable glands for the cable above	2	No.		
1.4.1d)	Cable lugs for the cable above, complete with hydraulic crimping	8	No.		
1.4.2	Allow for the transfer of all existing circuits and consumer units to the new MCCB type Switchboard.		Item		
1.4.3a)	Sub mains for the existing boards consisting 4C 35mm^2 PVC/SWA/PVC cable	80	m.		
1.4.3b)	Cable glands for the cable above	8	No.		
1.4.3d)	Cable lugs for the cable above, complete with hydraulic crimping	32	No.		
1.5.1	63A TP/N manual by-pass system for the UPS comprising 63A TP/N manual change-over switch, 3 No. 63A TP MCBs at input and output internal wiring and a common firmly bonded metallic enclosure made from 14 gauge cream powder coated galvanised steel sheets.	1	No		
1.5.2	5C 16mm^2 flexible PVC/PVC/copper cables	60	m		
	Total C/F to Page H12				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 1 – BASEMENT AND GROUND FLOORS

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total B/F from Page H11				
1.6.0a)	4-way TP/N power distribution board for clean line complete with 125A TP/N integral isolator and all accessories including lockable cover. The Distribution Board to be as Crabtree or Multi-9, or approved equivalent.	1	No		
1.6.0b)	SP MCB the boards above	10	No.		
1.6.0c)	Blanking plates for un-used spare ways.	2	No.		
1.6.0d)	Earthing for the board above.	Lot			
1.7.0a)	4C 16mm^2 PVC/SWA/PVC cable, copper	60	m.		
1.7.0b)	Cable glands for the cable above	2	No.		
1.7.0c)	Cable lugs for the cable above, complete with hydraulic crimping	8	No.		
1.7.1	Dia. 32mm HG PVC conduits buried in floor slab.	400	m.		
1.7.2.	Outlet point for hand drier comprising 20mm diameter conduit, wiring in 3 x 4.0 mm² SC-PVC-CU cables and all accessories including 20A DP switch with neon light as MK or Crabtree.	4	No		
1.7.3	Outlet for fire alarm points comprising concealed PVC conduit, box, wiring in 3 x 1.5mm² screened fire-proof cable as FIREPIX or approved equivalent, and all accessories.	50	No		
1.7.4a)	Outlet for air conditioning unit, comprising box concealed, HG PVC conduit, wiring in 3x4mm^2 SC-PVC-CU cables and all accessories including 20A DP switch with neon light.	22	No		
1.7.4b)	30A voltage switch for air-conditioning unit as Sollateck type AVS 30, wired to the A/C unit above	22	No		
Total for Bill No. 1– Basement and Ground Floors C/F to Summary Page					

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 2 – FIRST FLOOR – PARKING

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Supply, install, test, commission and set to work the following. All lighting fittings to be complete with lamp, control gear etc as applicable.				
2.1	**<u>Lighting</u>**				
2.1.1	Lighting point 1-way switched.	66	No.		
2.1.2	Lighting point 2-way switched.	Nil			
2.1.3	10 A white moulded switch plates as MK or Crabtree: -				
	(a) 20A 4gang grid switch with 4 no. 20A DP switches, rocker and cover as MK or approved equivalent.	2	No.		
2.1.4	Install permanent "DANGER" 415V labels where groups of switches have been fed by more than one phase.	3	No.		
2.1.5	Lighting fittings, complete with lamps of specified wattage and appropriate colour rendering: -				
2.1.5a)	Dust proof, jet proof, and corrosion resistant 2x58W, 1500mm HPF fluorescent fitting with plastic diffuser to IP 65 as THORN Cat No. FNDV 2065, or approved equivalent.	45	No.		
2.1.5b)	As above but full emergency version	19	No		
2.1.5c)	100W surface mounted Tungsten bulkhead fitting as Thorn Cat. No. OLG 1100, or approved equivalent, complete with a PL 26 "White" lamp.	1	No		
2.1.5d)	8W maintained Exit Emergency Light as Thorn Cat. No. EFVM3/ICEL, or approved equivalent. Minimum 3-hour autonomy.	1	No		
	Total C/F to Page H14				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 1 – FIRST FLOOR – PARKING

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total B/F from Page H13				
2.2.0	**<u>Power Supply</u>**				
2.2.0a)	8-way TP/N power distribution board complete with 125A TP/N integral isolator and all accessories including lockable cover. The Distribution Board to be as Crabtree or Multi-9, or approved equivalent.	1	No		
2.2.1a)	4C 25mm^2 PVC/SWA/PVC cables	50	m.		
2.2.1b)	Cable glands for the cable above	2	No.		
2.2.1c)	Cable lugs for the cable above	8	No.		
2.2.2d)	SP MCBs for the above board.	10	No.		
2.2.2e)	32A TP MCB in the boards above.	2	No.		
2.2.2f)	Blanking plates for un-used spare ways.	8	No.		
2.2.2g)	Earthing for the board above.	Lot			
2.3.1	13A metal clad twin socket outlet wired in 6x2.5mm^2 SC-PVC-CU cables inside 25mm diameter Class B galvanized steel conduits and complete with twin metal box. Socket outlet to be as MK Cat No. 2446 ALM or approved equivalent, complete with pilot light	18	No		
2.3.2	25mm Class B galvanized steel conduits, complete with coupler, saddles and all fixing accessories	300	m.		
2.3.3	450 x 450 x 300mm telephone draw-box with cover and screws, in 12-gauge galvanized steel.	1	No.		
2.3.4a)	Outlet for three phase isolator, comprising box, concealed 20mm diameter H/G PVC conduit, wiring in 5 x 6.0 mm² SC-PVC-CU cables and all accessories including 32A isolator.	2	No		
2.3.4b)	32A TPN local isolator as MK or approved equivalent.	2	No.		
2.3.5	Dia. 32mm HG PVC conduits buried in floor slab.	400	m.		
2.3.6	Outlet for fire alarm points comprising concealed PVC conduit, box, wiring in 3 x 1.5mm² screened fire-proof cable as FIREPIX or approved equivalent, and all accessories.	35	No		
Total for Bill No. 1 – First Floor – Parking C/F to Summary Page					

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 3 – SECOND FLOOR

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Supply, install, test, commission and set to work the following. All lighting fittings to be complete with lamp, control gear etc as applicable.				
3.1	**Lighting**				
3.1.1	Lighting point 1-way switched.	293	No.		
3.1.2a)	Lighting point 2-way switched.	80	No.		
3.1.2b)	Lighting point 2-way switched with intermediate switch.	40	No.		
3.1.3	10 A white moulded switch plates as MK or Crabtree: -				
	(a) 1-gang 1-way	38	No.		
	(b) 1-gang 2-way	12	No.		
	(c) 2-gang 1-way	8	No.		
	(d) 2-gang 2-way	6	No.		
	(e) 1-gang intermediate	3	No.		
	(f) 3-gang 1-way	2	No.		
3.1.4	Install permanent "DANGER" 415V labels where groups of switches have been fed by more than one phase.	6	No.		
3.1.5	Lighting fittings, complete with lamps of specified wattage and appropriate colour rendering: -				
3.1.5a)	600x600mm 4x18W HPF fully recessed fluorescent fitting with highly polished reflectors and lourvres as THORN Cat No EFQTS 418, or approved equivalent.	302	No.		
3.1.5b)	As item No. 3.1.5 (a) above but emergency version as THORN Cat No EFQTS 418.E, or approved equivalent.	103	No		
3.1.5c)	100W surface mounted Tungsten bulkhead fitting as Thorn Cat. No. OLG 1100, or approved equivalent, complete with a PL 26 "White" lamp.	1	No		
3.1.5d)	8W maintained Exit Emergency Light as Thorn Cat. No. EFVM3/ICEL, or approved equivalent. Minimum 3-hour autonomy	5	No		
3.1.5e)	2 x 36W 1200mm HPF fluorescent fitting with plastic diffuser to IP 65 as Thorn Cat. No. PPD236	2	No		
	Total C/F to Page H16				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 3 – SECOND FLOOR

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total B/F from Page H15				
3.2.0	**<u>Power Supply</u>**				
3.2.0a)	12-way TP/N power distribution board complete with 125A TP/N integral isolator and all accessories including lockable cover. The Distribution Board to be as Crabtree or Multi-9, or approved equivalent.	2	No		
3.2.0b)	As above but 8 Ways	1	No		
3.2.0c)	As above but 6 Ways	1	No		
3.2.1a)	4C 35mm^2 PVC/SWA/PVC cable, copper	140	m.		
3.2.1b)	4C 25mm^2 PVC/SWA/PVC cable, copper	140	m.		
3.2.1c)	Cable glands for the cable in 3.2.1a)	4	No.		
3.2.1d)	Cable lugs for the cable in 3.2.1a), complete with hydraulic crimping	16	No.		
3.2.1e)	Cable glands for the cable in 3.2.1 b)	4	No.		
3.2.1f)	Cable lugs for the cable in 3.2.1 b), complete with hydraulic crimping	16	No.		
3.2.2a)	SP MCB the boards above	73	No.		
3.2.2b)	Blanking plates for un-used spare ways.	41	No.		
3.2.2c)	Earthing for the boards above.	Lot			
3.3.1	300 x 50mm 3-compartment angle trunking to details shown, in 14-gauge galvanized steel sheet with cream powder coating finish to approved colour, complete with cover, screws, and all accessories.	850	m.		
3.3.2	300 x 50mm, factory-made corner-bends for the above trunking, in same material and colour finish.	84	No.		
3.3.3	Carry out bonding throughout the entire length of the above trunking in 6mm^2 green PVC insulated copper cable.		Item		
	Total C/F to Page H17				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 3 – SECOND FLOOR

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total B/F from Page H16				
3.3.4	Twin-outlet plates on the trunking, same colour finish	256	No.		
3.3.5	Punched outlet plates on the trunking for data/telephone outlets.	128	No		
3.3.6a)	Twin 13A non standard white socket outlets, with safety shutters on both live and neutral and with neon light for computer power supply, complete with wiring in 3x2.5mm^2 PVC-SC-CU cables inside the trunking. The socket outlets to be complete with unbreakable 13A fused non standard top plugs	128	No		
3.3.6b)	Additional non-standard top plugs for clients keeping	30	No		
3.3.6c)	Allow for terminating (flexible) computer power cables into non-standard top plugs	188	No		
3.3.6d)	Supply and install 5mm high permanent red trafollyte labels marked "UPS ONLY" for clean line power sockets	188	No		
3.3.7	Power pedestals complete with 4 No. twin normal socket outlets wiring in 6x2.5mm^2 PVC-SC-PVC cables, 4 No. twin nonstandard socket outlets for computer points with neon lights wiring in radial 3x2.5mm2 PVC-SC-PVC cables and 4 No. telephone/data outlet plates	15	No		
3.3.8	Twin standard 13A-socket outlet for normal power, wired in 6 x 2.5mm² SC-PVC-CU cables inside concealed conduits.	20	No		
3.3.9	As above but on trunking	128	No.		
3.3.10	Co-axial insulated TV outlet point complete with plate, and draw-wire.	9	No		
3.3.11	Complete TV aerial system to receive all local channels , comprising roof aerial roof with mounting, and 120m long coaxial cable for colour TV reception.(75 Ohms)	8	No		
3.4.0	Wall mounted purpose made MCCB type sub switchboard manufactured in 14SWG galvanised mild steel sheet and finished in cream (or appropriate colour) powder coating as shown on the schematic, complete with the following:				
(a)	1 No. 200A TP MCCB (adjustable in 150-200A range) main incomer..				
	Total C/F to Page H18				

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total B/F from Page H17				
(b)	5 No. 250A TPN insulated copper bus bars of 40 x 10mm cross section.				
(c)	4 No. 100A TPN MCCBs as shown, but adjustable in the range 80 –100A				
(d)	1 No. 125A TPN MCCBs as shown, but adjustable in the range 100 –125A				
(e)	3 No. spare capacity for future development all fitted with 100A MCCBs				
(f)	Sealable studs for all cover plate screws and all necessary accessories				
(g)	Carry out comprehensive labeling of all the bus bars, circuit breakers etc. of the board above, indicating the areas served, outgoing cable sizes etc.				
(h)	Comprehensive protective multiple earthing of the above board in 1200mm long 12mm diameter pure electrolytic copper earth rod deep driven to permanent moisture level, copper clamp. 50mm² green earth lead complete with all accessories. (Note: Use parallel rods if effective earthing cannot be achieved with 1 No. rod).	1	No		
3.4.1a)	Sub mains for the above board consisting 4C 95mm^2 PVC/SWA/PVC cable	40	m.		
3.4.1b)	Cable glands for the cable above	2	No.		
3.4.1d)	Cable lugs for the cable above, complete with hydraulic crimping	8	No.		
3.5.0	Allow for the transfer of all existing circuits and consumer units to the new MCCB type Switchboard.		Item		
3.5.1	125A TP/N manual by-pass system for the UPS comprising 125A TP/N manual change-over switch, 3 No. 125A TP MCBs at input and output internal wiring and a common firmly bonded metallic enclosure made from 14 gauge cream powder coated galvanised steel sheets.	1	No		
3.5.2	5C 35mm^2 flexible PVC/PVC/copper cables	60	m		
3.6.0a)	4-way TP/N purpose made power distribution board for clean line complete with 125A TP/N integral isolator and all accessories including lockable cover. The Distribution Board to be as Crabtree or Multi-9, or approved equivalent.	1	No		
	Total C/F to Page H19				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 3 – SECOND FLOOR

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total B/F from Page H18				
3.6.0b)	TP MCB the boards above	2	No.		
3.6.0c)	DP MCB the boards above	2	No.		
3.6.0d)	Blanking plates for un-used spare ways.	4	No.		
3.6.0e)	Earthing for the board above.	Lot			
3.6.1a)	6-way TP/N power distribution board for clean line complete with 125A TP/N integral isolator and all accessories including lockable cover. The Distribution Board to be as Crabtree or Multi-9, or approved equivalent.	2	No		
3.6.1b)	8-way SP/N power distribution board for clean line complete with 100A SP/N integral isolator and all accessories including lockable cover.	2	No		
3.6.1c)	SP MCB the boards above	40	No.		
3.6.1d)	Blanking plates for un-used spare ways.	12	No.		
3.6.1e)	Earthing for the board above.	Lot			
3.7.0a)	4C 16mm^2 PVC/SWA/PVC cable, copper	80	m.		
3.7.0b)	Cable glands for the above cable	4	No.		
3.7.0c)	Cable lugs for the above cable, complete with hydraulic crimping	16	No.		
3.7.1	2x16mm^2 +1x 10mm^2 SC PVC Cu cables	80	M		
3.7.2	Dia. 32mm HG PVC conduits buried in floor slab.	400	m.		
3.7.3	Outlet for fire alarm points comprising concealed PVC conduit, box, wiring in 3 x 1.5mm² screened fire-proof cable as FIREPIX or approved equivalent, and all accessories.	116	No		
3.8.0a)	Outlet for air conditioning unit, comprising box concealed, HG PVC conduit, wiring in 3x4mm^2 SC-PVC-CU cables and all accessories including 20A DP switch with neon light.	9	No		
3.8.0b)	30A voltage switch for air-conditioning unit as Sollateck type AVS 30, wired to the A/C unit above	9	No		
	Total for Bill No. 3– Second Floor C/F to Summary Page				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 4 – THIRD FLOOR

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Supply, install, test, commission and set to work the following. All lighting fittings to be complete with lamp, control gear etc as applicable.				
4.1	**Lighting**				
4.1.1	Lighting point 1-way switched.	119	No.		
4.1.2	Lighting point 2-way switched.	60	No.		
4.1.3	5 A white moulded switch plates as MK or Crabtree: -				
	(a) 1-gang 1-way	8	No.		
	(b) 1-gang 2-way	2	No.		
	(c) 2-gang 1-way	8	No.		
	(d) 2-gang 2-way	6	No.		
	(e) 4-gang 1-way	1	No.		
4.1.4	Install permanent "DANGER" 415V labels where groups of switches have been fed by more than one phase.	4	No.		
4.1.5	Lighting fittings, complete with lamps of specified wattage and appropriate colour rendering: -				
4.1.5a)	600x600mm 4x18W HPF fully recessed fluorescent fitting with highly polished reflectors and lourvres as THORN Cat No EFQTS 418, or approved equivalent.	112	No.		
4.1.5b)	As item No. 4.1.5 (a) above but emergency version as THORN Cat No EFQTS 418.E, or approved equivalent.	59	No		
4.1.5c)	100W surface mounted Tungsten bulkhead fitting as Thorn Cat. No. OLG 1100, or approved equivalent, complete with a PL 26 "White" lamp.	1	No		
4.1.5d)	8W maintained Exit Emergency Light as Thorn Cat. No. EFVM3/ICEL, or approved equivalent. Minimum 3-hour autonomy	4	No		
4.1.5e)	2 x 36W 1200mm HPF fluorescent fitting with plastic diffuser to IP 65 as Thorn Cat. No. PPD236	3	No		
	Total C/F to Page H21				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 4 – THIRD FLOOR

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total B/F from Page H20				
4.2.0	**<u>Power Supply</u>**				
4.2.0	8-way TP/N power distribution board complete with 125A TP/N integral isolator and all accessories including lockable cover. The Distribution Board to be as Crabtree or Multi-9, or approved equivalent.	2	No		
4.2.1a)	4C 35mm^2 PVC/SWA/PVC cable, copper	120	m.		
4.2.1b)	Cable glands for the cable above	4	No.		
4.2.1c)	Cable lugs for the cable above complete with hydraulic crimping	16	No.		
4.2.2a)	SP MCB the boards above	27	No.		
4.2.2b)	Blanking plates for un-used spare ways.	21	No.		
4.2.2c)	Earthing for the boards above.	Lot			
4.3.1	300 x 50mm 3-compartment angle trunking to details shown, in 14-gauge galvanized steel sheet with cream powder coating finish to approved colour, complete with cover, screws, and all accessories.	200	m.		
4.3.2	300 x 50mm, factory-made corner-bends for the above trunking, in same material and colour finish.	60	No.		
4.3.3	Carry out bonding throughout the entire length of the above trunking in 6mm^2 green PVC insulated copper cable.		Item		
4.3.4	Twin-outlet plates on the trunking, same colour finish	70	No.		
4.3.5	Punched outlet plates on the trunking for data/telephone outlets.	35	No		
4.3.6a)	Twin 13A non standard white socket outlets, with safety shutters on both live and neutral and with neon light for computer power supply, complete with wiring in 3x2.5mm^2 PVC-SC-CU cables inside the trunking. The socket outlets to be complete with unbreakable 13A fused non standard top plugs	35	No		
4.3.6b)	Additional non-standard top plugs for clients keeping	15	No		
	Total C/F to Page H22				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 4 – THIRD FLOOR

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total B/F from Page H21				
4.3.6c)	Allow for terminating (flexible) computer power cables into non-standard top plugs	83	No		
4.3.6d)	Supply and install 5mm high permanent red trafollyte labels marked "UPS ONLY" for clean line power sockets	83	No		
4.3.7	Power pedestals complete with 4 No. twin normal socket outlets wiring in 6x2.5mm^2 PVC-SC-PVC cables, 4 No. twin nonstandard socket outlets for computer points with neon lights wiring in radial 3x2.5mm2 PVC-SC-PVC cables and 4 No. telephone/data outlet plates	12	No		
4.3.8	Twin standard 13A-socket outlet for normal power, wired in 6 x 2.5mm² SC-PVC-CU cables inside concealed conduits.	17	No		
4.3.9	As above but on trunking	35	No.		
4.3.10	Co-axial insulated TV outlet point complete with plate, and draw-wire.	2	No		
4.3.11	Complete TV aerial system to receive all local channels , comprising roof aerial roof with mounting, and 120m long coaxial cable for colour TV reception.(75 Ohms)	2	No		
4.4.0	Wall mounted purpose made MCCB type sub switchboard manufactured in 14SWG galvanised mild steel sheet and finished in cream (or appropriate colour) powder coating as shown on the schematic, complete with the following:				
(a)	1 No. 200A TP MCCB (adjustable in 150-200A range) main incomer..				
	Total C/F to Page H23				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 4 – THIRD FLOOR

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total B/F from Page H22				
(b)	5 No. 250A TPN insulated copper bus bars of 40 x 10mm cross section.				
(c)	5 No. 100A TPN MCCBs as shown, but adjustable in the range 80 –100A				
(d)	3 No. spare capacity for future development all fitted with 100A MCCBs				
(e)	Sealable studs for all cover plate screws and all necessary accessories				
(f)	Carry out comprehensive labeling of all the bus bars, circuit breakers etc. of the board above, indicating the areas served, outgoing cable sizes etc.				
(g)	Comprehensive protective multiple earthing of the above board in 1200mm long 12mm diameter pure electrolytic copper earth rod deep driven to permanent moisture level, copper clamp. 50mm² green earth lead complete with all accessories. (Note: Use parallel rods if effective earthing cannot be achieved with 1 No. rod).	1	No		
4.4.1a)	Sub mains for the above board consisting 4C 95mm^2 PVC/SWA/PVC cable	80	m.		
4.4.1b)	Cable glands for the cable above	2	No.		
4.4.1d)	Cable lugs for the cable above, complete with hydraulic crimping	8	No.		
4.5.0	Allow for the transfer of all existing circuits and consumer units to the new MCCB type Switchboard.		Item		
4.5.1a)	Sub mains for the existing boards consisting 4C 25mm^2 PVC/SWA/PVC cable	80	m.		
4.5.1b)	Cable glands for the cable above	4	No.		
4.5.1d)	Cable lugs for the cable above, complete with hydraulic crimping	16	No.		
4.5.2	100A TP/N manual by-pass system for the UPS comprising 100A TP/N manual change-over switch, 3 No. 100A TP MCBs at input and output internal wiring and a common firmly bonded metallic enclosure made from 14 gauge cream powder coated galvanised steel sheets.	1	No		
4.5.3	5C 25mm^2 flexible PVC/PVC/copper cables	60	m		
	Total C/F to Page H24				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 4 – THIRD FLOOR

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total B/F from Page H23				
4.6.0a)	6-way TP/N power distribution board for clean line complete with 125A TP/N integral isolator and all accessories including lockable cover. The Distribution Board to be as Crabtree or Multi-9, or approved equivalent.	1	No		
4.6.0b)	DP MCB the boards above	2	No.		
4.6.0c)	Blanking plates for un-used spare ways.	4	No.		
4.6.0d)	Earthing for the board above.	Lot			
4.6.1a)	Sub mains consisting 4C 25mm^2 PVC/SWA/PVC cable	80	m.		
4.6.1b)	Cable glands for the cable above	2	No.		
4.6.1d)	Cable lugs for the cable above, complete with hydraulic crimping	8	No.		
4.6.2a)	Sub mains consisting 4C 16mm^2 PVC/SWA/PVC cable	120	m.		
4.6.2b)	Cable glands for the cable above	2	No.		
4.6.2d)	Cable lugs for the cable above, complete with hydraulic crimping	8	No.		
4.6.3a)	9-way SP/N power distribution board for clean line complete with 100A SP/N integral isolator and all accessories including lockable cover.	2	No		
4.6.3b)	SP MCB the boards above	15	No.		
4.6.3c)	Blanking plates for un-used spare ways.	3	No.		
4.6.3d)	Earthing for the board above.	Lot			
4.7.1	2x16mm^2 +1x 10mm^2 SC Cu cables	80	M		
4.7.2	Dia. 32mm HG PVC conduits buried in floor slab.	400	m.		
4.7.3	Outlet for fire alarm points comprising concealed PVC conduit, box, wiring in 3 x 1.5mm² screened fire-proof cable as FIREPIX or approved equivalent, and all accessories.	75	No		
	Total for Bill No. 4– Third Floor C/F to Summary Page				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 5 – FOURTH FLOOR

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Supply, install, test, commission and set to work the following. All lighting fittings to be complete with lamp, control gear etc as applicable.				
5.1	**Lighting**				
5.1.1	Lighting point 1-way switched.	269	No.		
5.1.2a)	Lighting point 2-way switched.	85	No.		
5.1.2b)	Lighting point 2-way switched with intermediate switch.	40	No.		
5.1.3	5 A white moulded switch plates as MK or Crabtree: -				
	(a) 1-gang 1-way	24	No.		
	(b) 1-gang 2-way	12	No.		
	(c) 2-gang 1-way	8	No.		
	(d) 2-gang 2-way	6	No.		
	(e) 1-gang intermediate	3	No.		
	(f) 3-gang 1-way	2	No.		
5.1.4	Install permanent "DANGER" 415V labels where groups of switches have been fed by more than one phase.	6	No.		
5.1.5	Lighting fittings, complete with lamps of specified wattage and appropriate colour rendering: -				
5.1.5a)	600x600mm 4x18W HPF fully recessed fluorescent fitting with highly polished reflectors and lourvres as THORN Cat No EFQTS 418, or approved equivalent.	256	No.		
5.1.5b)	As item No. 5.1.5 (a) above but emergency version as THORN Cat No EFQTS 418.E, or approved equivalent.	133	No		
5.1.5c)	100W surface mounted Tungsten bulkhead fitting as Thorn Cat. No. OLG 1100, or approved equivalent, complete with a PL 26 "White" lamp.	1	No		
5.1.5d)	8W maintained Exit Emergency Light as Thorn Cat. No. EFVM3/ICEL, or approved equivalent. Minimum 3-hour autonomy	4	No		
5.2.0	**Power Supply**				
5.2.0a)	12-way TP/N power distribution board complete with 125A TP/N integral isolator and all accessories including lockable cover. The Distribution Board to be as Crabtree or Multi-9, or approved equivalent.	1	No		
	Total C/F to Page H26				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 5 – FOURTH FLOOR

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total B/F from Page H25				
5.2.0b)	As above but 8 Ways	2	No		
5.2.1a)	4C 35mm^2 PVC/SWA/PVC cable, copper	80	m.		
5.2.1b)	4C 25mm^2 PVC/SWA/PVC cable, copper	120	m.		
5.2.1c)	Cable glands for the cable in 5.2.1a)	2	No.		
5.2.1d)	Cable lugs for the cable in 5.2.1a), complete with hydraulic crimping	8	No.		
5.2.1e)	Cable glands for the cable in 5.2.1 b)	4	No.		
5.2.1f)	Cable lugs for the cable in 5.2.1 b), complete with hydraulic crimping	16	No.		
5.2.2a)	SP MCB the boards above	54	No.		
5.2.2b)	Blanking plates for un-used spare ways.	18	No.		
5.2.2c)	Earthing for the boards above.	Lot			
5.3.1	300 x 50mm 3-compartment angle trunking to details shown, in 14-gauge galvanized steel sheet with cream powder coating finish to approved colour, complete with cover, screws, and all accessories.	500	m.		
5.3.2	300 x 50mm, factory-made corner-bends for the above trunking, in same material and colour finish.	100	No.		
5.3.3	Carry out bonding throughout the entire length of the above trunking in 6mm^2 green PVC insulated copper cable.		Item		
5.3.4	Twin-outlet plates on the trunking, same colour finish	156	No.		
5.3.5	Punched outlet plates on the trunking for data/telephone outlets.	78	No		
5.3.6a)	Twin 13A non standard white socket outlets, with safety shutters on both live and neutral and with neon light for computer power supply, complete with wiring in 3x2.5mm^2 PVC-SC-CU cables inside the trunking. The socket outlets to be complete with unbreakable 13A fused non standard top plugs	78	No		
5.3.6b)	Additional non-standard top plugs for clients keeping	20	No		
	Total C/F to Page H27				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 5 – FOURTH FLOOR

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total B/F from Page H26				
5.3.6c)	Allow for terminating (flexible) computer power cables into non-standard top plugs	202	No		
5.3.6d)	Supply and install 5mm high permanent red trafollyte labels marked "UPS ONLY" for clean line power sockets	202	No		
5.3.7	Power pedestals complete with 4 No. twin normal socket outlets wiring in 6x2.5mm^2 PVC-SC-PVC cables, 4 No. twin nonstandard socket outlets for computer points with neon lights wiring in radial 3x2.5mm2 PVC-SC-PVC cables and 4 No. telephone/data outlet plates	31	No		
5.3.8	Twin standard 13A-socket outlet for normal power, wired in 6 x 2.5mm² SC-PVC-CU cables inside concealed conduits.	20	No		
5.3.9	As above but on trunking	78	No.		
5.3.10	Co-axial insulated TV outlet point complete with plate, and draw-wire.	5	No		
5.3.11	Complete TV aerial system to receive all local channels , comprising roof aerial roof with mounting, and 120m long coaxial cable for colour TV reception.(75 Ohms)	5	No		
5.4.0	Wall mounted purpose made MCCB type sub switchboard manufactured in 14SWG galvanised mild steel sheet and finished in cream (or appropriate colour) powder coating as shown on the schematic, complete with the following:				
(a)	1 No. 200A TP MCCB (adjustable in 150-200A range) main incomer.				
(b)	5 No. 250A TPN insulated copper bus bars of 40 x 10mm cross section.				
(c)	7 No. 100A TPN MCCBs as shown, but adjustable in the range 80 –100A				
(d)	3 No. spare capacity for future development all fitted with 100A MCCBs				
	Total C/F to Page H28				

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total B/F from Page H27				
(e)	Sealable studs for all cover plate screws and all necessary accessories				
(f)	Carry out comprehensive labeling of all the bus bars, circuit breakers etc. of the board above, indicating the areas served, outgoing cable sizes etc.				
(g)	Comprehensive protective multiple earthing of the above board in 1200mm long 12mm diameter pure electrolytic copper earth rod deep driven to permanent moisture level, copper clamp. 50mm² green earth lead complete with all accessories. (Note: Use parallel rods if effective earthing cannot be achieved with 1 No. rod).	1	No		
5.4.1a)	Sub mains for the above board consisting 4C 95mm^2 PVC/SWA/PVC cable	40	m.		
5.4.1b)	Cable glands for the cable above	2	No.		
5.4.1d)	Cable lugs for the cable above, complete with hydraulic crimping	8	No.		
5.5.0	Allow for the transfer of all existing circuits and consumer units to the new MCCB type Switchboard.		Item		
5.5.1a)	Sub mains for the existing boards consisting 4C 25mm^2 PVC/SWA/PVC cable	60	m.		
5.5.1b)	Cable glands for the cable above	2	No.		
5.5.1d)	Cable lugs for the cable above, complete with hydraulic crimping	8	No.		
5.5.1	100A TP/N manual by-pass system for the UPS comprising 125A TP/N manual change-over switch, 3 No. 125A TP MCBs at input and output internal wiring and a common firmly bonded metallic enclosure made from 14 gauge cream powder coated galvanised steel sheets.	2	No		
5.5.2	5C 35mm^2 flexible PVC/PVC/copper cables	120	m		
5.6.0a)	4-way TP/N power distribution board for clean line complete with 125A TP/N integral isolator and all accessories including lockable cover. The Distribution Board to be as Crabtree or Multi-9, or approved equivalent.	2	No		
5.6.0b)	TP MCB the boards above	2	No.		
5.6.0c)	DP MCB the boards above	2	No.		
5.6.0d)	Blanking plates for un-used spare ways.	16	No.		
	Total C/F to Page H29				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 5 – FOURTH FLOOR

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total B/F from Page H28				
5.6.0e)	Earthing for the board above.	Lot			
5.6.1a)	4-way TP/N power distribution board for clean line complete with 125A TP/N integral isolator and all accessories including lockable cover. The Distribution Board to be as Crabtree or Multi-9, or approved equivalent.	2	No		
5.6.1b)	12-way SP/N power distribution board for clean line complete with 100A SP/N integral isolator and all accessories including lockable cover.	2	No		
5.6.1c)	SP MCB the boards above	40	No.		
5.6.1d)	Blanking plates for un-used spare ways.	8	No.		
5.6.1e)	Earthing for the board above.	Lot			
5.7.0a)	4C 25mm^2 PVC/SWA/PVC cable, copper	100	m.		
5.7.0b)	Cable glands for the above	4	No.		
5.7.0c)	Cable lugs for the cable above, complete with hydraulic crimping	16	No.		
5.7.1a)	4C 16mm^2 PVC/SWA/PVC cable, copper	80	m.		
5.7.1b)	Cable glands for the above	4	No.		
5.7.1c)	Cable lugs for the cable above, complete with hydraulic crimping	16	No.		
5.7.2	2x16mm^2 +1x 10mm^2 SC Cu cables	80	M		
5.7.3	Dia. 32mm HG PVC conduits buried in floor slab.	400	m.		
5.7.4	Outlet for fire alarm points comprising concealed PVC conduit, box, wiring in 3 x 1.5mm² screened fire-proof cable as FIREPIX or approved equivalent, and all accessories.	89	No		
5.8.0a)	Outlet for air conditioning unit, comprising box concealed, HG PVC conduit, wiring in 3x4mm^2 SC-PVC-CU cables and all accessories including 20A DP switch with neon light.	4	No		
5.8.0b)	30A voltage switch for air-conditioning unit as Sollateck type AVS 30, wired to the A/C unit above	4	No		
	Total for Bill No. 5– Fourth Floor C/F to Summary Page				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 6 – FIFTH FLOOR

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Supply, install, test, commission and set to work the following. All lighting fittings to be complete with lamp, control gear etc as applicable.				
6.1	**Lighting**				
6.1.1	Lighting point 1-way switched.	397	No.		
6.1.2a)	Lighting point 2-way switched.	111	No.		
6.1.2b)	Lighting point 2-way switched with intermediate switch.	27	No.		
6.1.3	5 A white moulded switch plates as MK or Crabtree: -				
	(a) 1-gang 1-way	24	No.		
	(b) 1-gang 2-way	12	No.		
	(c) 2-gang 1-way	4	No.		
	(d) 2-gang 2-way	12	No.		
	(e) 1-gang intermediate	3	No.		
6.1.4	Install permanent "DANGER" 415V labels where groups of switches have been fed by more than one phase.	6	No.		
6.1.5	Lighting fittings, complete with lamps of specified wattage and appropriate colour rendering: -				
6.1.5a)	600x600mm 4x18W HPF fully recessed fluorescent fitting with highly polished reflectors and lourvres as THORN Cat No EFQTS 418, or approved equivalent.	411	No.		
6.1.5b)	As item No. 6.1.5 (a) above but emergency version as THORN Cat No EFQTS 418.E, or approved equivalent.	116	No		
6.1.5c)	100W surface mounted Tungsten bulkhead fitting as Thorn Cat. No. OLG 1100, or approved equivalent, complete with a PL 26 "White" lamp.	1	No		
6.1.5d)	8W maintained Exit Emergency Light as Thorn Cat. No. EFVM3/ICEL, or approved equivalent. Minimum 3-hour autonomy	7	No		
6.2.0	**Power Supply**				
6.2.0a)	12-way TP/N power distribution board complete with 125A TP/N integral isolator and all accessories including lockable cover. The Distribution Board to be as Crabtree or Multi-9, or approved equivalent.	2	No		
6.2.0b)	As above but 6 Ways	2	No		
	Total C/F to Page H31				

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total B/F from Page H30				
6.2.1a)	4C 35mm^2 PVC/SWA/PVC cable, copper	150	m.		
6.2.1b)	4C 25mm^2 PVC/SWA/PVC cable, copper	150	m.		
6.2.1c)	Cable glands for the cable in 6.2.1a)	4	No.		
6.2.1d)	Cable lugs for the cable in 6.2.1a), complete with hydraulic crimping	16	No.		
6.2.1e)	Cable glands for the cable in 6.2.1 b)	4	No.		
6.2.1f)	Cable lugs for the cable in 6.2.1 b), complete with hydraulic crimping	16	No.		
6.2.2a)	SP MCB the boards above	74	No.		
6.2.2b)	Blanking plates for un-used spare ways.	34	No.		
6.2.2c)	Earthing for the boards above.	Lot			
6.3.1	300 x 50mm 3-compartment angle trunking to details shown, in 14-gauge galvanized steel sheet with cream powder coating finish to approved colour, complete with cover, screws, and all accessories.	600	m.		
6.3.2	300 x 50mm, factory-made corner-bends for the above trunking, in same material and colour finish.	120	No.		
6.3.3	Carry out bonding throughout the entire length of the above trunking in 6mm^2 green PVC insulated copper cable.		Item		
6.3.4	Twin-outlet plates on the trunking, same colour finish	226	No.		
6.3.5	Punched outlet plates on the trunking for data/telephone outlets.	113	No		
6.3.6a)	Twin 13A non standard white socket outlets, with safety shutters on both live and neutral and with neon light for computer power supply, complete with wiring in 3x2.5mm^2 PVC-SC-CU cables inside the trunking. The socket outlets to be complete with unbreakable 13A fused non standard top plugs	113	No		
6.3.6b)	Additional non-standard top plugs for clients keeping	40	No		
6.3.6c)	Allow for terminating (flexible) computer power cables into non-standard top plugs	233	No		
	Total C/F to Page H32				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 6 – FIFTH FLOOR

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total B/F from Page H31				
6.3.6d)	Supply and install 5mm high permanent red trafollyte labels marked "UPS ONLY" for clean line power sockets	233	No		
6.3.7	Power pedestals complete with 4 No. twin normal socket outlets wiring in 6x2.5mm^2 PVC-SC-PVC cables, 4 No. twin nonstandard socket outlets for computer points with neon lights wiring in radial 3x2.5mm2 PVC-SC-PVC cables and 4 No. telephone/data outlet plates	30	No		
6.3.8	Twin standard 13A-socket outlet for normal power, wired in 6 x 2.5mm² SC-PVC-CU cables inside concealed conduits.	20	No		
6.3.9	As above but on trunking	113	No.		
6.3.10	Co-axial insulated TV outlet point complete with plate, and draw-wire.	5	No		
6.3.11	Complete TV aerial system to receive all local channels , comprising roof aerial roof with mounting, and 120m long coaxial cable for colour TV reception.(75 Ohms)	5	No		
6.4.0	Wall mounted purpose made MCCB type sub switchboard manufactured in 14SWG galvanised mild steel sheet and finished in cream (or appropriate colour) powder coating as shown on the schematic, complete with the following:				
(a)	1 No. 200A TP MCCB (adjustable in 150-200A range) main incomer.				
(b)	5 No. 250A TPN insulated copper bus bars of 40 x 10mm cross section.				
(c)	7 No. 100A TPN MCCBs as shown, but adjustable in the range 80 –100A				
(d)	1 No. 63A TPN MCCBs as shown, but adjustable in the range 40 –63A				
(e)	3 No. spare capacity for future development all fitted with 100A MCCBs				
(f)	Sealable studs for all cover plate screws and all necessary accessories				
(g)	Carry out comprehensive labeling of all the bus bars, circuit breakers etc. of the board above, indicating the areas served, outgoing cable sizes etc.				
	Total C/F to Page H33				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 6 – FIFTH FLOOR

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total B/F from Page H32				
(h)	Comprehensive protective multiple earthing of the above board in 1200mm long 12mm diameter pure electrolytic copper earth rod deep driven to permanent moisture level, copper clamp. 50mm² green earth lead complete with all accessories. (Note: Use parallel rods if effective earthing cannot be achieved with 1 No. rod).	1	No		
6.4.1a)	Sub mains for the above board consisting 4C 95mm^2 PVC/SWA/PVC cable	80	m.		
6.4.1b)	Cable glands for the cable above	2	No.		
6.4.1d)	Cable lugs for the cable above, complete with hydraulic crimping	8	No.		
6.5.0	Allow for the transfer of all existing circuits and consumer units to the new MCCB type Switchboard.		Item		
6.5.1a)	Sub mains for the existing boards consisting 4C 25mm^2 PVC/SWA/PVC cable	80	m.		
6.5.1b)	Cable glands for the cable above	4	No.		
6.5.1d)	Cable lugs for the cable above, complete with hydraulic crimping	16	No.		
6.5.1a)	100A TP/N manual by-pass system for the UPS comprising 100A TP/N manual change-over switch, 3 No. 100A TP MCBs at input and output internal wiring and a common firmly bonded metallic enclosure made from 14 gauge cream powder coated galvanised steel sheets.	2	No		
6.5.1b)	As above but 63A	1	No		
6.5.2	5C 25mm^2 flexible PVC/PVC/copper cables	120	m		
6.5.2	5C 16mm^2 flexible PVC/PVC/copper cables	60	m		
6.6.0a)	4-way TP/N power distribution board for clean line complete with 125A TP/N integral isolator and all accessories including lockable cover. The Distribution Board to be as Crabtree or Multi-9, or approved equivalent.	2	No		
6.6.0b)	TP MCB the boards above	2	No.		
6.6.0c)	DP MCB the boards above	2	No.		
6.6.0d)	Blanking plates for un-used spare ways.	16	No.		
6.6.0e)	Earthing for the board above.	Lot			
	Total C/F to Page H34				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 6 – FIFTH FLOOR

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total B/F from Page H33				
6.6.1a)	10-way TP/N power distribution board for clean line complete with 125A TP/N integral isolator and all accessories including lockable cover. The Distribution Board to be as Crabtree or Multi-9, or approved equivalent.	2	No		
6.6.1b)	6-way SP/N power distribution board for clean line complete with 100A SP/N integral isolator and all accessories including lockable cover.	2	No		
6.6.1c)	SP MCB the boards above	47	No.		
6.6.1d)	Blanking plates for un-used spare ways.	25	No.		
6.6.1e)	Earthing for the board above.	Lot			
6.7.0a)	4C 25mm^2 PVC/SWA/PVC cable, copper	120	m.		
6.7.0b)	Cable glands for the cable above	6	No.		
6.7.0c)	Cable lugs for the cable above complete with hydraulic crimping	24	No.		
6.7.1a)	4C 16mm^2 PVC/SWA/PVC cable, copper	120	m.		
6.7.1b)	Cable glands for the cable above	6	No.		
6.7.1c)	Cable lugs for the cable in above, complete with hydraulic crimping	24	No.		
6.7.2	2x16mm^2 +1x 10mm^2 SC Cu cables	120	M		
6.7.3	Dia. 32mm HG PVC conduits buried in floor slab.	400	m.		
6.7.4	Outlet for fire alarm points comprising concealed PVC conduit, box, wiring in 3 x 1.5mm² screened fire-proof cable as FIREPIX or approved equivalent, and all accessories.	96	No		
6.8.0a)	Outlet for air conditioning unit, comprising box concealed, HG PVC conduit, wiring in 3x4mm^2 SC-PVC-CU cables and all accessories including 20A DP switch with neon light.	6	No		
6.8.0b)	30A voltage switch for air-conditioning unit as Sollateck type AVS 30, wired to the A/C unit above	6	No		
	Total for Bill No. 6– Fifth Floor C/F to Summary Page				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 7 – SIXTH FLOOR

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Supply, install, test, commission and set to work the following. All lighting fittings to be complete with lamp, control gear etc as applicable.				
7.1	**Lighting**				
7.1.1	Lighting point 1-way switched.	230	No.		
7.1.2a)	Lighting point 2-way switched.	120	No.		
7.1.2b)	Lighting point 2-way switched with intermediate switch.	29	No.		
7.1.3	5 A white moulded switch plates as MK or Crabtree: -				
	(a) 1-gang 1-way	18	No.		
	(b) 1-gang 2-way	12	No.		
	(c) 2-gang 1-way	4	No.		
	(d) 2-gang 2-way	12	No.		
	(e) 1-gang intermediate	3	No.		
7.1.4	Install permanent "DANGER" 415V labels where groups of switches have been fed by more than one phase.	6	No.		
7.1.5	Lighting fittings, complete with lamps of specified wattage and appropriate colour rendering: -				
7.1.5a)	600x600mm 4x18W HPF fully recessed fluorescent fitting with highly polished reflectors and lourvres as THORN Cat No EFQTS 418, or approved equivalent.	187	No.		
7.1.5b)	As item No. 7.1.5 (a) above but emergency version as THORN Cat No EFQTS 418.E, or approved equivalent.	102	No		
7.1.5c)	100W surface mounted Tungsten bulkhead fitting as Thorn Cat. No. OLG 1100, or approved equivalent, complete with a PL 26 "White" lamp.	1	No		
7.1.5d)	160mm diameter fully recessed downlighter as THORN Corsa160T Cat No COR160 2H126 Cat2, or approved equivalent.	47	No		
7.1.5e)	18 W opal glass finished with chrome trim detail decorative wall bracket as Thorn Venette.	15	No.		
7.1.5f)	1 x 36W 1200mm HPF fluorescent fitting with plastic diffuser to IP 65 as Thorn Cat. No. PPD236	15	No		
7.1.5g)	8W maintained Exit Emergency Light as Thorn Cat. No. EFVM3/ICEL, or approved equivalent. Minimum 3-hour autonomy	5	No		
	Total C/F to Page H36				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 7 – SIXTH FLOOR

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total B/F from Page H35				
7.1.5h)	Corrossion resistant fluorescent range to IP 65/67 1 x 36W HPF fluorescent fitting with acrylic diffuser as Thorn LU Euro Proof.	7	No.		
7.2.0	**Power Supply**				
7.2.0a)	12-way TP/N power distribution board complete with 125A TP/N integral isolator and all accessories including lockable cover. The Distribution Board to be as Crabtree or Multi-9, or approved equivalent.	2	No		
7.2.0b)	As above but 6 Ways	1	No		
7.2.1a)	4C 35mm^2 PVC/SWA/PVC cable, copper	160	m.		
7.2.1b)	4C 25mm^2 PVC/SWA/PVC cable, copper	60	m.		
7.2.1c)	Cable glands for the cable in 7.2.1a)	4	No.		
7.2.1d)	Cable lugs for the cable in 7.2.1a), complete with hydraulic crimping	16	No.		
7.2.1e)	Cable glands for the cable in 7.2.1 b)	2	No.		
7.2.1f)	Cable lugs for the cable in 7.2.1 b), complete with hydraulic crimping	8	No.		
7.2.2a)	SP MCB the boards above	72	No.		
7.2.2b)	Blanking plates for un-used spare ways.	18	No.		
7.2.2c)	Earthing for the boards above.	Lot			
7.3.1	300 x 50mm 3-compartment angle trunking to details shown, in 14-gauge galvanized steel sheet with cream powder coating finish to approved colour, complete with cover, screws, and all accessories.	380	m.		
7.3.2	300 x 50mm, factory-made corner-bends for the above trunking, in same material and colour finish.	90	No.		
7.3.3	Carry out bonding throughout the entire length of the above trunking in 6mm^2 green PVC insulated copper cable.		Item		
7.3.4	Twin-outlet plates on the trunking, same colour finish	124	No.		
7.3.5	Punched outlet plates on the trunking for data/telephone outlets.	62	No		
	Total C/F to Page H37				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 7 – SIXTH FLOOR

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total B/F from Page H36				
7.3.6a)	Twin 13A non standard white socket outlets, with safety shutters on both live and neutral and with neon light for computer power supply, complete with wiring in 3x2.5mm^2 PVC-SC-CU cables inside the trunking. The socket outlets to be complete with unbreakable 13A fused non standard top plugs	62	No		
7.3.6b)	Additional non-standard top plugs for clients keeping	20	No		
7.3.6c)	Allow for terminating (flexible) computer power cables into non-standard top plugs	126	No		
7.3.6d)	Supply and install 5mm high permanent red trafollyte labels marked "UPS ONLY" for clean line power sockets	126	No		
7.3.7	Power pedestals complete with 4 No. twin normal socket outlets wiring in 6x2.5mm^2 PVC-SC-PVC cables, 4 No. twin nonstandard socket outlets for computer points with neon lights wiring in radial 3x2.5mm2 PVC-SC-PVC cables and 4 No. telephone/data outlet plates	16	No		
7.3.8	Twin standard 13A-socket outlet for normal power, wired in 6 x 2.5mm² SC-PVC-CU cables inside concealed conduits.	68	No		
7.3.9	As above but on trunking	62	No.		
7.3.10	Co-axial insulated TV outlet point complete with plate, and draw-wire.	12	No		
7.3.11	Complete TV aerial system to receive all local channels , comprising roof aerial roof with mounting, and 120m long coaxial cable for colour TV reception.(75 Ohms)	1	No		
7.4.0	Wall mounted purpose made MCCB type sub switchboard manufactured in 14SWG galvanised mild steel sheet and finished in cream (or appropriate colour) powder coating as shown on the schematic, complete with the following:				
(a)	1 No. 200A TP MCCB (adjustable in 150-200A range) main incomer.				
(b)	5 No. 250A TPN insulated copper bus bars of 40 x 10mm cross section.				
(c)	4 No. 100A TPN MCCBs as shown, but adjustable in the range 80 –100A				
	Total C/F to Page H38				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 7 – SIXTH FLOOR

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total B/F from Page H37				
(d)	1 No. 63A TPN MCCBs as shown, but adjustable in the range 40 –63A				
(e)	3 No. spare capacity for future development all fitted with 100A MCCBs				
(f)	Sealable studs for all cover plate screws and all necessary accessories				
(g)	Carry out comprehensive labeling of all the bus bars, circuit breakers etc. of the board above, indicating the areas served, outgoing cable sizes etc.				
(h)	Comprehensive protective multiple earthing of the above board in 1200mm long 12mm diameter pure electrolytic copper earth rod deep driven to permanent moisture level, copper clamp. 50mm² green earth lead complete with all accessories. (Note: Use parallel rods if effective earthing cannot be achieved with 1 No. rod).	1	No		
7.4.1a)	Sub mains for the above board consisting 4C 95mm^2 PVC/SWA/PVC cable	40	m.		
7.4.1b)	Cable glands for the cable above	2	No.		
7.4.1d)	Cable lugs for the cable above, complete with hydraulic crimping	8	No.		
7.5.0	Allow for the transfer of all existing circuits and consumer units to the new MCCB type Switchboard.		Item		
7.5.1a)	Sub mains for the existing boards consisting 4C 25mm^2 PVC/SWA/PVC cable	60	m.		
7.5.1b)	Cable glands for the cable above	4	No.		
7.5.1d)	Cable lugs for the cable above, complete with hydraulic crimping	16	No.		
7.5.2	63A TP/N manual by-pass system for the UPS comprising 63A TP/N manual change-over switch, 3 No. 63A TP MCBs at input and output internal wiring and a common firmly bonded metallic enclosure made from 14 gauge cream powder coated galvanised steel sheets.	1	No		
7.5.3	5C 16mm^2 flexible PVC/PVC/copper cables	60	m		
7.6.0a)	10-way TP/N power distribution board for clean line complete with 125A TP/N integral isolator and all accessories including lockable cover. The Distribution Board to be as Crabtree or Multi-9, or approved equivalent.	1	No		
	Total C/F to Page H39				

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total B/F from Page H38				
7.6.0b)	SP MCB the boards above	22	No.		
7.6.0c)	Blanking plates for un-used spare ways.	8	No.		
7.6.0d)	Earthing for the board above.	Lot			
7.7.0a)	4C 16mm^2 PVC/SWA/PVC cable, copper	60	m.		
7.7.0b)	Cable glands for the cable above	2	No.		
7.7.0c)	Cable lugs for the cable in above, complete with hydraulic crimping	8	No.		
7.7.1	Dia. 32mm HG PVC conduits buried in floor slab.	400	m.		
7.7.2.	Outlet point for heater and hand drier comprising 20mm diameter conduit, wiring in 3 x 4.0 mm² SC-PVC-CU cables and all accessories including 20A DP switch with neon light as MK or Crabtree.	8	No		
7.7.3	Outlet for 15A socket outlet, comprising box, concealed 20mm diameter H/G PVC conduit, wiring in 3 x 4.0 mm² SC-PVC-CU cables and all accessories including 15A DP switch with neon light.	2	No		
7.7.4	Outlet for cooker control unit comprising wiring in 3x6.0mm^2 SC-PVC CU cables, twin steel box Dia. 25mm HG PVC conduit link, and all accessories including 45A DP cooker control unit with neon lamp, and 13A integral socket with neon lam as MK or approved equivalent.	2	No.		
7.7.5	45A DP cooker connector unit with wiring in 3 x 6.0mm^2 SC-PVC-CU cables, and Dia. 25mm HG conduit link to the above.	2	No.		
7.7.6	Outlet for fire alarm points comprising concealed PVC conduit, box, wiring in 3 x 1.5mm² screened fire-proof cable as FIREPIX or approved equivalent, and all accessories.	80	No		
7.7.7a)	Outlet for air conditioning unit, comprising box concealed, HG PVC conduit, wiring in 3x4mm^2 SC-PVC-CU cables and all accessories including 20A DP switch with neon light.	22	No		
7.7.7b)	30A voltage switch for air-conditioning unit as Sollateck type AVS 30, wired to the A/C unit above	22	No		
	Total for Bill No. 7– Sixth Floor C/F to Summary Page				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 8 – INSTALLATION OF PASSENGER AND GOODS LIFTS

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs Cts.
	Supply, install, test, commission, and set to work the following:				
8.00	125A TP MCCB in Main Switchboard.	1	No.		
8.01	Label the above MCCBs thus "LIFTS DISTRIBUTION BOARD" in permanent traffolyte labels.		Item		
8.02	8-way TP/N distribution board as Crabtree or Merlin Gerlin complete with 100A TP/N integral isolator.	1	No.		
8.03	4C 50 mm² SWA/PVC/SWA copper cable to the lift distribution board in lift motor room.	240	m.		
8.04a)	Cable glands for the cable above.	4	No.		
8.04b)	Cable lugs for the cable above complete with hydraulic crimping	16	No.		
8.05a)	SP MCB units for item No. 8.02 above.	6	No.		
8.05b)	50A TP MCB in the above board.	4	No.		
8.05c)	80A TP MCB in the above board.	1	No.		
8.05d)	Blanking plates for un-used spares	3	No.		
8.06	Labelling of all the final sub-circuits in item No. 8.02 in permanent traffolyte labels.		Item		
8.07a)	63A TPN local isolator in lift motor room	4	No.		
8.07a)	As above but 80A TPN local isolator	1	No.		
8.08	5C 25mm^2 flexible PVC-PVC- copper cable between isolators above and lift motor	250	m.		
8.09	Lighting points in the lift and hoist shaft in 20mm Class B galvanized steel conduit, steel box, wiring in 3 x 1.5 mm² SC-PVC-CU cables metal-clad 5A 1-gang switch and all accessories.	18	No.		
8.10	Outlet for 13A metal-clad twin socket outlet complete with 20mm class B galvanized steel conduits, twin steel box and all accessories including 13A twin Metal-clad socket at 1400mm affl.	18	No.		
8.11	Outlet for extract fan in the lift shaft, comprising box, concealed PVC conduit, wiring in 3 x 4.0 mm² SC-PVC-CU cables and all accessories including 20A DP switch with neon light.	5	No.		
Total for Bill No. 8: Installation of Passenger and Goods Lift C/F to Summary Page					

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 9 – MAINS POWER DISTRIBUTION

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Supply, install, test, commission and set to work the following:-				
9.01	Take delivery and erection/testing and commissioning of the CT/PT Metering panel supplied by Kenya Power and Lighting Company with all the necessary wiring for the CT/PT and sealing as per the requirement of the power company	1	No		
9.02	Supply and install One off 3 panel, SF6 insulated, indoor/outdoor, non-isolatable, extensible patter, metal clad switchboard suitable for use on an 11 kV 3 phase 3 wire, 50 Hz, earthed Neutral System with an Impulse level of 95 kV and fault rating of 21 kA for 3 seconds to IP54 comprising 1 no. 200A ring switch disconnector/incomer and 2 no. 200A Transformer feeders in SF_6 circuit breaker, manufactured to IEC standards, as Merlin Gerin Ringmaster RE2c-T2, having the following characteristics:- i) Transfer: 2 no. 1000 kVA ii) Busbar Rating: 1000A iii) Short time withstand: 16/21kA 3s iv) Normal current rating: 630A/200A v) Normal rated voltage: 12/13.8 kV vi) Protection & control: Self powered IDMT overcurrent and earth fault relay vii) Protection CT's: 20-200/1A class X viii) Setting Range: Overcurrent 20-200A, Earth fault 2-160A The ring main unit to be complete with the enclosing cubicle manufactured to standards for indoor HV distribution	2	No		
9.03	11000/433, 1000 KVA, 3phase, dry type cast resin, self cooled, indoor type, copper wound transformer connected delta on H.V. side, and star on the L.V. side with additional neutral brought out on load side as approved	1	No		
9.04	Carry out earthing in copper earth mats with rods and earth continuity conductors for 11 kv potential with necessary soil treatment methods to achieve impedance not exceeding 1.0 ohms		Item		
9.05	Before and after installation of the transformer, carry out comprehensive testing comprising:- a) Full merger tests b) Oil tests		Item		
9.06a)	$95mm^2$ 3 Core 11 kv XLPE copper cables	200	m		
9.06b)	$95mm^2$ 3 Core 11 kv XLPE copper cables termination kits	8	No		
	Total C/F to Page H42				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 9 – MAINS POWER DISTRIBUTION

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total C/F from Page H41				
9.06c)	$95mm^2$ 3 Core 11 kv XLPE copper cables lugs	24	No		
9.06d)	$95mm^2$ 3 Core 11 kv XLPE copper cables jointing kits	8	No		
9.07	Free-standing purpose made front access sub main switchboard (Fully Type-Tested Assemblies – TTA), modular, metal clad, manufactured in 12 SWG galvanised mild steel sheet and finished in cream (or appropriate colour) powder coating as shown on the schematic. The switchboard should consist of a PLC section. The switchboard to be as Merlin Gerin Switchgear or equivalent and approved, complete with the following:-				
(a)	Space for KPLC's cut-outs. CTS and meters. The spaces to be provided with punched studs for installing KPLC seals.				
(b)	Digital multimeter type PM820 with CTs and fuse protection capable of measuring voltage in the range 0 – 1000V, 3-phase, current in the range 0-2000A, 3-phase, and all power system parameters (KW, KVA, KWHr, KVArs, Frequency, P.F., harmonics and all the parameters). The multimeter to have an accessible terminal for connecting an external printer, and should be complete with selector switches for viewing/displaying the various parameters.				
(c)	Set of neon phase presence indicator lamps				
(d)	2 No. 1600 A TPN MCCB main incomer type NS 1600N with adjustable over current settings and having a short-circuit breaking capacity of 100KA at 415Vac, 50Hz. The MCCB to be adjustable in 1250-1600A range. The MCCBs to be motorized and have both electrical and mechanical inter-lock.				
(e)	5 No. 2000A TPN insulated copper bus bars of 120 x 15 mm cross section.				
(f)	1 No. 630A 3 P TPN motorized MCCBs as shown, but adjustable in the range 630 –800A				
(g)	1 No. 1250A 3 P TPN motorized MCCBs as shown, but adjustable in the range 1000 –1250A				
(h)	1 No. 450A 3 P TPN motorized MCCBs as shown, but adjustable in the range 400 –450A				
	Total C/F to Page H43				

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total C/F from Page H42				
(i)	1 No. 150A 3 P TPN motorized MCCBs as shown, but adjustable in the range 125 –150A				
(j)	1 No. 125A 3 P TPN motorized MCCBs as shown, but adjustable in the range 100 –125A				
(k)	2 No. 100A 3 P TPN motorized MCCBs as shown, but adjustable in the range 80 –100A				
(l)	1 No. 63A 3 P TPN motorized MCCBs as shown, but adjustable in the range 40 –63A				
(m)	Sufficient spare capacity for future development all fitted with 4 No. 100A MCCBs				
(n)	Sealable studs for all cover plate screws and all necessary accessories				
(o)	6mm perspex viewing window				
(p)	Heavy duty rubber lining for all the perspex viewing windows				
(q)	415V three-phase surge diverter as Furse ESP 415, wired as shown, complete with enclosure with viewing window.				
9.08	Carry out comprehensive labelling of all the bus bars. CT chambers, circuit breakers etc. of item No. 9.07 and above, indicating the areas served, outgoing cable sizes etc.				
9.09	Comprehensive protective multiple earthing of item No. 9.07 in 1500mm long 12mm diameter pure electrolytic copper earth rod deep driven to permanent moisture level, copper clamp. 100mm² green earth lead complete with all accessories. (Note: Use parallel rods if effective earthing cannot be achieved with 1 No. rod).		Item		
9.10a)	4x4C 240mm^2 PVC/SWA/PVC copper cable (The 4No cables to run in parallel. Unit cost to be for 4 No. Cables run in parallel)	250	m.		
9.10b)	Cable glands for the above cable	8	No		
9.10c)	Cable lugs for the above cable complete with hydraulic crimping	32	No		
	Total C/F to Page H44				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 9 – MAINS POWER DISTRIBUTION

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total C/F from Page H43				
9.11	One off free standing 450 KVAr's automatic Power Factor Correction Capacitor Bank comprising the following:- i) 7 No 50 KVAr's 415 V,50Hz, 3-Phase ii) 4 No 20 KVAr's 415 V,50Hz, 3-Phase iii) 2 No 10 KVAr's 415 V,50Hz, 3-Phase iv) 13 No Special contactors for capacitor switching v) 13 No Fuse bases and fuses for each capacitor protection vi) 13 No Step indicator lamps vii) 1 No Control circuit protection fuse/fuse holder viii) 1 No. 13-Step automatic control regulator for maintaining power factor at the set level and regulating the switching of capacitor steps ix) 1 No 1600/5A Current transformer (to be mounted after the mains incoming circuit breaker) The bank to be made from low-loss bio-degradable capacitive units, complete with earthed enclosure. All the contactors, controls and indicator lamps, including a digital read-out screen, to be included.	1	No.		
9.12a)	2x4C 150mm^2 PVC/SWA/PVC copper cable for the above bank (The 2No cables to run in parallel Unit cost to be for 2 No. Cables run in parallel)	80	m.		
9.12b)	Cable glands for the above cable	8	No		
9.12c)	Cable lugs for the above cable complete with hydraulic crimping	32	No		
9.13a)	4C 240mm^2 PVC/SWA/PVC copper cable for Data Centre	250	m.		
9.13b)	Cable glands for the above cable	8	No		
9.13c)	Cable lugs for the above cable complete with hydraulic crimping	32	No		
9.14	Allow for the following (provisional) lengths of cable (4C PVC/SWA/PVC) to be used for terminating existing circuits onto the new main switchboard.				
(a)	120mm^2	150	m.		
(b)	95mm^2	150	m.		
(c)	70mm^2	150	m		
(d)	35mm^2	150	m		
9.15	Cable glands for the above cables				
(a)	120mm^2	8	No.		
(b)	95mm^2	8	No.		
(c)	70mm^2	8	No		
(d)	35mm^2	8	No		
	Total C/F to Page H45				

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total C/F from Page H44				
9.16	Cable lugs complete with hydraulic crimping				
(a)	120mm^2	32	No.		
(b)	95mm^2	32	No.		
(c)	70mm^2	32	No		
(d)	35mm^2	32	No		
9.17	Allow for following works as PROVISIONAL to facilitate connection of existing cables to the new switchboard as necessary: - **(Note: Switchboard shop drawings to be prepared with full site understanding as to how the existing cables will be terminated into the proposed positions of the various outgoing circuit breakers)**				
(a)	Cable terminal block to be fitted into the switchboard to take up to between 120 mm^2 and 240 mm^2 SWA cable.	8	No		
(a)	Cable terminal block to be fitted into the switchboard to take up to between 25 mm^2 and 120 mm^2 SWA cable.	8	No		
9.17	Diameter 150mm HG PVC ducts for external power distribution.	800	m.		
9.18	450 x 450 x 250mm 14-gauge galvanised steel cable draw box, complete with cover, screws etc.	16	No.		
9.19	Excavate trenches for the above ducts average depth 700mm, remove soft earth, lay duct, cover with "DANGER – HATARI" tiles, back-fill with soil and compact to natural ground level.	800	m.		
9.20a)	Build 600 x 600 x 700mm deep power manhole complete with internal plaster and heavy duty EAFW steel cover.	12	No.		
9.20b)	As 9.07a) above, but earthing manhole, with cover marked "EARTH"	2	No.		
9.21a)	Clipping spacer saddles with screws for the cables in the riser	60	No.		
9.21(b)	200mm x 4mm hard-wood support in the riser duct for cable supports complete with clips etc.	40	m.		
9.21c)	400 x 75mm 12 gauge galvanised steel perforated cable tray for support of the cables.	200	m.		
9.21d)	Heavy duty cable ties for the trays above, 300mm	250	No.		
9.22	300 x 300 x 150mm 14 SWG galvanised steel adaptable box for termination of armoured cables complete with covers, fixing and mounting accessories.	20	No.		
	Total C/F to Page H46				

Item No.	Description	Qty	Unit	Rate	Amount Ksh. Cts.
	Total C/F from Page H45				
9.23	An automatic voltage regulator with the following characteristics: -				
i.	Rating: 1000 KVA				
ii.	Power Supply: 3 Phase, 415V/240V				
iii.	Input Voltage Tolerance: 20% i.e. from 365-505V 3 Phase from 192-288V 1 Phase				
iv.	Operation: Independent correction for each Phase				
v.	Output: ± 1% of 415V/240V				
vi.	Frequency 50/60Hz ± 5%				
vii.	Rated Current: 1,392 Amps				
viii.	Admitted Load Variation 0 to 100%				
ix.	Admitted Load unbalance up to 100%				
x.	Correction Speed:16ms/V				
xi.	Waveform distortion <0.2%				
xii.	Efficiency 98%				
xiii.	Cooling: Natural air cooled (free convection without fans)				
xiv.	Ambient temperature: -10^{o} C to +40 ^{o}C				
xv.	Storage temperature: -20^{o} C to +60 ^{o}C				
xvi.	Relative Humidity: 90% (without condensate)				
xvii.	Warranty: Not less than 2 Years				
xviii.	State Dimensions of the AVR (WxDxH) and Weight of the AVR				
xix.	State Protection degree of the AVR.				
xx.	State Make, country of origin and model of the AVR. **(The AVR to be complete with 7-position selector to read input/output (PH/PH), internal trimmer to adjust output voltage ±, Pilot lamps for operating status, Input/Output terminals boards)**	1	No		
	Total C/F to Page H47				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 9 – MAINS POWER DISTRIBUTION

Item No.	Description	Qty	Unit	Rate	Amount Ksh. Cts.
	Total B/F from Page H46				
9.24a)	1600 A TPN Motorized MCCB with adjustable time-delay, enclosed in the Main switchboard Assembly and to be adjustable from 1250A-1600A	2	No		
9.24b)	2000A TPN Manual by-pass system across the AVR to be complete with 3 No 2000A TPN Manual change over switches and incorporated in the main switchboard assembly	1	No		
9.24a)	4x4C 240mm^2 PVC/SWA/PVC copper cable (The 4No cables to run in parallel Unit cost to be for 4 No. Cables run in parallel)	80	m.		
9.24b)	Cable glands for the above cable	8	No		
9.24c)	Cable lugs for the above cable complete with hydraulic crimping	32	No		
9.25	1250A, 660V, 3-phase, 5-conductor, insulated copper busbar, to IP52 and IP54 degree of protection, conductor cross-sectional area 257mm^2 with 4 active conductors, with a short circuit capacity (peak/RMS) of 68/32 KA, with maximum voltage drop (mV per amp) of at 0.7, 0.8, 0.9, and 1.0 P.F. of 0.102, 0.102, 0.098, and 0.076 respectively, and an average weight in Kg/m of 13.4. The riser busbar to comprise the following:-				
i)	4m 3p + N + PE straight unit copper conductors ref. 1634-0	8	No.		
ii)	End-cover	2	No.		
iii)	Fixing brackets for vertical installation	21	No.		
iv)	Fixing hanger	21	No.		
v)	Wall fixing bracket	21	No.		
vi)	End feed piece (3P+ N + E)	2	No.		
vii)	Right Feed Unit	6	No.		
viii)	Left Feed Unit	6	No.		
ix)	Centre Feed Unit	6	No.		
x)	Edge-wise elbows	6	No.		
xi)	Flat-wise elbow (indoor neutral)	6	No.		
	Total C/F to Page H48				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 9 – MAINS POWER DISTRIBUTION

Item No.	Description	Qty	Unit	Rate	Amount Ksh. Cts.
	Total B/F from Page H47				
xii)	Busbar-feed unit	6	No.		
xiii)	200A MCCB-type pull-out tap-off units	6	No.		
xiv)	4-hour ceramic fibre fire barrier completely fitting the trunking at floor slab penetrations	7	No.		
xv)	Mechanical/Electrical junction box for expansion control	7	No.		
xvi)	Any other items to complete riser busbar installation (please list the items) i) _____ ii) _____				
9.24a)	4x4C 240mm^2 PVC/SWA/PVC copper cable (The 4No cables to run in parallel Unit cost to be for 4 No. Cables run in parallel)	200	m.		
9.24b)	Cable glands for the above cable	8	No		
9.24c)	Cable lugs for the above cable complete with hydraulic crimping	32	No		
9.25	Make and install 200 x 200mm wide silver plate labels with 50mm long lettering for "ELECTRICAL DUCT" and 150mm long "SPIKE" sign to be pasted to the electric ducts.	7	No.		
9.26	Allow for the transfer of all existing circuits to the new main Switchboard. **Please study the existing arrangement first before pricing this item**		Item		
	Total C/F to Page H49				

BILL NO. 9 – MAINS POWER DISTRIBUTION

Item No.	Description	Qty	Unit	Rate	Amount Ksh. Cts.
	Total B/F from Page H48				
9.27	Allow for carrying out comprehensive testing of the installation as per IEE Wiring Regulation, 17th Edition.		Item		
9.28	Carry out very concise load balancing to achieve a maximum imbalance not greater than ± 10% between any two phases, measured at the main switch.		Item		
9.29	Allow for disconnection and re-connection of the existing 810 KVA Standby Generator set		Item		
9.30	Allow for full load testing of the AVR with variable load		Item		
Note: The following to be included with the bid:- **1. Detailed technical brochure outlining all the features of the AVR, including environmental conditions.** **2. Catalogue showing number of similar equipment installed previously.** **3. Detailed shop drawing of the Main switchboard and all the sub switchboards**					
Total for Bill No. 9: Mains Power Distribution, C/F to Summary Page					

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 10 – INSTALLATION OF WATER BOOSTER PUMP AND HOSE-REEL PUMPS

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Supply, install, test and commission the following:-				
10.00	63A TP MCCB on the supply side of the main 800A TP MCCB main switch.	1	No.		
10.01	Label the above MCCB thus: "SUPPLY TO WATER BOOSTER/HOSE REEL PUMPS: DO NOT SWITCH OFF" in red 10mm higher permanent traffolyte labels.		Item		
10.02(a)	Sub mains circuit comprising 4C 35mm^2 PVC/SWA/PVC copper cable from the MCCB to the 4-way TP/N board for water booster/hose reel pumps.	60	m.		
10.02(b)	Cable glands for the above cable.	2	m.		
10.02(c)	Cable lugs for the above cable.	8	No.		
10.03	6-way TP/N power distribution board in the switch room complete with 100A TP/N integral isolator, the board to be Crabtree or Merlin Gerlin	1	No.		
10.04	20A TP MCB in the board above.	4	No.		
10.05	Label the above MCB's thus "HOSE REEL PUMP 1, HOSE REEL PUMP 2 and WATER BOOSTER PUMP" respectively.		Item		
10.06	Install blanking plates for un-used spare ways	6	No.		
10.07	4-core 10mm² PVC/SWA/PVC cables from the MCB's above to the local isolators of the hose reel pumps and fountain pump.	100	m.		
10.08	32A TPN Splash-proof local isolator for hosereel / water booster pumps, as Telemecanique, complete with all accessories.	4	No.		
	Total for Bill No. 10: Water Booster / Hose Reel Pumps C/F to Summary Page				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 11 – LIGHTNING PROTECTION AND PILOT LIGHTING

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Note: All lightning protection products to be FURSE – Alternative makes will NOT be accepted.				
11.1	**Air Termination**				
11.1.1	15mm diameter multiple point copper air terminal as Furse Cat. No. RA 600.	9	No.		
11.1.2	Copper air terminal base as Furse Cat. No. SD 105.	9	No.		
11.1.3	Copper junction clamps for tape.	80	No.		
11.1.4	25 x 3mm turned copper tape as Furse Cat. No. TC 230.	495	m.		
11.1.5	Copper ridge saddle as Furse Cat. No. CD 115.	120	No.		
11.1.6	D.C. tape clip as Furse Cat. No.CP 210.	100	No.		
11.1.7	Copper rod-to-tape coupling.	100	No.		
11.2	**Down Conductors**				
11.2.1	25 x 3mm turned copper tape as Furse Cat. No. TC 230.	800	m.		
11.2.2	D.C. tape clip as Furse Cat. No. CP 210.	150	No.		
11.2.3	Oblong test/junction clamp as Furse Cat. No. CN 105.	9	No.		
11.2.4	Diameter 38mm HG PVC conduits for the down conductors above.	800	m.		
11.3	**Earth Termination**				
11.3.1	15mm diameter, 1200mm long solid copper earth rod as Furse Cat. No. RC 020, complete with driving stud and spike.	9	No.		
11.3.2	Earth rod-to-tape clamp type A.	9	No.		
11.3.3	Concrete inspection earth pit Cat. No. PT 005 with 5 hole earth bar as Furse Cat. No. PT 006.	9	No.		
11.3.4	1500mm x 1500mm copper earth mat made from 25mm x 3mm copper tape at 300mm spacing, buried at permanent moisture level and complete with all clamps, welding joints and 6m long 25mm x 3mm insulated copper tape clamped to the down conductors.	9	No.		
	Total for C/F to Page H52				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 11 – LIGHTNING PROTECTION AND PILOT LIGHTING

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total B/F from Page H51				
11.4	**Bonding**				
11.4.1	Bonding and clamping to all metal work including water pipes, gas pipes, hand-rails, air-conditioning units, window frames, cladding, metal roof etc. and the main earth for the building.		Item		
Total for Bill No. 11 –Lightning Protection and Pilot Lighting C/F to Summary Page					

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 12 – GENERAL ITEMS

Item No.	Description	Qty	Unit	Rate	Amount KSh. Cts.
	Supply, install, test, commission and set to work the following:				
12.00a)	Carry out comprehensive 24-hour power analysis, after installing main switchboard, but before switching on load, upgrading of switch-gear, with a digital power meter (with printer) to: i) Record and print all the power system parameters. ii) Submit 3 copies of the print-outs. **(Note: Parameters must be satisfactory before building is switched on).**		Item		
12.00b)	Carry out comprehensive 24-hour power analysis, after switching main switchboard on full load but AVR off, with a digital power meter (with printer) to: i) Record and print all the power system parameters. ii) Submit 3 copies of the print-outs.		Item		
12.01	With the AVR "on" repeat the above process but before the AVR (i.e. on the supply side of the AVR		Item		
12.02	With the AVR "on" repeat the above process but after the AVR (i.e. on the load side if the AVR)		Item		
12.03	Acquire and submit a Bank Guarantee for 10% of the sub-contract sum, as a Performance Guarantee.		Item		
12.04	Acquire and submit Insurance for the sub-contract work.		Item		
12.05	Allow for presentation of all the required samples as per specifications, Bills of Quantities and Drawings.		Item		
12.06	Prepare and submit Working Drawings as follows:- i) Draft soft copy in Archicad® and Autocad® 2000 in CD-RW. ii) Amended soft copy in Archicad® and Autocad® 2000 in CD-RW. iii) 5 Final soft copies in Archicad® and Autocad® 2000 in CD-RW to Architect, Client, Quantity Surveyor, and Engineer (2 copies) iv) 3 Draft hard-copies of Working Drawings in Ao (Scales 1:50, 1:25) to Engineer, Architect and Main Contractor. v) 2 Amended hard copies of Working Drawings in Ao (Scales 1:50 and 1:25) to Engineer, Architect and Main Contractor. vi) 11 No. Final hard copies of working drawings in Ao (Scales 1:50, 1:25) to Engineer (3 copies), Architect (1 copy), Quantity Surveyor (1 copy), Client (3 copies), Contractor (3 copies). **(Note: Full set of drawings to be presented as per drawing list).**		Item		
	Total C/F to Page H54				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 12: GENERAL ITEMS

Item No.	Description	Qty	Unit	Rate (KSh)	Amount KShs. Cts.
	Total B/F from Page H53				
12.07	As item no. 12.06, but for Record (As-Installed) Drawings comprising: i) Fully dimensioned drawings of all plants and apparatus. ii) General arrangement drawings of equipment, plant etc. iii) Routes – types and sizes and arrangement of all pipework. iv) System schematics and trunking diagrams showing all salient information relating to control and instrumentation. v) Grading charts vi) Wiring and piping diagrams of plant and apparatus. vii) Schematic diagram of individual plants and switch and control boards. viii) All the required operating instructions for all panels, boards, control panels etc.		Item		
12.08	Prepare and submit Maintenance Manuals for all items installed.		Item		
12.09	Provide a year's (12 months') initial maintenance upon expiry of the Defects Liability Period. The maintenance to be carried out every quarter (3 months) for a period of 12 months.		Item		
12.10	<u>All other items</u> of general preliminary to cover, but not limited to:- • Attendance on all other sub-contractors, such as for UPS Installations, Structured LAN Cabling, PABX Installations, Fire Detection and Alarm Installations, Audio Visual Installations, Generator Installations, Lift Services, Solar Water Heating, V-Sat services etc. i) Hiring and keeping a Supervisor/Foreman on site ii) Constant supervision of the works. iii) Provision of all the required spares. iv) Testing and Inspection of materials/works. v) Provision of labour camps. vi) Storage of materials. vii) Initial maintenance (During Defects Liability) viii) Providing water/electricity for the works. ix) Protection of the works/materials x) Clearing away on completion. xi) Preparing Final Account. xii) Providing all Test Certificates, etc.		Item		
Total for Bill No. 12 – General Items, Carried Forward to Summary Page					

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
SUMMARY PAGE:

ITEM	DESCRIPTION	AMOUNT KSHS.	CTS.
S.01	Sub-Contract Preliminaries, B/f from Part D		
S.02	Bill No. 1: Ground Floor B/F from Page H12		
S.03	Bill No. 2: First Floor B/F from Page H14		
S.04	Bill No. 3: Second Floor B/F from Page H19		
S.05	Bill No. 4: Third Floor B/F from Page H24		
S.06	Bill No. 5: Fourth Floor B/F from Page H29		
S.07	Bill No. 6: Fifth Floor B/F from Page H34		
S.08	Bill No. 7: Sixth Floor B/F from Page H39		
S.09	Bill No. 8. Installation of Passenger Lifts B/F from Page H40		
S.10	Bill No. 9. Mains Power Distribution B/F from Page H49		
S.11	Bill No. 10: Water Booster/Hose Reel Pump B/F from Page H50		
S.12	Bill No. 11: Lightning Protection B/F from Page H52		
S.13	Bill No. 12: General Items B/F from Page H54		
S.15	Allow for sub-contractors charges for liaison with Kenya Power comprising the following:- i) Extracting load details from the drawings ii) Calculating total load, together with necessary diversity iii) Verifying the details with the engineer. iv) Getting the required documentation and letters from client v) Filling all the required forms, and generating correspondences for power application. vi) Presenting application and getting reference number. vii) Making regular follow-ups with Kenya Power viii) Facilitating inspection, approvals and certification by Kenya Power ix) Providing attendance and materials required for power connection. x) Filling out and submitting Commencement and Completion certificates xi) Handing over all approved drawings and certificates to the client. xii) Performing all other services required for power supply to site. xiii) Building/modifying all power manholes to Kenya Power standards. xiv) All other incidental Kenya Power requirements/charges.		
S.16	Sub Total		
S 17.	Add 10% of the Sub-Total in Item No. S.16 above as Contingency		
	Total (Carried to Form of Tender)		

ADDENDUM

NOTE: TENDERERS TO FILL THE RATES ONLY.

BILL NO. 13 – INTERNAL ELECTRICAL INSTALLATIONS FOR THE STAFF CLINIC

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Supply, install, test, commission and set to work the following. All lighting fittings to be complete with lamp, control gear etc as applicable.				
	Note: TENDERERS TO FILL THE RATES ONLY IN THIS SECTION				
13.1	**Lighting**				
13.1.1	Lighting point 1-way switched.	138	No.		
13.1.2a)	Lighting point 2-way switched.	64	No.		
13.1.3	5 A white moulded switch plates as MK or Crabtree: -				
	(a) 1-gang 1-way	48	No.		
	(b) 1-gang 2-way	19	No.		
	(c) 2-gang 1-way	4	No.		
	(d) 2-gang 2-way	6	No.		
13.1.4	Install permanent "DANGER" 415V labels where groups of switches have been fed by more than one phase.	6	No.		
13.1.5	Lighting fittings, complete with lamps of specified wattage and appropriate colour rendering: -				
13.1.5a)	600x600mm 4x18W HPF fully recessed fluorescent fitting with highly polished reflectors and lourvres as THORN Cat No EFQTS 418, or approved equivalent.	82	No.		
13.1.5b)	As item No. 12.1.5 (a) above but emergency version as THORN Cat No EFQTS 418.E, or approved equivalent.	41	No		
13.1.5c)	160mm diameter fully recessed downlighter as THORN Corsa160T Cat No COR160 2H126 Cat2, or approved equivalent.	53	No		
13.1.5d)	1 x 36W 1200mm HPF fluorescent fitting with plastic diffuser to IP 65 as Thorn Cat. No. PPD236	7	No		
13.1.5e)	8W maintained Exit Emergency Light as Thorn Cat. No. EFVM3/ICEL, or approved equivalent. Minimum 3-hour autonomy	4	No		
13.1.5f)	16W 2D shallow plastic light fitting as Thorn super club Cat. No. 2D CL16W complete with lamp	10	No.		
13.1.5g)	1 x 18W HPF fluorescent batten fitting with plastic diffuser as Thorn PPD 118 or approved equivalent.	5	No.		
	Total C/F to Page H54				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 12 – INTERNAL ELECTRICAL INSTALLATIONS FOR THE STAFF CLINIC

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total B/F from Page H53				
13.2.0	**<u>Power Supply</u>**				
13.2.0a)	125A MCCB in the existing switch board, complete with metallic enclosures	4	No.		
13.2.0b)	12-way TP/N power distribution board complete with 125A TP/N integral isolator and all accessories including lockable cover. The Distribution Board to be as Crabtree or Multi-9, or approved equivalent.	1	No		
13.2.0c)	As above but 10 way	2	No		
13.2.0d)	As above but 8 way	1	No		
13.2.1a)	4C 35mm^2 PVC/SWA/PVC cable, copper	160	m.		
13.2.1b)	Cable glands for the cable above	8	No.		
13.2.1c)	Cable lugs for the cable above, complete with hydraulic crimping	32	No.		
13.2.2a)	SP MCB the boards above	65	No.		
13.2.2b)	TP MCB the boards above	8	No.		
13.2.2c)	Blanking plates for un-used spare ways.	31	No.		
12.2.2d)	Earthing for the boards above.	Lot			
13.3.1	300 x 50mm 3-compartment angle trunking to details shown, in 14-gauge galvanized steel sheet with cream powder coating finish to approved colour, complete with cover, screws, and all accessories.	240	m.		
13.3.2	300 x 50mm, factory-made corner-bends for the above trunking, in same material and colour finish.	40	No.		
13.3.3	Carry out bonding throughout the entire length of the above trunking in 6mm^2 green PVC insulated copper cable.		Item		
13.3.4	Twin-outlet plates on the trunking, same colour finish	140	No.		
13.3.5	Punched outlet plates on the trunking for data/telephone outlets.	60	No		
	Total C/F to Page H58				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 7 – INTERNAL ELECTRICAL INSTALLATIONS FOR THE STAFF CLINIC

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total B/F from Page H57				
13.3.6a)	Twin 13A non standard white socket outlets, with safety shutters on both live and neutral and with neon light for computer power supply, complete with wiring in 3x2.5mm^2 PVC-SC-CU cables inside the trunking. The socket outlets to be complete with unbreakable 13A fused non standard top plugs	60	No		
13.3.6b)	Additional non-standard top plugs for clients keeping	10	No		
13.3.6c)	Allow for terminating (flexible) computer power cables into non-standard top plugs	60	No		
13.3.6d)	Supply and install 5mm high permanent red trafollyte labels marked "UPS ONLY" for clean line power sockets	60	No		
13.3.7	Twin standard 13A-socket outlet for normal power, wired in 6 x 2.5mm² SC-PVC-CU cables inside concealed conduits.	20	No		
13.3.8	As above but on trunking	60	No.		
13.3.9	Co-axial insulated TV outlet point complete with plate, and draw-wire.	7	No		
13.3.10	Complete TV aerial system to receive all local channels , comprising roof aerial roof with mounting, and 120m long coaxial cable for colour TV reception.(75 Ohms)	7	No		
13.5.2	100A SP/N manual by-pass system for the UPS comprising 100A SP/N manual change-over switch, 3 No. 100A DP MCBs at input and output internal wiring and a common firmly bonded metallic enclosure made from 14 gauge cream powder coated galvanised steel sheets.	1	No		
13.5.3	5C 25mm^2 flexible PVC/PVC/copper cables	60	m		
13.6.0a)	12-way SP/N Consumer unit for clean line complete with 125A SP/N integral isolator and all accessories including lockable cover as approved.	2	No		
13.6.0b)	SP MCB the boards above	17	No.		
13.6.0c)	Blanking plates for un-used spare ways.	7	No.		
13.6.0d)	Earthing for the board above.	Lot			
	Total C/F to Page H59				

CENTRAL BANK OF KENYA
PROPOSED OFFICE MODERNIZATION AND CREATION OF WORK STATIONS-PHASE III AT CENTRAL BANK OF KENYA – NAIROBI
ELECTRICAL INSTALLATIONS – BILLS OF QUANTITIES
BILL NO. 12 – INTERNAL ELECTRICAL INSTALLATIONS FOR THE STAFF CLINIC

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KShs. Cts.
	Total B/F from Page H58				
13.7.0a)	4 x 25mm^2 + 1 x 16 mm^2 SC PVC cable, copper	60	m.		
13.7.1	Dia. 32mm HG PVC conduits buried in floor slab.	300	m.		
13.7.2.	Outlet point for heater and hand drier comprising 20mm diameter conduit, wiring in 3 x 4.0 mm² SC-PVC-CU cables and all accessories including 20A DP switch with neon light as MK or Crabtree.	16	No		
13.7.3	Outlet for 15A socket outlet, comprising box, concealed 20mm diameter H/G PVC conduit, wiring in 3 x 4.0 mm² SC-PVC-CU cables and all accessories including 15A DP switch with neon light.	2	No		
13.7.4	Outlet for cooker control unit comprising wiring in 3x6.0mm^2 SC-PVC CU cables, twin steel box Dia. 25mm HG PVC conduit link, and all accessories including 45A DP cooker control unit with neon lamp, and 13A integral socket with neon lam as MK or approved equivalent.	1	No.		
13.7.5	45A DP cooker connector unit with wiring in 3 x 6.0mm^2 SC-PVC-CU cables, and Dia. 25mm HG conduit link to the above.	1	No.		
13.7.6	Outlet for fire alarm points comprising concealed PVC conduit, box, wiring in 3 x 1.5mm² screened fire-proof cable as FIREPIX or approved equivalent, and all accessories.	54	No		
13.7.7a)	Outlet for air conditioning unit, comprising box concealed, HG PVC conduit, wiring in 3x4mm^2 SC-PVC-CU cables and all accessories including 20A DP switch with neon light.	22	No		
13.7.7b)	30A voltage switch for air-conditioning unit as Sollateck type AVS 30, wired to the A/C unit above	22	No		
13.7.8	Outlet for three phase out door unit for air conditioning unit, comprising box concealed, HG PVC conduit, wiring in 5x10mm^2 SC-PVC-CU cables and all accessories including 32A TP Isolator	6	No		
Total for Bill No. 13– Internal Electrical Installations for the Staff Clinic					

SUMMARY PAGE (continued)

Total Amount in words ……..……

……..…….

Tenderer's Name and Stamp ……..……

Signature…….. **Date ……..……**

PIN No. …… **VAT No. ……**

Witness …… **Address ……..**

Signature …….. **Date ……**

SCHEDULE OF UNIT RATES

ITEM	DESCRIPTION	UNIT	RATE (KShs)
1.00	5A 1 Gang 1 Way SP Plate Switch **Tenderer's Alternative:**		
1.01	5A 2 Gang 1 Way SP Plate Switch **Tenderer's Alternative:**		
1.02	5A 1 Gang 2 Way SP Plate Switch **Tenderer's Alternative:**		
1.03	5A 2 Gang 2 Way SP Plate Switch **Tenderer's Alternative:**		
1.04	5A 3 Gang 2 Way SP Plate Switch **Tenderer's Alternative:**		
1.05	5A 1 Gang Intermediate Switch **Tenderer's Alternative:**		
1.06	13A Twin Switched Socket Outlet for Normal Power Supply **Tenderer's Alternative:**		
1.07	13A Twin Socket Outlet for Clean Line Supply **Tenderer's Alternative:**		
1.08	Single Phase Power Distribution Board 2-way 8-way 12-way 4-way 9-way 16-way 6-way 10-way **Tenderer's Alternative:**		
1.09	Three Phase Power Distribution Board 2-way 8-way 12-way 4-way 9-way 16-way 6-way 10-way **Tenderer's Alternative:**		
1.10	16mm Dia. fully recessed downlighter **Tenderer's Alternative:**		
1.11	600 x 600mm 4 x 18W HPF fully recessed light **Tenderer's Alternative:**		

SCHEDULE OF UNIT RATES

ITEM	DESCRIPTION	UNIT	RATE (KShs)
1.12	As 1.11 above but full emergency version		
	Tenderer's Alternative:		
1.13	2 x 36W 1200mm HPF surface fluorescent batten fitting as Thorn Cat. PP236		
	Tenderer's Alternative:		
1.14	32A TPN Isolator as Telemecanique		
	Tenderer's Alternative:		
1.15	3 – Compartment Perimeter Trunking, 300mm		
	Tenderer's Alternative:		
1.16	Air Terminal for Lightning Protection		
	Tenderer's Alternative:		
1.17	Lightning Protection Earthing Point		
	Tenderer's Alternative:		
1.18	Power Manholes (To KPLC Standards)		
1.19	100mm Dia. HG Duct across road with 100mm concrete surround		
1.20	Dia. 25mm HG PVC conduits in Floor		
1.21	45A DP Cooker Control Unit		
	Tenderer's Alternative:		
1.22	20A DP switch with Neon Light.		
	Tenderer's Alternative:		
1.23	15A round pin socket outlet		
	Tenderer's Alternative:		

SCHEDULE OF UNIT RATES

ITEM	DESCRIPTION	UNIT	RATE (KShs)
1.24	Floor power box detail: **Tenderer's Alternative:**		
1.25	8W maintained 'EXIT' emergency light as Thorn Cat. No. EFVM3/ICEL **Tenderer's Alternative:**		
1.26	100W Tungsten Bulkhead fitting as Thorn Cat. No. OLG 1100 fully recessed on lift shaft mid-floor levels, but fitted with PL 26W lamp. **Tenderer's Alternative:**		
1.27	1 x 36W HPF Fluorescent batten fitting as Thorn Cat. PP136 **Tenderer's Alternative:**		
1.28	1 x 36W HPF Fluorescent batten fitting with back-up battery for 3-hour emergency lighting as Thorn Cat. No. PP136E. **Tenderer's Alternative:**		
1.29	Dust-proof, Jet-proof, corrosion Resistant 2 x 58W 1500mm HPF Fluorescent fitting with plastic diffuser to IP 65 as Thorn Cat. No. FNDV 2065 **Tenderer's Alternative:**		
1.30	Corrosion resistant fluorescent range to IP65/67, 2X36 HPF fluorescent fitting with a crylic diffiuser as Thorn LU Europroof **Tenderer's Alternative:**		
1.31	16W, 2D shallow plastic light fitting as Thorn Superclub **Tenderer's Alternative:**		
1.32	80A TP MCCB **Tenderer's Alternative:**		
1.33	9-Way SP/N Consumer's unit **Tenderer's Alternative:**		

SCHEDULE OF UNIT RATES

ITEM	DESCRIPTION	UNIT	RATE (KShs)
1.34	45A DP isolator as Mk Cat No. 5230 ALM		
	Tenderer's Alternative:		
1.35	30A SP/N contactor unit		
	Tenderer's Alternative:		
1.36	12-way TP/N distribution board		
	Tenderer's Alternative:		
1.37	50A TPN contactor		
	Tenderer's Alternative:		
1.38	50A TPN manual by-pass switch		
	Tenderer's Alternative:		
1.39	50A DP by-pass switch		
	Tenderer's Alternative:		
1.40	50A TP MCB		
	Tenderer's Alternative:		
1.41	300 x 50mm 3-compartment angle trunking		
	Tenderer's Alternative:		
1.42	5A DP switch with pilot light as MK 1060 WHI		
	Tenderer's Alternative:		
1.43	Dual RJ45 outlet point		
	Tenderer's Alternative:		
1.44	450 x 450 x 200mm 14 gauge telephone draw box		
	Tenderer's Alternative:		
1.45	Purpose made floor box, as per details		
	Tenderer's Alternative:		

SCHEDULE OF UNIT RATES

ITEM	DESCRIPTION	UNIT	RATE (KShs)
1.46	Dia. 50mm HG PVC duct	m.	
1.47	Dia. 75mm HG PVC duct	m.	
1.48	Dia. 100m HV PVC duct	m.	
1.49	Dia. 20mm HG PVC conduit	m.	
1.50	Dia. 25mm HG PVC conduit	m.	
1.51	Dia. 32mm HG PVC conduit	m.	
1.52	Dia. 38mm HG PVC conduit	m.	
1.53	1.5mm^2 SC-PVC-Cu cable	m.	
1.54	2.5mm^2 SC-PVC-Cu cable	m.	
1.55	4.0mm^2 SC-PVC-Cu cable	m.	
1.56	6.0mm^2 SC-PVC-Cu cable	m.	
1.57	10.0mm^2 SC-PVC-Cu cable	m.	
1.58	16.0mm^2 SC-PVC-Cu cable	m.	
1.59	25.0mm^2 SC-PVC-Cu cable	m.	
1.60	35.0mm^2 SC-PVC-Cu cable	m.	
1.61	50.0mm^2 SC-PVC-Cu cable	m.	
1.62	4C 240mm^2 PVC/SWA/PVC copper cable	m.	
1.63	4C 1205mm^2 PVC/SWA/PVC copper cable	m.	
1.64	4C 95mm^2 PVC/SWA/PVC copper cable	m.	
1.65	4C 70mm^2 PVC/SWA/PVC copper cable	m.	
1.66	4C 35mm^2 PVC/SWA/PVC copper cable	m.	
1.67	4C 25mm^2 PVC/SWA/PVC copper cable	m.	
1.68	4C 16mm^2 PVC/SWA/PVC copper cable	m.	

SCHEDULE OF UNIT RATES

ITEM	DESCRIPTION	UNIT	RATE (KShs)
1.70	1000KVA 415/240V 3-phase Automatic Voltage regulator capable of regulating each phase independently, with the following characteristics:- Input Variance: ± 25% Output: ± 1% (State Make/type/weight and physical dimensions).		
1.71	Manual By-pass for the 1000 KVA automatic voltage regulator.		
1.72	Manual By-pass for 500KVA automatic voltage regulator.		
1.73	Manual By-pass for the 250 KVA automatic voltage regulator.		

SCHEDULE OF UNIT RATES

ITEM	DESCRIPTION	UNIT (HR)	RATE (KShs)
	HOURLY RATES		
01	Unskilled labourer		
02	Semi-skilled labourer		
03	Skilled labourer		
04	Foreman		
05	Supervisor		
06	Senior Supervisor		
07	Junior Manager		
08	Manager		
09	Senior Manager		
10	Non-Executive Director		
11	Executive Director		

PART I:

FULL SERVICE MAINTENACE PER YEAR AFTER EXPIRY OF DEFECTS LIABILITY PERIOD

PART I: FULL SERVICE MAINTANANCE PER YEAR AFTER EXPIRY OF DEFECTS LIABILITY PERIOD

SPECIAL NOTES

1. The tenderer is advised to note that their price shall be used in the evaluation of the tenders.

2. The tenderer shall price for both labour and consumables (materials) during the 12 months full service period in appenix A of this section. The price shall be for supply, installation, testing and commissioning including all taxes applicable at the time of tender.

3. The tenderer shall list and price the consumable/ spare parts/ materials to be used during the 12 months full service period in appenix B of this section. The price shall be for supply, installation, testing and commissioning including all taxes applicable at the time of tender.

4. The tenderer shall list and price the consumable/ spare parts/ materials to be used during the 36 months full service period. This list is to be comprehensive as possible and shall inculde major spares as cards, fan motors etc. The price shall be for supply, installation, testing and commissioning including all taxes applicable at the time of tender. These are the spare parts that are not required during the normal routine maintenance. These spare parts shall only be paid for as and when repalced. The tenderer shall give the details of these spare parts in in appenix C of this section.

5. The price quoted for the above shall be as per the Standard Maintanance Tender Document.

6. The tenderer shall be required to the sign the 12 Months after Defects Liability Maintanance Contract based on the price quoted and the Standard Maintanance Tender Document refered to in item 5 above.

7. The tenderer **MUST** fill all the prices and rates in the Appendices A, B and C of this section. Failure to do so shall lead to disqualification.

APPENDIX 'A'

PRICE FOR FULL NORMAL ROUTINE MAINTANANCE PER YEAR AFTER DEFECTS LIABILITY PERIOD

Item	Description	Kshs	Cts
1.0	Labour costs per month		
2.0	Material costs for spare parts (consumables) per month – see Appendix C of this section		
Sub-total for one (1No.) Month Maintenance after the Defects Liability Period (Not to be carried to Form of Tender)			
Grand Total for 12 Months Maintenance after the Defects Liability Period (Not to be carried to Form of Tender)			

Signed by the Tenderer.....

Official Stamp .....

Date.....

APPENDIX 'B'

SCHEDULE OF UNIT RATES OF SPARES THAT MAY BE REQUIRED DURING 12 MONTHS AFTER DEFECTS LIABILITY MAINTENANCE PERIOD (ATTACHMENTS ARE ALLOWED IF THE LIST IS LONG)

Item	Description	Unit	Qty	Cost(Kshs.)
Total (Not to be carried to Form of Tender)				

Signed By Tenderer ……..

Official Stamp ……..

……

Date ……

APPENDIX 'C'

PRICE BREAKDOWN OF SPARES / CONSUMABLES TO BE USED DURING 12 MONTHS AFTER DEFECTS LIABILITY MAINTENANCE PERIOD

NOTE: The Price Total in this Appendix C SHOULD tally with the Grand Price Total in Appenix A of this section.

Item	Description	Unit	Qty	Cost(Kshs.)
Total (Not to be carried to Form of Tender)				

Signed By Tenderer ……..

Official Stamp ……..

……

Date ……

PART J:

TECHNICAL SCHEDULE OF ITEMS TO BE SUPPLIED

PART J: TECHNICAL SCHEDULE OF ITEMS TO BE SUPPLIED

CONTENTS

TECHNICAL SCHEDULE

1. General Notes to the Tenderer

1.1 The tenderer shall submit technical schedules for all materials and equipment upon which he has based his tender sum.

1.2 The tenderer shall also submit separate comprehensive descriptive and performance details for all plant apparatus and fittings described in the technical schedules. Manufacturer's literature shall be accepted. Failure to comply with this may have his tender disqualified.

1.3 Completion of the technical schedule shall not relieve the Contractor from complying with the requirements of the specifications except as may be approved by the Engineer.

2. TECHNICAL SCHEDULE

ITEM	DESCRIPTION	MANUFACTURER	COUNTRY OF ORIGIN	REMARKS (Catalogue No.etc.)
1.00	5A 1 Gang 1 Way SP Plate Switch			
1.01	5A 2 Gang 1 Way SP Plate Switch			
1.02	5A 1 Gang 2 Way SP Plate Switch			
1.03	5A 2 Gang 2 Way SP Plate Switch			
1.04	5A 3 Gang 2 Way SP Plate Switch			
1.05	5A 1 Gang Intermediate Switch			
1.06	13A Twin Switched Socket Outlet for Normal Power Supply			
1.07	13A Twin Socket Outlet for Clean Line Supply			
1.08	Single Phase Power Distribution Board 2-way 8-way 12-way 4-way 9-way 16-way 6-way 10-way			
1.09	Three Phase Power Distribution Board 2-way 8-way 12-way 4-way 9-way 16-way 6-way 10-way			
1.10	Rate of Rise Heat Detector			
1.11	Point Ionization Smoke Detector			
1.12	Fire Alarm Bell			
1.13	16mm Dia. fully recessed downlighter			
1.14	600 x 600mm 4 x 18W HPF fully recessed light			
1.15	As 1.14 above but full emergency version			
1.16	2 x 36W 1200mm HPF surface fluorescent batten fitting as Thorn Cat. PP236			
1.17	1x58W 1500mm HPF bare fluorescent batten fitting as Thorn Cat PP158			

TECHNICAL SCHEDULE

ITEM	DESCRIPTION	MANUFACTURER	COUNTRY OF ORIGIN	REMARKS (Catalogue No.etc.)
1.18	As 1.17 above but full emergency version as Thorn Cat. No. EFQTS 418E			
1.19	As 1.17 above but incorporating diffuser as Thorn Cat. No. PP118			
1.20	32A TPN Isolator as Telemecanique			
1.21	Fire Alarm manual call point as Menvier			
1.22	3 – Compartment Perimeter Trunking, 300mm			
1.23	Air Terminal for Lightning Protection			
1.24	Lightning Protection Earthing Point			
1.25	Power Manholes (To KPLC Standards)			
1.26	Telephone Manholes (To Telkom Kenya Standards)			
1.27	High Efficiency enclosed white LM6 Aluminium Floodlight			
1.28	100mm Dia. HG Duct across road with 100mm concrete surround			
1.29	Dia. 25mm HG PVC conduits in Floor			
1.30	45A DP Cooker Control Unit			
1.31	20A DP switch with Neon Light.			
1.32	Computer Data Cable Outlet			
1.33	15A round pin socket outlet			
1.34	Main fire alarm bell			

TECHNICAL SCHEDULE

ITEM	DESCRIPTION	MANUFACTURER	COUNTRY OF ORIGIN	REMARKS (Catalogue No.etc.)
1.35	Fire Alarm Repeater / MIMIC Panel			
1.36	5A Fused (unswitched) connection unit			
1.37	Floor power box detail:			
1.38	8W maintained 'EXIT' emergency light as Thorn Cat. No. EFVM3/ICEL			
1.39	1 x 36W HPF Fluorescent batten fitting as Thorn Cat. PP136			
1.40	1 x 36W HPF Fluorescent batten fitting with back-up battery for 3-hour emergency lighting as Thorn Cat. No. PP136E.			
1.41	16W, 2D shallow plastic light fitting as Thorn Superclub			
1.42	21W 2D Shallow Opal surface mounted light fitting as Thorn Cat. No. 2DXN1			
1.43	4-Lamp, external light fittings rising to 3m above ground.			
1.44	50A TP MCB			
1.45	300 x 50mm 3-compartment angle trunking			
1.46	5A DP switch with pilot light as MK 1060 WHI			
1.47	Dual RJ45 outlet point			
1.48	450 x 450 x 200mm 14 gauge telephone draw box			
1.49	Purpose made table mounted power box, as per details			
1.50	5A DP switch with pilot light as MK 1060 WHI			
1.51	450 x 450 x 200mm 14 gauge telephone draw box			
1.52	Purpose made floor box, as per details			

PART K:

STANDARD FORMS

CONTENTS OF SECTION J

NOTE:

Tenderers must duly fill these Standard Forms as a mandatory requirement as they will form part of the evaluation criteria.

PERFORMANCE BANK GUARANTEE

To: Director,
Department of Estates, Supplies and Transport
Central Bank of Kenya,
Haile Selassie Avenue,
P O Box 60000-00200,
Nairobi.

Dear Sir,

WHEREAS …….(hereinafter called "the Contractor") has undertaken, in pursuance of Contract No. …… dated …… to execute …… (hereinafter called "the Works");

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognised bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee:

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of:
Kshs. ……. (*amount of Guarantee in figures*)
Kenya Shillings ……
…….(*amount of Guarantee in words*),
and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of Kenya Shillings ……..
…….. (*amount of Guarantee in words*) as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change, addition or other modification of the terms of the Contract or of the Works to be performed thereunder or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this Guarantee, and we hereby waive notice of any change, addition, or modification.

This guarantee shall be valid until the date of issue of the Certificate of Completion.

SIGNATURE AND SEAL OF THE GUARANTOR …….

Name of Bank …….

Address ……

Date ……

TENDER QUESTIONNAIRE

Please fill in block letters.

1. Full names of Tenderer:

   ……

2. Full address of Tenderer to which tender correspondence is to be sent (unless an agent has been appointed below):

   ……

3. Telephone number (s) of Tenderer:

   ……

4. Telex/Fax Address of Tenderer:
   ……

5. Name of Tenderer's representative to be contacted on matters of the tender during the tender period:
   ……

6. Details of Tenderer's nominated agent (if any) to receive tender notices. This is essential if the Tenderer does not have his registered address in Kenya (name, address, telephone, telex):

   ……

   ……

_____
Signature of Tenderer

CONFIDENTIAL BUSINESS QUESTIONNAIRE

You are requested to give the particulars indicated in Part 1 and either Part 2 (a), 2 (b) or 2(c) and (2d) whichever applies to your type of business.

You are advised that it is a serious offence to give false information on this Form.

Part 1 – General

Business Name ……

Location of business premises: Country/Town…….

Plot No…… Street/Road ……

Postal Address…… Tel No……..

Nature of Business……..

Current Trade Licence No…… Expiring date……

Maximum value of business which you can handle at any time:

Kenya Shillings……

Name of your bankers……

Branch……

Part 2 (a) – Sole Proprietor

Your name in full…… Age……

Nationality…… Country of Origin……

Citizenship details ……

Part 2 (b) – Partnership

Give details of partners as follows:

	Name in full	*Nationality*	*Citizenship Details*	*Shares*
1.	……	……	…….	……..
2.	……	…….	…….	……
3.	……	……	……	……
4.	……	……	……	.....…

Part 2(c) – Registered Company

Private or Public ……

State the nominal and issued capita of the company:

Nominal KShs. ……..

Issued KShs. ……..

Give details of all directors as follows:

	Name in full	*Nationality*	*Citizenship Details**	*Shares*
1.	……	……	…….	……..
2.	……	…….	…….	……
3.	……	……	……	……
4.	……	……	……	.....…

Part 2(d) Interest in the Firm:

Is there any person/persons in the employment of the Government of Kenya who has interest in this firm? Yes/No ……. (Delete as necessary)

I certify that the above information is correct.

……..	……	…….
Title	Signature	Date

* *Attach proof of citizenship*

KEY PERSONNEL

Qualifications and experience of key personnel proposed for administration and execution of the Contract.

POSITION	NAME	YEARS OF EXPERIENCE (GENERAL)	YEARS OF EXPERIENCE IN PROPOSED POSITION

I certify that the above information is correct.

…….. …… ……

Title Signature Date

CONTRACTS COMPLETED IN THE LAST FIVE (5) YEARS

Work performed on works of a similar nature, complexity and volume over the last 5 years.

PROJECT NAME	NAME OF CLIENT	TYPE OF WORK AND YEAR OF COMPLETION	VALUE OF CONTRACT (Kshs.)

I certify that the above works were successfully carried out and completed by ourselves.

……. …… …….

Title Signature Date

SCHEDULE OF ON-GOING PROJECTS

Details of on-going or committed projects, including expected completion date.

PROJECT NAME	NAME OF CLIENT	CONTRACT SUM	% COMPLETE	COMPLETION DATE

I certify that the above works are currently being carried out by ourselves.

……. ……..…… …….

Title Signature Date

EVIDENCE OF FINANCIAL RESOURCES TO MEET QUALIFICATION REQUIREMENTS

(Cash in hand, Lines of credit, e.t.c. List below and attach copies of supportive documents)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

BIDDERS BANK INFORMATION
(This should be for banks that may provide reference if contacted by the employer)

NAME OF BANK	BANK BRANCH	ACCOUNT NAME	ADDRESS	TELEPHONE

SCHEDULE OF MAJOR ITEMS OF CONTRACTOR'S EQUIPMENT PROPOSED FOR CARRYING OUT THE WORKS

ITEM OF EQUIPMENT	DESCRIPTION, MAKE AND AGE (Years)	CONDITION (New, good, poor) and number available	OWNED, LEASED (From whom?), or to be purchased (From whom?)

PART L:

SCHEDULE OF DRAWINGS