

---

REPUBLIC OF KENYA



**Employer:**            **MINISTRY OF EDUCATION  
STATE DEPARTMENT FOR BASIC EDUCATION**

**Project:**            **SECONDARY EDUCATION QUALITY  
IMPROVEMENT PROJECT (SEQIP)**

**Project No.**        **P160083**

**Contract title:**    **DATA CENTER MECHANICAL AND  
ELECTRICAL INSTALLATIONS AT THE  
ULTRA-MODERN TRAINING CENTRE-  
CEMASTEVA, IN KAREN, NAIROBI COUNTY**

**RFB NO.:**        **MOE/SEQIP/NCB/02/2023-2024**

**REQUEST FOR BIDS  
(DATA CENTRE MECHANICAL AND ELECTRICAL  
INSTALLATIONS)**

**APRIL 2024**

---

# Request for Bids

## Small Works

(One-Envelope Bidding Process)

**Country:** Republic of Kenya

**Name of Project:** Secondary Education Quality Improvement Project (SEQIP)

**Contract Title:** Data Center Mechanical and Electrical Installations at the Ultra-Modern Training Centre- CEMASTEa in KAREN, Nairobi County

**Credit No.:** 6138-KE

**RFB Reference No.:** MOE/SEQIP/NCB/02/2023-2024

1. The **Government of Kenya** has received financing from the World Bank toward the cost of the Secondary Education Quality Improvement Project (SEQIP), and intends to apply part of the proceeds toward payments under the contract for **Data Center Mechanical and Electrical Installations at the Ultra-Modern Training Centre-Cemastea, in Karen, Nairobi County**
2. The Ministry of Education, **State Department for Basic Education** now invites sealed Bids from eligible Bidders for **Data Center Mechanical and Electrical Installations at the Ultra-Modern Training Centre-Cemastea, in Karen, Nairobi County**.
3. Bidding will be conducted through approaching National market using Request for Bids (RFB) selection method as specified in the World Bank's "Procurement Regulations for IPF Borrowers- Procurement in Investment Projects Financing 2016" and revised o Nov, 20220, Fourth Edition" ("Procurement Regulations"), and is open to all eligible Bidders as defined in the Procurement Regulations.
4. Interested eligible Bidders may obtain further information from Head of Supply Chain Management Services, State Department for Basic Education through [scmsequip@education.go.ke](mailto:scmsequip@education.go.ke) and cc [ppo@education.go.ke](mailto:ppo@education.go.ke) or [seqip2018@gmail.com](mailto:seqip2018@gmail.com).
5. The Bidding document in English may be obtained from our offices situated at the address given below during official working hours or downloaded from our website. [www.education.go.ke](http://www.education.go.ke) for free.
6. Bids must be delivered to the address below on or before Date: **2<sup>nd</sup> May, 2024 at 10.00a.m**
7. Electronic Bidding **will not be permitted**. Late Bids will be rejected. Bids will be publicly opened in the presence of the Bidders' designated representatives and anyone who chooses to attend at the address below on Date: **2<sup>nd</sup> May, 2024 at 10.00a.m**
8. All Bids must be accompanied by a Bid Security of **Kenya Shillings 2,000,000.00**

9. All interested local bidders must be registered by National Construction Authority (NCA) **Category 1**. For A Successful Foreign Firm, it will be a requirement to register with the Kenya National Construction Authority Before Signing of the Contract.
10. Attention is drawn to the Procurement Regulations requiring the Borrower to disclose information on the successful bidder's beneficial ownership, as part of the Contract Award Notice, using the Beneficial Ownership Disclosure Form as included in the bidding document.
11. A **compulsory** Pre-Tender conference and site visit will be held at the site located at CEMASTEKA Karen, Date: **17<sup>th</sup> April, 2024 from 9:00 a.m. to 5:00 p.m.** A site visit certificate will be issued.
12. The address (es) referred to above is (are):

**Bid Submission:**

The Principal Secretary  
Attn: Head of Supply Chain  
Management Services  
State Department for Basic Education  
Secondary Education Quality Improvement  
Project Jogoo House 'B' Ground Floor Room  
14, Harambee Avenue  
Postal Address: P.O. Box 30040,  
Nairobi, Kenya Code: 00100  
City: Nairobi  
Tel: (0)20 318581 Ext.30413  
Email: [scmsequip@education.go.ke](mailto:scmsequip@education.go.ke)  
Alternative Emails: [ppo@education.go.ke](mailto:ppo@education.go.ke)  
[seqip2018@gmail.com](mailto:seqip2018@gmail.com)

**Bid Opening:**

Street Address: Jogoo House 'B' Harambee Avenue,  
Floor, room number: 10th Floor, Big Boardroom  
City: Nairobi  
Country: Kenya

# Standard Procurement Document

## Table of Contents

<b>PART 1 – Bidding Procedures .....</b>	<b>2-4</b>
Section I - Instructions to Bidders.....	3-30
Section II - Bid Data Sheet (BDS) .....	31-37
Section III - Evaluation and Qualification Criteria .....	40-50
Section IV - Bidding Forms .....	55-93
Section V - Eligible Countries .....	98-96
Section VI - Fraud and Corruption.....	99-97
<b>PART 2 – Works’ Requirements .....</b>	<b>102-105</b>
Section VII - Works’ Requirements .....	103-105
<b>PART 3 – Conditions of Contract and Contract Forms.....</b>	<b>110</b>
Section VIII - General Conditions of Contract .....	111-139
Section IX - Particular Conditions of Contract .....	144-146
Section X - Contract Forms.....	151-165
<b>PART 6 - Services Installations Works .....</b>	<b>166-GSP 1</b>

# **PART 1 – Bidding Procedures**



# Section I - Instructions to Bidders

## Contents

<b>A. General.....</b>	<b>5</b>
1. Scope of Bid.....	5
2. Source of Funds .....	5
3. Fraud and Corruption .....	6
4. Eligible Bidders.....	6
5. Eligible Materials, Equipment and Services .....	9
<b>B. Contents of Bidding Document .....</b>	<b>9</b>
6. Sections of Bidding Document .....	9
7. Clarification of Bidding Document, Site Visit, Pre-Bid Meeting .....	10
8. Amendment of Bidding Document .....	11
<b>C. Preparation of Bids .....</b>	<b>11</b>
9. Cost of Bidding .....	11
10. Language of Bid.....	11
11. Documents Comprising the Bid.....	11
12. Letter of Bid and Schedules .....	12
13. Alternative Bids.....	12
14. Bid Prices and Discounts.....	13
15. Currencies of Bid and Payment.....	14
16. Documents Comprising the Technical Proposal .....	14
17. Documents Establishing the Eligibility and Qualifications of the Bidder .....	14
18. Period of Validity of Bids .....	15
19. Bid Security.....	15
20. Format and Signing of Bid.....	17
<b>D. Submission and Opening of Bids .....</b>	<b>18</b>
21. Sealing and Marking of Bids.....	18
22. Deadline for Submission of Bids .....	19
23. Late Bids .....	19
24. Withdrawal, Substitution, and Modification of Bids .....	19
25. Bid Opening .....	20
<b>E. Evaluation and Comparison of Bids.....</b>	<b>21</b>
26. Confidentiality.....	21
27. Clarification of Bids.....	21

---

28.	Deviations, Reservations, and Omissions .....	22
29.	Determination of Responsiveness .....	22
30.	Nonmaterial Nonconformities .....	23
31.	Correction of Arithmetical Errors .....	23
32.	Conversion to Single Currency .....	23
33.	Margin of Preference.....	24
34.	Subcontractors .....	24
35.	Evaluation of Bids.....	24
36.	Comparison of Bids.....	25
37.	Abnormally Low Bids.....	25
38.	Unbalanced or Front Loaded Bids .....	26
39.	Qualification of the Bidder.....	26
40.	Most Advantageous Bid.....	27
41.	Employer’s Right to Accept Any Bid, and to Reject Any or All Bids .....	27
42.	Standstill Period .....	27
43.	Notification of Intention to Award.....	27
<b>F.</b>	<b>Award of Contract .....</b>	<b>28</b>
44.	Award Criteria.....	28
45.	Notification of Award .....	28
46.	Debriefing by the Employer .....	29
47.	Signing of Contract .....	29
48.	Performance Security .....	29
49.	Adjudicator.....	30
50.	Procurement Related Complaint .....	30

# Section I - Instructions to Bidders

## A. General

### 1. Scope of Bid

1.1 In connection with the Specific Procurement Notice - Request for Bids (RFB), specified in the Bid Data Sheet (BDS), the Employer, as specified **in the BDS**, issues this bidding document for the provision of Works as specified in Section VII, Works' Requirements. The name, identification and number of lots (contracts) of this RFB are specified **in the BDS**.

1.2 Throughout this bidding document:

- (a) the term "in writing" means communicated in written form (e.g. by mail, e-mail, and fax, including if specified **in the BDS**, distributed or received through the electronic-procurement system used by the Employer) with proof of receipt;
- (b) if the context so requires, "singular" means "plural" and vice versa;
- (c) "Day" means calendar day, unless otherwise specified as "Business Day". A Business Day is any day that is an official working day of the Borrower. It excludes the Borrower's official public holidays; and
- (d) "ESHS" means environmental, social (including sexual exploitation and abuse (SEA) and gender based violence (GBV)), health and safety.

### 2. Source of Funds

2.1 The Borrower or Recipient (hereinafter called "Borrower") specified **in the BDS** has received or has applied for financing (hereinafter called "funds") from the International Bank for Reconstruction and Development or the International Development Association (hereinafter called "the Bank") in an amount specified **in the BDS**, toward the project named **in the BDS**. The Borrower intends to apply a portion of the funds to eligible payments under the contract(s) for which this bidding document is issued.

2.2 Payment by the Bank will be made only at the request of the Borrower and upon approval by the Bank, and will be subject, in all respects, to the terms and conditions of the Loan (or other financing) Agreement. The Loan (or other financing) Agreement prohibits a withdrawal from the loan account for the purpose of any payment to persons or entities, or for any import of goods,

equipment, plant, or materials, if such payment or import is prohibited by a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations. No party other than the Borrower shall derive any rights from the Loan (or other financing) Agreement or have any claim to the proceeds of the Loan (or other financing).

### **3. Fraud and Corruption**

- 3.1 The Bank requires compliance with the Bank's Anti-Corruption Guidelines and its prevailing sanctions policies and procedures as set forth in the WBG's Sanctions Framework, as set forth in Section VI.
- 3.2 In further pursuance of this policy, bidders shall permit and shall cause their agents (where declared or not), subcontractors, subconsultants, service providers, suppliers, and their personnel, to permit the Bank to inspect all accounts, records and other documents relating to any initial selection process, prequalification process, bid submission, proposal submission, and contract performance (in the case of award), and to have them audited by auditors appointed by the Bank.

### **4. Eligible Bidders**

- 4.1 A Bidder may be a firm that is a private entity, or a state-owned enterprise or institution, subject to ITB 4.6, or any combination of them in the form of a joint venture (JV), under an existing agreement, or with the intent to enter into such an agreement supported by a letter of intent. In the case of a joint venture, all members shall be jointly and severally liable for the execution of the entire Contract in accordance with the Contract terms. The JV shall nominate a Representative who shall have the authority to conduct all business for and on behalf of any and all the members of the JV during the Bidding process and, in the event the JV is awarded the Contract, during contract execution. Unless specified **in the BDS**, there is no limit on the number of members in a JV.
- 4.2 A Bidder shall not have a conflict of interest. All Bidders found to have a conflict of interest shall be disqualified. A Bidder may be considered to have a conflict of interest for the purpose of this Bidding process, if the Bidder:
  - (a) directly or indirectly controls, is controlled by or is under common control with another Bidder; or
  - (b) receives or has received any direct or indirect subsidy from another Bidder; or
  - (c) has the same legal representative as another Bidder; or
  - (d) has a relationship with another Bidder, directly or through common third parties, that puts it in a position to influence

- the Bid of another Bidder, or influence the decisions of the Employer regarding this bidding process; or
- (e) or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the works that are the subject of the Bid; or
  - (f) or any of its affiliates has been hired (or is proposed to be hired) by the Employer or Borrower as Project Manager for the Contract implementation;
  - (g) would be providing goods, works, or non-consulting services resulting from or directly related to consulting services for the preparation or implementation of the project specified in the BDS ITB 2.1 that it provided or were provided by any affiliate that directly or indirectly controls, is controlled by, or is under common control with that firm;
  - (h) has a close business or family relationship with a professional staff of the Borrower (or of the project implementing agency, or of a recipient of a part of the loan) who: (i) are directly or indirectly involved in the preparation of the bidding document or specifications of the contract, and/or the Bid evaluation process of such contract; or (ii) would be involved in the implementation or supervision of such contract unless the conflict stemming from such relationship has been resolved in a manner acceptable to the Bank throughout the procurement process and execution of the contract.
- 4.3 A firm that is a Bidder (either individually or as a JV member) shall not participate in more than one Bid, except for permitted alternative Bids. This includes participation as a Subcontractor in other Bids. Such participation shall result in the disqualification of all Bids in which the firm is involved. A firm that is not a Bidder or a JV member may participate as a subcontractor in more than one Bid.
- 4.4 A Bidder may have the nationality of any country, subject to the restrictions pursuant to ITB 4.8. A Bidder shall be deemed to have the nationality of a country if the Bidder is constituted, incorporated or registered in and operates in conformity with the provisions of the laws of that country, as evidenced by its articles of incorporation (or equivalent documents of constitution or association) and its registration documents, as the case may be. This criterion also shall apply to the determination of the nationality of proposed subcontractors or subconsultants for any

part of the Contract including related Services.

- 4.5 A Bidder that has been sanctioned by the Bank, pursuant to the Bank's Anti-Corruption Guidelines, in accordance with its prevailing sanctions policies and procedures as set forth in the WBG's Sanctions Framework as described in Section VI paragraph 2.2 d., shall be ineligible to be prequalified for, initially selected for, bid for, propose for, or be awarded a Bank-financed contract or benefit from a Bank-financed contract, financially or otherwise, during such period of time as the Bank shall have determined. The list of debarred firms and individuals is available at the electronic address specified in the BDS.
- 4.6 Bidders that are state-owned enterprises or institutions in the Employer's Country may be eligible to compete and be awarded a Contract(s) only if they can establish, in a manner acceptable to the Bank, that they (i) are legally and financially autonomous (ii) operate under commercial law, and (iii) are not under supervision of the Employer.
- 4.7 A Bidder shall not be under suspension from Bidding by the Employer as the result of the operation of a Bid-Securing or Proposal-Securing Declaration.
- 4.8 Firms and individuals may be ineligible if so indicated in Section V and (a) as a matter of law or official regulations, the Borrower's country prohibits commercial relations with that country, provided that the Bank is satisfied that such exclusion does not preclude effective competition for the supply of goods or the contracting of works or services required; or (b) by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, the Borrower's country prohibits any import of goods or contracting of works or services from that country, or any payments to any country, person, or entity in that country. When the Works are implemented across jurisdictional boundaries (and more than one country is a Borrower, and is involved in the procurement), then exclusion of a firm or individual on the basis of ITB 4.8 (a) above by any country may be applied to that procurement across other countries involved, if the Bank and the Borrowers involved in the procurement agree.
- 4.9 A Bidder shall provide such documentary evidence of eligibility satisfactory to the Employer, as the Employer shall reasonably request.
- 4.10 A firm that is under a sanction of debarment by the Borrower from being awarded a contract is eligible to participate in this

procurement, unless the Bank, at the Borrower's request, is satisfied that the debarment;

- (a) relates to fraud or corruption, and
- (b) followed a judicial or administrative proceeding that afforded the firm adequate due process.

**5. Eligible Materials, Equipment and Services**

5.1 The materials, equipment and services to be supplied under the Contract and financed by the Bank may have their origin in any country subject to the restrictions specified in Section V, Eligible Countries, and all expenditures under the Contract will not contravene such restrictions. At the Employer's request, Bidders may be required to provide evidence of the origin of materials, equipment and services.

**B. Contents of Bidding Document**

**6. Sections of Bidding Document**

6.1 The bidding document consists of Parts 1, 2, and 3, which include all the sections specified below, and which should be read in conjunction with any Addenda issued in accordance with ITB 8.

**PART 1 Bidding Procedures**

- Section I - Instructions to Bidders (ITB)
- Section II - Bid Data Sheet (BDS)
- Section III - Evaluation and Qualification Criteria
- Section IV - Bidding Forms
- Section V - Eligible Countries
- Section VI - Fraud and Corruption

**PART 2 Works' Requirements**

- Section VII - Works' Requirements

**PART 3 Conditions of Contract and Contract Forms**

- Section VIII - General Conditions of Contract (GCC)
- Section IX - Particular Conditions of Contract (PCC)
- Section X - Contract Forms

6.2 The Specific Procurement Notice - Request for Bids (RFB) issued by the Employer is not part of this bidding document.

6.3 Unless obtained directly from the Employer, the Employer is not responsible for the completeness of the bidding document,

responses to requests for clarification, the minutes of the pre-Bid meeting (if any), or Addenda to the bidding document in accordance with ITB 8. In case of any contradiction, documents obtained directly from the Employer shall prevail.

6.4 The Bidder is expected to examine all instructions, forms, terms, and specifications in the bidding document and to furnish with its Bid all information and documentation as is required by the bidding document.

**7. Clarification of Bidding Document, Site Visit, Pre-Bid Meeting**

7.1 A Bidder requiring any clarification of the bidding document shall contact the Employer in writing at the Employer's address specified **in the BDS** or raise its inquiries during the pre-Bid meeting if provided for in accordance with ITB 7.4. The Employer will respond in writing to any request for clarification, provided that such request is received prior to the deadline for submission of Bids within a period specified **in the BDS**. The Employer shall forward copies of its response to all Bidders who have acquired the bidding document in accordance with ITB 6.3, including a description of the inquiry but without identifying its source. If so specified **in the BDS**, the Employer shall also promptly publish its response at the web page identified in the BDS. Should the clarification result in changes to the essential elements of the bidding document, the Employer shall amend the bidding document following the procedure under ITB 8 and ITB 22.2.

7.2 The Bidder is advised to visit and examine the Site of Works and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the bid and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the Bidder's own expense.

7.3 The Bidder and any of its personnel or agents will be granted permission by the Employer to enter upon its premises and lands for the purpose of such visit, but only upon the express condition that the Bidder, its personnel, and agents will release and indemnify the Employer and its personnel and agents from and against all liability in respect thereof, and will be responsible for death or personal injury, loss of or damage to property, and any other loss, damage, costs, and expenses incurred as a result of the inspection.

7.4 If so specified **in the BDS**, the Bidder's designated representative is invited to attend a pre-Bid meeting and/or a Site of Works visit. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.

- 7.5 The Bidder is requested, to submit any questions in writing, to reach the Employer not later than one week before the meeting.
- 7.6 Minutes of the pre-Bid meeting, if applicable, including the text of the questions asked by Bidders, without identifying the source, and the responses given, together with any responses prepared after the meeting, will be transmitted promptly to all Bidders who have acquired the bidding document in accordance with ITB 6.3 Any modification to the bidding document that may become necessary as a result of the pre-Bid meeting shall be made by the Employer exclusively through the issue of an addendum pursuant to ITB 8 and not through the minutes of the pre-Bid meeting. Nonattendance at the pre-Bid meeting will not be a cause for disqualification of a Bidder.

**8. Amendment of Bidding Document**

- 8.1 At any time prior to the deadline for submission of bids, the Employer may amend the bidding document by issuing addenda.
- 8.2 Any addendum issued shall be part of the bidding document and shall be communicated in writing to all who have obtained the bidding document from the Employer in accordance with ITB 6. The Employer shall also promptly publish the addendum on the Employer's web page in accordance with ITB 7.1.
- 8.3 To give prospective Bidders reasonable time in which to take an addendum into account in preparing their Bids, the Employer may, at its discretion, extend the deadline for the submission of Bids, pursuant to ITB 22.2.

**C. Preparation of Bids**

**9. Cost of Bidding**

- 9.1 The Bidder shall bear all costs associated with the preparation and submission of its Bid, and the Employer shall in no case be responsible or liable for those costs regardless of the conduct or outcome of the Bidding process.

**10. Language of Bid**

- 10.1 The Bid, as well as all correspondence and documents relating to the Bid exchanged by the Bidder and the Employer, shall be written in the language specified in the BDS. Supporting documents and printed literature that are part of the Bid may be in another language provided they are accompanied by an accurate translation of the relevant passages in the language specified in the BDS, in which case, for purposes of interpretation of the Bid, such translation shall govern.

**11. Documents Comprising the**

- 11.1 The Bid shall comprise the following:

**Bid**

- (a) **Letter of Bid** prepared in accordance with ITB 12;
- (b) **Bill of Quantities or Activity Schedule:** completed in accordance with ITB 12 and ITB 14, as specified **in the BDS**;
- (c) **Bid Security or Bid-Securing Declaration**, in accordance with ITB 19.1;
- (d) **Alternative Bid**, if permissible, in accordance with ITB 13;
- (e) **Authorization:** written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB 20.3;
- (f) **Bidder's Eligibility:** documentary evidence in accordance with ITB 17 establishing the Bidder's eligibility to Bid;
- (g) **Qualifications:** documentary evidence in accordance with ITB 17 establishing the Bidder's qualifications to perform the contract if its Bid is accepted;
- (h) **Conformity:** a technical proposal in accordance with ITB 16;
- (i) any other document required **in the BDS**.

11.2 In addition to the requirements under ITB 11.1, Bids submitted by a JV shall include a copy of the Joint Venture Agreement entered into by all members. Alternatively, a letter of intent to execute a Joint Venture Agreement in the event of a successful bid shall be signed by all members and submitted with the Bid, together with a copy of the proposed Agreement.

11.3 The Bidder shall furnish in the Letter of Bid information on commissions and gratuities, if any, paid or to be paid to agents or any other party relating to this Bid.

**12. Letter of Bid and Schedules**

12.1 The Letter of Bid and Schedules shall be prepared using the relevant forms furnished in Section IV, Bidding Forms. The forms must be completed without any alterations to the text, and no substitutes shall be accepted except as provided under ITB 20.3. All blank spaces shall be filled in with the information requested.

**13. Alternative Bids**

13.1 Unless otherwise specified **in the BDS**, alternative Bids shall not be considered.

13.2 When alternative times for completion are explicitly invited, a statement to that effect will be included **in the BDS** and the

method of evaluating different alternative times for completion will be described in Section III, Evaluation and Qualification Criteria.

- 13.3 Except as provided under ITB 13.4 below, Bidders wishing to offer technical alternatives to the requirements of the bidding document must first price the Employer's design as described in the bidding document and shall further provide all information necessary for a complete evaluation of the alternative by the Employer, including drawings, design calculations, technical specifications, breakdown of prices, and proposed construction methodology and other relevant details. Only the technical alternatives, if any, of the Bidder with the Most Advantageous Bid conforming to the basic technical requirements shall be considered by the Employer.
- 13.4 When specified **in the BDS**, Bidders are permitted to submit alternative technical solutions for specified parts of the Works. Such parts will be identified **in the BDS** and described in Section VII, Works' Requirements. The method for their evaluation will be stipulated in Section III, Evaluation and Qualification Criteria.

#### **14. Bid Prices and Discounts**

- 14.1 The prices and discounts quoted by the Bidder in the Letter of Bid and in the Activity Schedule or Bill of Quantities shall conform to the requirements specified below.
- 14.2 The Bidder shall submit a Bid for the whole of the Works described in ITB 1.1 by filling in prices for all items of the Works, as identified in Section IV. Bidding Forms. In case of admeasurement contracts, the Bidder shall fill in rates and prices for all items of the Works described in the Bill of Quantities. Items against which no rate or price is entered by the Bidder 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 Bill of Quantities.
- 14.3 The price to be quoted in the Letter of Bid, in accordance with ITB 12.1, shall be the total price of the Bid, excluding any discounts offered.
- 14.4 The Bidder shall quote any discounts and indicate the methodology for their application in the Letter of Bid in accordance with ITB 12.1.
- 14.5 Unless otherwise specified **in the BDS** and the Conditions of Contract, the prices quoted by the Bidder shall be fixed. If the prices quoted by the Bidder are subject to adjustment during the performance of the Contract in accordance with the provisions of

the Conditions of Contract, the Bidder shall furnish the indices and weightings for the price adjustment formulae in the Schedule of Adjustment Data in Section IV- Bidding Forms and the Employer may require the Bidder to justify its proposed indices and weightings.

- 14.6 If so specified in ITB 1.1, Bids are invited for individual lots (contracts) or for any combination of lots (packages). Bidders wishing to offer discounts for the award of more than one Contract shall specify in their Bid the price reductions applicable to each package, or alternatively, to individual Contracts within the package. Discounts shall be submitted in accordance with ITB 14.4, provided the Bids for all lots (contracts) are opened at the same time.
- 14.7 All duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause, as of the date 28 days prior to the deadline for submission of Bids, shall be included in the rates and prices<sup>1</sup> and the total Bid price submitted by the Bidder.

**15. Currencies of Bid and Payment**

- 15.1 The currency(ies) of the Bid and the currency(ies) of payments shall be the same and shall be as specified **in the BDS**.
- 15.2 Bidders may be required by the Employer to justify, to the Employer's satisfaction, their local and foreign currency requirements, and to substantiate that the amounts included in the unit rates and prices and shown in the Schedule of Adjustment Data are reasonable<sup>2</sup>, in which case a detailed breakdown of the foreign currency requirements shall be provided by Bidders.

**16. Documents Comprising the Technical Proposal**

- 16.1 The Bidder shall furnish a technical proposal including a statement of work methods, equipment, personnel, schedule and any other information as stipulated in Section IV, Bidding Forms, in sufficient detail to demonstrate the adequacy of the Bidders' proposal to meet the work's requirements and the completion time.

**17. Documents Establishing the Eligibility and Qualifications of the Bidder**

- 17.1 To establish Bidder's eligibility in accordance with ITB 4, Bidders shall complete the Letter of Bid, included in Section IV, Bidding Forms.
- 17.2 In accordance with Section III, Evaluation and Qualification Criteria, to establish its qualifications to perform the Contract, the Bidder shall provide the information requested in the

<sup>1</sup> In lump sum contracts, delete "rates and prices and the."

<sup>2</sup> For lump sum contracts, delete "unit rates and prices and shown in the Schedule of Adjustment Data are reasonable" and replace with "Lump Sum."

corresponding information sheets included in Section IV, Bidding Forms.

17.3 If a margin of preference applies as specified in accordance with ITB 33.1, domestic Bidders, individually or in joint ventures, applying for eligibility for domestic preference shall supply all information required to satisfy the criteria for eligibility specified in accordance with ITB 33.1.

## 18. Period of Validity of Bids

18.1 Bids shall remain valid for the Bid Validity period specified **in the BDS**. The Bid Validity period starts from the date fixed for the Bid submission deadline (as prescribed by the Employer in accordance with ITB 22.1). A Bid valid for a shorter period shall be rejected by the Employer as nonresponsive.

18.2 In exceptional circumstances, prior to the expiration of the Bid validity period, the Employer may request Bidders to extend the period of validity of their Bids. The request and the responses shall be made in writing. If a Bid Security is requested in accordance with ITB 19, it shall also be extended for twenty- eight (28) days beyond the deadline of the extended validity period. A Bidder may refuse the request without forfeiting its Bid Security. A Bidder granting the request shall not be required or permitted to modify its Bid, except as provided in ITB 18.3.

18.3 If the award is delayed by a period exceeding fifty-six (56) days beyond the expiry of the initial Bid validity period, the Contract price shall be determined as follows:

- (a) in the case of **fixed price** contracts, the Contract price shall be the Bid price adjusted by the factor specified **in the BDS**;
- (b) in the case of **adjustable** price contracts, no adjustment shall be made; or
- (c) in any case, Bid evaluation shall be based on the Bid price without taking into consideration the applicable correction from those indicated above.

## 19. Bid Security

19.1 The Bidder shall furnish as part of its Bid, either a Bid-Securing Declaration or a Bid Security as specified **in the BDS**, in original form and, in the case of a Bid Security, in the amount and currency specified **in the BDS**.

19.2 A Bid Securing Declaration shall use the form included in Section IV, Bidding Forms.

19.3 If a Bid Security is specified pursuant to ITB 19.1, the Bid Security shall be a demand guarantee in any of the following forms at the Bidder's option:

- (a) an unconditional guarantee issued by a bank or non-bank financial institution (such as an insurance, bonding or surety company);
- (b) an irrevocable letter of credit;
- (c) a cashier's or certified check; or
- (d) another security specified **in the BDS**,

from a reputable source from an eligible country. If an unconditional guarantee is issued by a non-bank financial institution located outside the Employer's Country, the issuing non-bank financial institution shall have a correspondent financial institution located in the Employer's Country to make it enforceable, unless the Employer has agreed in writing, prior to Bid submission, that a correspondent financial institution is not required. In the case of a bank guarantee, the Bid Security shall be submitted either using the Bid Security Form included in Section IV, Bidding Forms, or in another substantially similar format approved by the Employer prior to Bid submission. The Bid Security shall be valid for twenty-eight (28) days beyond the original validity period of the Bid, or beyond any period of extension if requested under ITB 18.2.

19.4 If a Bid Security or Bid Securing Declaration is specified pursuant to ITB 19.1, any Bid not accompanied by a substantially responsive Bid Security or Bid-Securing Declaration shall be rejected by the Employer as non-responsive.

19.5 If a Bid Security is specified pursuant to ITB 19.1, the Bid Security of unsuccessful Bidders shall be returned as promptly as possible upon the successful Bidder's signing the Contract and furnishing the Performance Security and if required in the BDS, the Environmental, Social, Health and Safety (ESHS) Performance Security pursuant to ITB 48.

19.6 The Bid Security of the successful Bidder shall be returned as promptly as possible once the successful Bidder has signed the Contract and furnished the required Performance Security. and if required in the BDS, the Environmental, Social, Health and Safety (ESHS) Performance Security.

19.7 The Bid Security may be forfeited or the Bid-Securing

Declaration executed:

- (a) if a Bidder withdraws its Bid during the period of Bid validity specified by the Bidder on the Letter of Bid, or any extension thereto provided by the Bidder; or
- (b) if the successful Bidder fails to:
  - (i) sign the Contract in accordance with ITB 47; or
  - (ii) furnish a Performance Security and if required in the BDS, the Environmental, Social, Health and Safety (ESHS) Performance Security in accordance with ITB 48.

19.8 The Bid Security or the Bid-Securing Declaration of a JV shall be in the name of the JV that submits the Bid. If the JV has not been constituted into a legally enforceable JV, at the time of Bidding, the Bid Security or the Bid-Securing Declaration shall be in the names of all future members as named in the letter of intent mentioned in ITB 4.1 and ITB 11.2.

19.9 If a Bid Security is not required **in the BDS**, pursuant to ITB 19.1, and;

- (a) if a Bidder withdraws its Bid during the period of Bid validity specified by the Bidder on the Letter of Bid; or
- (b) if the successful Bidder fails to: sign the Contract in accordance with ITB 47, or furnish a Performance Security and if required in the BDS, the Environmental, Social, Health and Safety (ESHS) Performance Security in accordance with ITB 48;

the Borrower may, if provided for **in the BDS**, declare the Bidder ineligible to be awarded a contract by the Employer for a period of time stated **in the BDS**.

## 20. Format and Signing of Bid

20.1 The Bidder shall prepare one original of the documents comprising the Bid as described in ITB 11 and clearly mark it "ORIGINAL". Alternative Bids, if permitted in accordance with ITB 13, shall be clearly marked "ALTERNATIVE". In addition, the Bidder shall submit copies of the Bid in the number specified **in the BDS**, and clearly mark each of them "COPY." In the event of any discrepancy between the original and the copies, the original shall prevail.

20.2 Bidders shall mark as "CONFIDENTIAL" information in their Bids which is confidential to their business. This may include

proprietary information, trade secrets, or commercial or financially sensitive information.

- 20.3 The original and all copies of the Bid shall be typed or written in indelible ink and shall be signed by a person duly authorized to sign on behalf of the Bidder. This authorization shall consist of a written confirmation as specified **in the BDS** and shall be attached to the Bid. The name and position held by each person signing the authorization must be typed or printed below the signature. All pages of the Bid where entries or amendments have been made shall be signed or initialed by the person signing the Bid.
- 20.4 In case the Bidder is a JV, the Bid shall be signed by an authorized representative of the JV on behalf of the JV, and so as to be legally binding on all the members as evidenced by a power of attorney signed by their legally authorized representatives.
- 20.5 Any interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the Bid.

#### **D. Submission and Opening of Bids**

#### **21. Sealing and Marking of Bids**

- 21.1 The Bidder shall deliver the Bid in a single, sealed envelope (one-envelope Bidding process). Within the single envelope the Bidder shall place the following separate, sealed envelopes:
- (a) in an envelope marked “ORIGINAL”, all documents comprising the Bid, as described in ITB 11; and
  - (b) in an envelope marked “COPIES”, all required copies of the Bid; and
  - (c) if alternative Bids are permitted in accordance with ITB 13, and if relevant:
    - (i) in an envelope marked “ ORIGINAL - ALTERNATIVE BID”, the alternative Bid; and
    - (ii) in the enveloped marked “COPIES – ALTERNATIVE BID” all required copies of the alternative Bid.
- 21.2 The inner and outer envelopes shall:
- (a) bear the name and address of the Bidder;
  - (b) be addressed to the Employer in accordance with ITB 22.1;
  - (c) bear the specific identification of this Bidding process

specified in accordance with BDS 1.1; and

- (d) bear a warning not to open before the time and date for Bid opening.

21.3 If all envelopes are not sealed and marked as required, the Employer will assume no responsibility for the misplacement or premature opening of the Bid.

## **22. Deadline for Submission of Bids**

22.1 Bids must be received by the Employer at the address and no later than the date and time specified **in the BDS**. When so specified **in the BDS**, Bidders shall have the option of submitting their Bids electronically. Bidders submitting Bids electronically shall follow the electronic bid submission procedures specified **in the BDS**.

22.2 The Employer may, at its discretion, extend the deadline for the submission of Bids by amending the bidding document in accordance with ITB 8, in which case all rights and obligations of the Employer and Bidders previously subject to the deadline shall thereafter be subject to the deadline as extended.

## **23. Late Bids**

23.1 The Employer shall not consider any Bid that arrives after the deadline for submission of Bids, in accordance with ITB 22. Any Bid received by the Employer after the deadline for submission of Bids shall be declared late, rejected, and returned unopened to the Bidder.

## **24. Withdrawal, Substitution, and Modification of Bids**

24.1 A Bidder may withdraw, substitute, or modify its Bid after it has been submitted by sending a written notice, duly signed by an authorized representative, and shall include a copy of the authorization in accordance with ITB 20.3, (except that withdrawal notices do not require copies). The corresponding substitution or modification of the Bid must accompany the respective written notice. All notices must be:

- (a) prepared and submitted in accordance with ITB 20 and ITB 21 (except that withdrawal notices do not require copies), and in addition, the respective envelopes shall be clearly marked “WITHDRAWAL,” “SUBSTITUTION,” “MODIFICATION”; and
- (b) received by the Employer prior to the deadline prescribed for submission of Bids, in accordance with ITB 22.

24.2 Bids requested to be withdrawn in accordance with ITB 24.1 shall be returned unopened to the Bidders.

24.3 No Bid may be withdrawn, substituted, or modified in the interval between the deadline for submission of Bids and the expiration of

the period of Bid validity specified by the Bidder on the Letter of Bid or any extension thereof.

## 25. Bid Opening

- 25.1 Except in the cases specified in ITB 23 and ITB 24.2, the Employer shall publicly open and read out in accordance with this ITB, all Bids received by the deadline, at the date, time and place specified **in the BDS**, in the presence of Bidders' designated representatives and anyone who chooses to attend. All Bidders, or their representatives and any interested party may attend a public opening. Any specific electronic Bid opening procedures required if electronic bidding is permitted in accordance with ITB 22.1, shall be as specified **in the BDS**.
- 25.2 First, envelopes marked "WITHDRAWAL" shall be opened and read out and the envelope with the corresponding Bid shall not be opened, but returned to the Bidder. No Bid withdrawal shall be permitted unless the corresponding withdrawal notice contains a valid authorization to request the withdrawal and is read out at Bid opening.
- 25.3 Next, envelopes marked "SUBSTITUTION" shall be opened and read out and exchanged with the corresponding Bid being substituted, and the substituted Bid shall not be opened, but returned to the Bidder. No Bid substitution shall be permitted unless the corresponding substitution notice contains a valid authorization to request the substitution and is read out at Bid opening.
- 25.4 Next, envelopes marked "MODIFICATION" shall be opened and read out with the corresponding Bid. No Bid modification shall be permitted unless the corresponding modification notice contains a valid authorization to request the modification and is read out at bid opening.
- 25.5 Next, all remaining envelopes shall be opened one at a time, reading out: the name of the Bidder and whether there is a modification; the total Bid Price, per lot (contract) if applicable, including any discounts and alternative Bids; the presence or absence of a Bid Security, or Bid Securing Declaration, if required; and any other details as the Employer may consider appropriate.
- 25.6 Only Bids, alternative Bids and discounts that are opened and read out at Bid opening shall be considered further for evaluation. The Letter of Bid and the priced Schedules are to be initialed by representatives of the Employer attending Bid opening in the manner specified **in the BDS**.

- 25.7 The Employer shall neither discuss the merits of any Bid nor reject any Bid (except for late Bids, in accordance with ITB 23.1).
- 25.8 The Employer shall prepare a record of the Bid opening that shall include, as a minimum:
- (a) the name of the Bidder and whether there is a withdrawal, substitution, or modification;
  - (b) the Bid Price, per lot (contract) if applicable, including any discounts;
  - (c) the presence or absence of a Bid Security or Bid-Securing Declaration, if one was required; and
  - (d) any alternative Bids.
- 25.9 The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record. A copy of the record shall be distributed to all Bidders.

### **E. Evaluation and Comparison of Bids**

#### **26. Confidentiality**

- 26.1 Information relating to the evaluation of Bids and recommendation of contract award, shall not be disclosed to Bidders or any other persons not officially concerned with the Bidding process until information on Intention to Award the Contract is transmitted to all Bidders in accordance with ITB 43.
- 26.2 Any effort by a Bidder to influence the Employer in the evaluation of the Bids or Contract award decisions may result in the rejection of its Bid.
- 26.3 Notwithstanding ITB 26.2, from the time of Bid opening to the time of Contract award, if a Bidder wishes to contact the Employer on any matter related to the Bidding process, it shall do so in writing.

#### **27. Clarification of Bids**

- 27.1 To assist in the examination, evaluation, and comparison of the Bids, and qualification of the Bidders, the Employer may, at its discretion, ask any Bidder for a clarification of its Bid given a reasonable time for a response. Any clarification submitted by a Bidder that is not in response to a request by the Employer shall not be considered. The Employer's request for clarification and the response shall be in writing. No change, including any voluntary increase or decrease in the prices or substance of the

Bid shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Bids, in accordance with ITB 31.

27.2 If a Bidder does not provide clarifications of its Bid by the date and time set in the Employer's request for clarification, its Bid may be rejected.

**28. Deviations,  
Reservations,  
and Omissions**

28.1 During the evaluation of Bids, the following definitions apply:

- (a) "Deviation" is a departure from the requirements specified in the bidding document;
- (b) "Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the bidding document; and
- (c) "Omission" is the failure to submit part or all of the information or documentation required in the bidding document.

**29. Determination of  
Responsiveness**

29.1 The Employer's determination of a Bid's responsiveness is to be based on the contents of the Bid itself, as defined in ITB 11.

29.2 A substantially responsive Bid is one that meets the requirements of the bidding document without material deviation, reservation, or omission. A material deviation, reservation, or omission is one that:

- (a) if accepted, would:
  - (i) affect in any substantial way the scope, quality, or performance of the Works specified in the Contract; or
  - (ii) limit in any substantial way, inconsistent with the bidding document, the Employer's rights or the Bidder's obligations under the proposed Contract; or
- (b) if rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive Bids.

29.3 The Employer shall examine the technical aspects of the Bid submitted in accordance with ITB 16, in particular, to confirm that all requirements of Section VII, Works' Requirements have been met without any material deviation, reservation or omission.

29.4 If a Bid is not substantially responsive to the requirements of the bidding document, it shall be rejected by the Employer and may not subsequently be made responsive by correction of the material

deviation, reservation, or omission.

**30. Nonmaterial  
Nonconformities**

30.1 Provided that a Bid is substantially responsive, the Employer may waive any nonconformities in the Bid.

30.2 Provided that a Bid is substantially responsive, the Employer may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities in the Bid related to documentation requirements. Requesting information or documentation on such nonconformities shall not be related to any aspect of the price of the Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.

30.3 Provided that a Bid is substantially responsive, the Employer shall rectify quantifiable nonmaterial nonconformities related to the Bid Price. To this effect, the Bid Price shall be adjusted, for comparison purposes only, to reflect the price of a missing or nonconforming item or component in the manner specified **in the BDS**.

**31. Correction of  
Arithmetical  
Errors**

31.1 Provided that the Bid is substantially responsive, the Employer shall correct arithmetical errors on the following basis:

- (a) only for admeasurement contracts, if there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected, unless in the opinion of the Employer there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price shall be corrected;
- (b) if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and
- (c) if there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a) and (b) above.

31.2 Bidders shall be requested to accept correction of arithmetical errors. Failure to accept the correction in accordance with ITB

31.1, shall result in the rejection of the Bid.

**32. Conversion to  
Single Currency**

32.1 For evaluation and comparison purposes, the currency(ies) of the Bid shall be converted into a single currency as specified **in the**

**BDS.**

- 33. Margin of Preference** 33.1 Unless otherwise specified **in the BDS**, a margin of preference for domestic Bidders<sup>3</sup> shall not apply.
- 34. Subcontractors** 34.1 Unless otherwise stated **in the BDS**, the Employer does not intend to execute any specific elements of the Works by subcontractors selected in advance by the Employer, Financial Parts
- 34.2 The subcontractor's qualifications shall not be used by the Bidder to qualify for the Works unless their specialized parts of the Works were previously designated by the Employer **in the BDS** as can be met by subcontractors referred to hereafter as 'Specialized Subcontractors', in which case, the qualifications of the Specialized Subcontractors proposed by the Bidder may be added to the qualifications.
- 34.3 Bidders may propose subcontracting up to the percentage of total value of contracts or the volume of works as specified **in the BDS**. Subcontractors proposed by the Bidder shall be fully qualified for their parts of the Works.
- 35. Evaluation of Bids** 35.1 The Employer shall use the criteria and methodologies listed in this ITB and Section III, Evaluation and Qualification criteria. No other evaluation criteria or methodologies shall be permitted. By applying the criteria and methodologies the Employer shall determine the Most Advantageous Bid. This is the Bid of the Bidder that meets the Qualification Criteria and whose Bid has been determined to be:
- (a) substantially responsive to the bidding document; and
  - (b) the lowest evaluated cost.
- 35.2 To evaluate a Bid, the Employer shall consider the following:
- (a) the Bid price, excluding Provisional Sums and the provision, if any, for contingencies in the Summary Bill of

---

<sup>3</sup> An individual firm is considered a domestic Bidder for purposes of the margin of preference if it is registered in the country of the Employer, has more than 50 percent ownership by nationals of the country of the Employer, and if it does not subcontract more than 10 percent of the contract price, excluding provisional sums, to foreign contractors. JVs are considered as domestic Bidders and eligible for domestic preference only if the individual member firms are registered in the country of the Employer or have more than 50 percent ownership by nationals of the country of the Employer, and the JV shall be registered in the country of the Borrower. The JV shall not subcontract more than 10 percent of the contract price, excluding provisional sums, to foreign firms. JVs between foreign and national firms will not be eligible for domestic preference.

Quantities<sup>4</sup> for admeasurement contracts, but including Daywork<sup>5</sup> items, where priced competitively;

- (b) price adjustment for correction of arithmetic errors in accordance with ITB 31.1;
- (c) price adjustment due to discounts offered in accordance with ITB 14.4;
- (d) converting the amount resulting from applying (a) to (c) above, if relevant, to a single currency in accordance with ITB 32;
- (e) price adjustment for nonconformities in accordance with ITB 30.3; and
- (f) the additional evaluation factors are specified in Section III, Evaluation and Qualification Criteria.

35.3 The estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be taken into account in Bid evaluation.

35.4 If this bidding document allows Bidders to quote separate prices for different lots (contracts), the methodology to determine the lowest evaluated cost of the contract combinations, including any discounts offered in the Letter of Bid, is specified in Section III, Evaluation and Qualification Criteria.

### **36. Comparison of Bids**

36.1 The Employer shall compare the evaluated costs of all substantially responsive Bids established in accordance with ITB 35.2 to determine the Bid that has the lowest evaluated cost.

### **37. Abnormally Low Bids**

37.1 An Abnormally Low Bid is one where the Bid price, in combination with other constituent elements of the Bid, appears unreasonably low to the extent that the Bid price raises material concerns as to the capability of the Bidder to perform the Contract for the offered Bid price.

37.2 In the event of identification of a potentially Abnormally Low Bid, the Employer shall seek written clarifications from the Bidder,

<sup>4</sup> In lump sum contracts, delete “Bill of Quantities” and replace with “Activity Schedule.”

<sup>5</sup> Daywork is work carried out following instructions of the Project Manager and paid for on the basis of time spent by workers, and the use of materials and the Contractor’s equipment, at the rates quoted in the Bid. For Daywork to be priced competitively for Bid evaluation purposes, the Employer must list tentative quantities for individual items to be costed against Daywork (e.g., a specific number of tractor driver staff- days, or a specific tonnage of Portland cement), to be multiplied by the Bidders’ quoted rates and included in the total Bid price.

including detailed price analyses of its Bid price in relation to the subject matter of the contract, scope, proposed methodology, schedule, allocation of risks and responsibilities and any other requirements of the bidding document.

37.3 After evaluation of the price analyses, in the event that the Employer determines that the Bidder has failed to demonstrate its capability to perform the Contract for the offered Bid Price, the Employer shall reject the Bid.

**38. Unbalanced or Front Loaded Bids**

38.1 If the Bid for an admeasurement contract, which results in the lowest evaluated cost is, in the Employer's opinion, seriously unbalanced or, front loaded, the Employer may require the Bidder to provide written clarifications. Clarifications may include detailed price analyses to demonstrate the consistency of the Bid price as with the scope of works, proposed methodology, schedule and any other requirements of the bidding document.

38.2 After the evaluation of the information and detailed price analyses presented by the Bidder, the Employer may as appropriate:

(a) accept the Bid; or

(b) require that the amount of the Performance Security be increased at the expense of the Bidder to a level not exceeding 20% of the Contract Price; or

(c) reject the Bid.

**39. Qualification of the Bidder**

39.1 The Employer shall determine to its satisfaction whether the eligible Bidder that is selected as having submitted the lowest evaluated cost and substantially responsive Bid meets the qualifying criteria specified in Section III, Evaluation and Qualification Criteria.

39.2 The determination shall be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to ITB 17. The determination shall not take into consideration the qualifications of other firms such as the Bidder's subsidiaries, parent entities, affiliates, subcontractors (other than Specialized Subcontractors if permitted in the bidding document), or any other firm(s) different from the Bidder.

39.3 An affirmative determination of qualification shall be a prerequisite for award of the Contract to the Bidder. A negative determination shall result in disqualification of the Bid, in which event the Employer shall proceed to the substantially responsive Bid which offers the next lowest evaluated cost to make a similar determination of that Bidder's qualifications to perform

satisfactorily.

- 40. Most Advantageous Bid**
- 40.1 Having compared the evaluated costs of Bids, the Employer shall determine the Most Advantageous Bid. The Most Advantageous Bid is the Bid of the Bidder that meets the Qualification Criteria and whose Bid has been determined to be:
- (a) substantially responsive to the bidding document; and
  - (b) the lowest evaluated cost.
- 41. Employer's Right to Accept Any Bid, and to Any or All Bids**
- 41.1 The Employer reserves the right to accept or reject any Bid, and to annul the Bidding process and reject all Bids at any time prior to Contract Award, without thereby incurring any liability to **Reject** Bidders. In case of annulment, all Bids submitted and specifically, Bid securities, shall be promptly returned to the Bidders.
- 42. Standstill Period**
- 42.1 The Contract shall not be awarded earlier than the expiry of the Standstill Period. The Standstill Period shall be ten (10) Business Days unless extended in accordance with ITB 46. The Standstill Period commences the day after the date the Employer has transmitted to each Bidder the Notification of Intention to Award the Contract. Where only one Bid is submitted, or if this contract is in response to an emergency situation recognized by the Bank, the Standstill Period shall not apply.
- 43. Notification of Intention to Award**
- 43.1 The Employer shall send to each Bidder the Notification of Intention to Award the Contract to the successful Bidder. The Notification of Intention to Award shall contain, at a minimum, the following information:
- (a) the name and address of the Bidder submitting the successful Bid;
  - (b) the Contract price of the successful Bid;
  - (c) the names of all Bidders who submitted Bids, and their Bid prices as readout, and as evaluated;
  - (d) a statement of the reason(s) the Bid (of the unsuccessful Bidder to whom the notification is addressed) was unsuccessful, unless the price information in c) above already reveals the reason;
  - (e) the expiry date of the Standstill Period;
  - (f) instructions on how to request a debriefing and/or submit a complaint during the standstill period.

## F. Award of Contract

- 44. Award Criteria** 44.1 Subject to ITB 41, the Employer shall award the Contract to the successful Bidder. This is the Bidder whose Bid has been determined to be the Most Advantageous Bid as specified in ITB 40.
- 45. Notification of Award** 45.1 Prior to the expiration of the Bid Validity Period and upon expiry of the Standstill Period, specified in ITB 42.1 or any extension thereof, and, upon satisfactorily addressing any complaint that has been filed within the Standstill Period, the Employer shall notify the successful Bidder, in writing, that its Bid has been accepted. The notification of award (hereinafter and in the Conditions of Contract and Contract Forms called the “Letter of Acceptance”) shall specify the sum that the Employer will pay the Contractor in consideration of the execution of the contract (hereinafter and in the Conditions of Contract and Contract Forms called “the Contract Price”).
- 45.2 Within ten (10) Business Days after the date of transmission of the Letter of Acceptance, the Employer shall publish the Contract Award Notice which shall contain, at a minimum, the following information:
- (a) name and address of the Employer;
  - (b) name and reference number of the contract being awarded, and the selection method used;
  - (c) names of all Bidders that submitted Bids, and their Bid prices as read out at Bid opening, and as evaluated;
  - (d) names of all Bidders whose Bids were rejected either as nonresponsive or as not meeting qualification criteria, or were not evaluated, with the reasons therefor;
  - (e) the name of the successful Bidder, the final total contract price, the contract duration and a summary of its scope; and
  - (f) successful Bidder’s Beneficial Ownership Disclosure Form, if specified in BDS ITB 47.1.
- 45.3 The Contract Award Notice shall be published on the Employer’s website with free access if available, or in at least one newspaper of national circulation in the Employer’s Country, or in the official gazette. The Employer shall also publish the contract award notice in UNDB online.

- 45.4 Until a formal contract is prepared and executed, the Letter of Acceptance shall constitute a binding Contract.
- 46. Debriefing by the Employer**
- 46.1 On receipt of the Employer's Notification of Intention to Award referred to in ITB 43.1, an unsuccessful Bidder has three (3) Business Days to make a written request to the Employer for a debriefing. The Employer shall provide a debriefing to all unsuccessful Bidders whose request is received within this deadline.
- 46.2 Where a request for debriefing is received within the deadline, the Employer shall provide a debriefing within five (5) Business Days, unless the Employer decides, for justifiable reasons, to provide the debriefing outside this timeframe. In that case, the standstill period shall automatically be extended until five (5) Business Days after such debriefing is provided. If more than one debriefing is so delayed, the standstill period shall not end earlier than five (5) Business Days after the last debriefing takes place. The Employer shall promptly inform, by the quickest means available, all Bidders of the extended standstill period
- 46.3 Where a request for debriefing is received by the Employer later than the three (3)-Business Day deadline, the Employer should provide the debriefing as soon as practicable, and normally no later than fifteen (15) Business Days from the date of publication of Public Notice of Award of contract. Requests for debriefing received outside the three (3)-day deadline shall not lead to extension of the standstill period.
- 46.4 Debriefings of unsuccessful Bidders may be done in writing or verbally. The Bidder shall bear their own costs of attending such a debriefing meeting.
- 47. Signing of Contract**
- 47.1 The Employer shall send to the successful Bidder the Letter of Acceptance including the Contract Agreement, and, if specified in the BDS, a request to submit the Beneficial Ownership Disclosure Form providing additional information on its beneficial ownership. The Beneficial Ownership Disclosure Form, if so requested, shall be submitted within eight (8) Business Days of receiving this request.
- 47.2 The successful Bidder shall sign, date and return to the Employer, the Contract Agreement within twenty-eight (28) days of its receipt.
- 48. Performance Security**
- 48.1 Within twenty-eight (28) days of the receipt of the Letter of Acceptance from the Employer, the successful Bidder shall furnish the Performance Security and, if required in the BDS, the

Environmental, Social, Health and Safety (ESHS) Performance Security in accordance with the General Conditions of Contract, subject to ITB 38.2 (b), using for that purpose the Performance Security and ESHS Performance Security Forms included in Section X, Contract Forms, or another form acceptable to the Employer. If the Performance Security furnished by the successful Bidder is in the form of a bond, it shall be issued by a bonding or insurance company that has been determined by the successful Bidder to be acceptable to the Employer. A foreign institution providing a bond shall have a correspondent financial institution located in the Employer's Country, unless the Employer has agreed in writing that a correspondent financial institution is not required.

48.2 Failure of the successful Bidder to submit the above-mentioned Performance Security and, if required in the BDS, the Environmental, Social, Health and Safety (ESHS) Performance Security, or to sign the Contract Agreement shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid Security. In that event the Employer may award the Contract to the Bidder offering the next Most Advantageous Bid.

#### **49. Adjudicator**

49.1 The Employer proposes the person named **in the BDS** to be appointed as Adjudicator under the Contract, at the hourly fee specified **in the BDS**, plus reimbursable expenses. If the Bidder disagrees with this proposal, the Bidder should so state in his Bid. If, in the Letter of Acceptance, the Employer does not agree on the appointment of the Adjudicator, the Employer will request the Appointing Authority designated in the Particular Conditions of Contract (PCC) pursuant to Clause 23.1 of the General Conditions of Contract (GCC), to appoint the Adjudicator.

#### **50. Procurement Related Complaint**

50.1 The procedures for making a Procurement-related Complaint are as specified in the BDS.

## Section II - Bid Data Sheet (BDS)

The following specific data for the Works to be procured shall complement, supplement, or amend the provisions in the Instructions to Bidders (ITB). Whenever there is a conflict, the provisions herein shall prevail over those in ITB.

ITB Reference	A. General
ITB 1.1	<p>The number of the Invitation for Bids is: <b>KE-MOE-416346-CW-RFB</b></p> <p>The Employer is: <b>MINISTRY OF EDUCATION STATE DEPARTMENT FOR BASIC EDUCATION</b></p> <p>The reference number of the Request for Bids (RFB) is: <b>MOE/SEQIP/NCB/2/2023-2024</b></p> <p>The name of the RFB is: <b>DATA CENTER MECHANICAL AND ELECTRICAL INSTALLATIONS AT THE ULTRA-MODERN TRAINING CENTRE-CEMASTEA, IN KAREN, NAIROBI COUNTY</b></p> <p>The number and identification of lots (contracts) comprising this RFB is: <b>1 Lot</b></p>
ITB 1.2(a)	<b>Not Applicable</b>
ITB 2.1	<p>The Borrower is: <b>Government of Kenya</b></p> <p>Loan or Financing Agreement amount: <b>USD 200 Million</b></p> <p>The name of the Project is: <b>SECONDARY EDUCATION QUALITY IMPROVEMENT PROJECT (SEQIP)</b></p>
ITB 4.1	Maximum number of members in the Joint Venture (JV) shall be: <b>Two (2)</b>
ITB 4.5	A list of debarred firms and individuals is available on the Bank's external website: <a href="http://www.worldbank.org/debarr">http://www.worldbank.org/debarr</a> .
<b>B. Contents of Bidding Document</b>	
ITB 7.1	<p>For <b><u>Clarification of Bid purposes</u></b> only, the Employer's address is:</p> <p>Attention: Head Supply Chain Management Services</p> <p>State Department for Basic Education</p> <p>Secondary Education Quality Improvement Project</p> <p>Jogoo House 'B' Ground Floor Room 14, Harambee Avenue</p> <p>Postal Address: P.O. Box 30040, Nairobi, Kenya</p>

	<p>Code: 00100  City: Nairobi  Zip code: +254  Tel: (0)20 318581 Ext.30413  Email:<a href="mailto:scmsequip@education.go.ke">scmsequip@education.go.ke</a>  Alternative Emails: <a href="mailto:ppo@education.go.ke">ppo@education.go.ke</a>  <a href="mailto:seqip2018@gmail.com">seqip2018@gmail.com</a></p>
<b>ITB 7.1</b>	Requests for clarification should be received by the Employer no later than: <b>14 Days before closing of bids.</b>
<b>ITB 7.1</b>	Web page: <a href="http://www.education.go.ke">www.education.go.ke</a>
<b>ITB 7.4</b>	<p>A Pre-Bid meeting shall take place at the following date, time and Place:Date: <b>17<sup>th</sup> April, 2024.</b></p> <p>Time: <b>9:00 a.m</b> Address: CEMASTEIA, Karen  Telephone: +254 (0)20 318581 Ext.30413  E-mail:<a href="mailto:scmsequip@education.go.ke">scmsequip@education.go.ke</a> and cc Project Coordinator;<a href="mailto:janmbug@gmail.com">janmbug@gmail.com</a></p> <p>Contact person/conference coordinator: Ms. Jane Mbugua, National Project Coordinator.</p> <p>A site visit conducted by the Employer <b>shall</b> be organized.</p>
<b>C. Preparation of Bids</b>	
<b>ITB 10.1</b>	<p>The language of the Bid is: <b>English</b></p> <p>All correspondence exchange shall be in <b>English</b> language.</p> <p>Language for translation of supporting documents and printed literature is <b>English.</b></p>
<b>ITB 11.1 (b)</b>	<p>The following schedules shall be submitted with the Bid:</p> <p><b>1. Priced Bill of Quantities</b></p>
<b>ITB 11.1 (i)</b>	<p>The Bidder shall submit the following additional documents in its Bid:</p> <p><b>1. Code of Conduct for Contractor’s Personnel (ES)</b></p> <p>The Bidder shall submit its Code of Conduct that will apply to Contractor’s Personnel (as defined in Sub-Clause 1.1.17 of the General Conditions of Contract), to ensure compliance with the Contractor’s Environmental and Social (ES) obligations under the Contract. The Bidder shall use for this purpose the Code of Conduct form provided in Section IV. No substantial modifications shall be made to this form, except that the Bidder may introduce additional requirements, including as necessary to take into account specific Contract issues/risks.</p>

## **2. Management Strategies and Implementation Plans (MSIP) to manage the (ES) risks**

The Bidder shall refer to the following documents, note the risks and mitigation measures and submit a written confirmation (attached as an appendix to the ESMP) to comply with the provided measures:

- ESHS document at the Section VII Works' Requirements
- Annexed Environmental and Social Management Plan (ESMP) at Part no. 4 Bills of quantities.

## **2. Electrical Sub- Contractors (For Local Bidders)**

The Bidder must have the following Electrical Sub-Contractors and provide the relevant applicable documents showing their qualification:

- a. Electrical Installations Subcontractor
  - **National Construction Authority, Category 1**
  - **Energy & Petroleum Regulatory Authority (EPRA) Class A1**
- b. Security Installations Subcontractor
  - **National Construction Authority, Category 1**
  - **Communications Authority of Kenya (CAK) registration**
- c. Standby Generator Installations Subcontractor
  - **National Construction Authority, Category 1**
  - **Energy & Petroleum Regulatory Authority (EPRA) Class A1**
- d. Structured cabling Subcontractor
  - **National Construction Authority, Category 1**
  - **Communications Authority of Kenya (CAK) registration**

## **3. Mechanical Sub- Contractors (For Local Bidders)**

The Bidder must have the following Mechanical Sub-Contractors and provide the relevant applicable documents showing their qualification:

- a. Heating Ventilating and Air Conditioning Installations Subcontractor
  - **National Construction Authority, Category 3**
  - **Energy & Petroleum Regulatory Authority (EPRA) Class A**
- b. Firefighting Installations Subcontractor
  - **National Construction Authority, Category 3**
  - **Energy & Petroleum Regulatory Authority (EPRA)**

**Class A**

**In addition, local contractors MUST provide the following;**

- 4. Certified copy of Registration certificate from National Construction Authority, Category 1 in Mechanical or Electrical works**
- 5. Certified Copy of Company Registration Certificates. (Is a registered company incorporated in Kenya under the Companies Act CAP 486).**
- 6. Certified copy of Valid Tax Compliance Certificate, including a certified copy of the company's Pin No.**
- 7. Current Business License.**
- 8. Provide letter of Authority to seek references from tenderer's bank (letter addressed to specific Banks giving authority to Client to verify the bank statements).**
- 9. Evidence of physical location of office by providing certified copies of premises ownership / lease, and utility bills.**
- 10. A copy of company's list of directors, beneficial owners, name of proprietor or names of partners (Copy of CR12) issued within the last one year and showing the list of directors**
- 11. The Bidders' are required to fill in the Technical Schedule as specified in the tender document for Equipment and Items indicating the Country of Origin, Model/Make/Manufacturer of the Item/Equipment they propose to supply.**
  - a. The Bidders' are also required to submit relevant technical brochures/catalogues with the tender document, highlighting the catalogue Numbers of the proposed items. Such brochures/catalogues are to indicate comprehensive relevant data of the proposed equipment/items which should include but not limited to the following:**
    - (a) Standards of manufacture;
    - (b) Performance ratings/characteristics;
    - (c) Material of manufacture;
    - (d) Electrical power ratings; and
    - (e) Any other necessary requirements

**NB**

- FOR FOREIGN FIRMS PROVIDE EQUIVALENT OF ALL THE**

	<p><b>ABOVE WHERE APPLICABLE.</b></p> <ul style="list-style-type: none"> <li>• <b>FOR A SUCCESSFUL FOREIGN FIRM, IT WILL BE A MUST OR WILL BE REQUIRED TO REGISTER WITH KENYA NATIONAL CONSTRUCTION AUTHORITY BEFORE SIGNING OF THE CONTRACT.</b> NCA Website: <a href="http://nca.go.ke/">http://nca.go.ke/</a>.</li> <li>• <b>Submitted tender documents must be properly TAPE BOUND and PAGINATED in the correct sequence and all pages must be initiated/signed/stamped.</b></li> <li>• <b>Spiral binding and use of spring or box file will NOT BE ALLOWED and will result in automatic disqualification</b></li> </ul>
<b>ITB 13.1</b>	Alternative Bids <b>shall not be</b> considered.
<b>ITB 13.2</b>	Alternative times for completion <b>shall not be</b> permitted.
<b>ITB 13.4</b>	<b>Not Applicable</b>
<b>ITB 14.5</b>	The prices quoted by the Bidder <b>shall not</b> be subject to adjustment during the performance of the Contract.
<b>ITB 15.1</b>	The price shall be quoted by the Bidder in: <b>Kenya Shillings</b>
<b>ITB 18.1</b>	The Bid validity period shall be <b>120 days</b> .
<b>ITB 18.3 (a)</b>	The Bid price shall be adjusted by the following factor(s): <b>None</b>
<b>ITB 19.1</b>	A Bid Security <b>shall be</b> required. A Bid-Securing Declaration <b>shall not be</b> required. If a Bid Security shall be required, the amount and currency of the Bid Security shall be <b>Kenya Shillings 2,000,000.00</b>
<b>ITB 19.3 (d)</b>	Other types of acceptable securities: <b>None</b>
<b>ITB 20.1</b>	In addition to the original of the Bid, the number of copies is: <b>Two (2) copies and a softcopy in PDF in a flash drive</b>
<b>ITB 20.3</b>	The written confirmation of authorization to sign on behalf of the Bidder shall consist of: <b>Power of Attorney which demonstrates that the signatory is duly authorized to sign the bid on behalf of the bidder partners. Power of the Attorney shall be signed and stamped by a commissioner of oath.</b>
<b>D. Submission and Opening of Bids</b>	

<b>ITB 22.1</b>	<p>For <b><u>Bid submission purposes</u></b> only, the Employer’s address is:</p> <p style="text-align: center;">The Principal Secretary Attn: Head of Supply Chain Management Services State Department for Basic Education Secondary Education Quality Improvement Project Jogoo House ‘B’ Ground Floor Room 14, Harambee Avenue Postal Address: P.O. Box 30040, Nairobi, Kenya Code: 00100 City: Nairobi</p> <p>The deadline for Bid Submission is: Date: <b>2<sup>nd</sup> May, 2024</b> Time: <b>10:00 a.m. East Africa Local Time</b></p> <p>Bidders <b>shall not</b> have the option of submitting their Bids electronically.</p>
<b>ITB 25.1</b>	<p>The Bid opening shall take place at: Street Address: Jogoo House ‘B’ Harambee Avenue, Floor, room number: 10th Floor, Big Boardroom City: Nairobi Country: Kenya Date: <b>2<sup>nd</sup> May, 2024</b> Time: <b><u>10:00 a.m. East Africa Local Time</u></b></p>
<b>ITB 25.6</b>	<p>The Letter of Bid and priced Bill of Quantities shall be initialed by all appointed representatives of the Purchaser conducting Bid opening.</p>
<b>E. Evaluation and Comparison of Bids</b>	
<b>ITB 30.3</b>	<p>The adjustment shall be based on the <b>average</b> price of the item or component as quoted in other substantially responsive Bids. If the price of the item or component cannot be derived from the price of other substantially responsive Bids, the Employer shall use its best estimate.</p>
<b>ITB 32.1</b>	<p>The currency that shall be used for Bid evaluation and comparison purposes to convert at the selling exchange rate all Bid prices expressed in various currencies into a single currency is: <b>Kenya Shillings</b></p>

<b>ITB 33.1</b>	A margin of domestic preference <b>shall not</b> apply.
<b>ITB 34.1</b>	At this time the Employer <b>does not intend</b> to execute certain specific parts of the Works by subcontractors selected in advance.
<b>ITB 34.2</b>	<p>The parts of the Works for which the Employer permits Bidders to propose Specialized Subcontractors are designated as follows:</p> <ol style="list-style-type: none"> <li>a. Heating Ventilating and Air Conditioning Installations</li> <li>b. Firefighting Installations</li> <li>c. Electrical Installations Subcontractor</li> <li>d. Structured Cabling Installations Subcontractor</li> <li>e. Security Installations Subcontractor</li> <li>f. Standby Generator Installations Subcontractor</li> </ol>
<b>ITB 34.3</b>	<p>Contractor’s proposed subcontracting: Maximum percentage of subcontracting permitted is: <b>Not Limited</b></p> <p>Bidders planning to subcontract more than 10% of total volume of work shall specify, in the Letter of Bid, the activity (ies) or parts of the Works to be subcontracted along with complete details of the subcontractors and their qualification and experience.</p>
<b>F. Award of Contract</b>	
<b>ITB 47.1</b>	The successful Bidder <b>shall</b> submit the Beneficial Ownership Disclosure Form.
<b>ITB 49</b>	<p>The Adjudicator proposed by the Employer is: <b>To be appointed by either CIArb Kenyan Chapter, IQSK, or AAK.</b></p> <p>The hourly fee for this proposed Adjudicator shall be: As per the standard fees of the proposed bodies above.</p> <p>The biographical data of the proposed Adjudicator is as follows: As approved by the appointing professional body.</p>
<b>ITB 50.1</b>	<p>The procedures for making a Procurement-related Complaint are detailed in the “<a href="#">Procurement Regulations for IPF Borrowers</a> (Annex III).” If a Bidder wishes to make a Procurement-related Complaint, the Bidder shall submit its complaint following these procedures, In Writing (by the quickest means available, such as by email or fax), to:</p> <p><b>For the attention:</b> Head Supply Chain Management Services</p> <p><b>Title/position:</b> Senior Deputy Director, SCMS</p> <p><b>Client:</b> State Department for Basic Education, Secondary Education Quality Improvement Project (SEQIP)</p>

**Email address: [scmsequip@education.go.ke](mailto:scmsequip@education.go.ke)**

**Alternative Emails: [ppo@education.go.ke](mailto:ppo@education.go.ke)  
[seqip2018@gmail.com](mailto:seqip2018@gmail.com)**

In summary, a Procurement-related Complaint may challenge any of the following:

1. the terms of the Bidding Documents; and
2. the Employer's decision to award the contract.



## Section III - Evaluation and Qualification Criteria

Wherever a Bidder is required to state a monetary amount, Bidders should indicate the **Kenya Shilling** equivalent using the rate of exchange determined as follows:

- for construction turnover or financial data required for each year - Exchange rate prevailing on the last day of the respective calendar year (in which the amounts for that year is to be converted) was originally established; or
- value of single contract - Exchange rate prevailing on the date of the contract.

Exchange rates shall be taken from the publicly available source identified in the ITB 32.1. Any error in determining the exchange rates in the Bid may be corrected by the Employer

## Table of Criteria

<b>1. Margin of Preference .....</b>	<b>42</b>
<b>2. Evaluation .....</b>	<b>43</b>
<b>3. Qualification.....</b>	<b>45</b>
<b>4. Key Personnel .....</b>	<b>52</b>
<b>5. Equipment.....</b>	<b>54</b>

## 1. Margin of Preference

If BDS so specifies, the Employer will grant a margin of preference of 7.5% (seven and one-half percent) to domestic contractors, in accordance with, and subject to, the following provisions:

- (a) Contractors applying for such preference shall be asked to provide, as part of the data for qualification, such information, including details of ownership, as shall be required to determine whether, according to the classification established by the Employer and accepted by the Bank, a particular contractor or group of contractors qualifies for a domestic preference. The bidding document shall clearly indicate the preference and the method that will be followed in the evaluation and comparison of Bids to give effect to such preference.
- (b) After Bids have been received and reviewed by the Employer, responsive Bids shall be classified into the following groups:
  - (i) Group A: Bids offered by domestic contractors eligible for the preference.
  - (ii) Group B: Bids offered by other contractors.

All evaluated Bids in each group shall, as a first evaluation step, be compared to determine the Bid with lowest evaluated cost, and the Bid with the lowest evaluated cost in each group shall be further compared with each other. If a result of this comparison, a Bid from Group A is the lowest, it shall be selected for the award as the Most Advantageous Bid, if the Bidder is qualified. If a Bid from Group B is the lowest, as a second evaluation step, all Bids from Group B shall then be further compared with the lowest evaluated cost from Group A. For the purpose of this further comparison only, an amount equal to 7.5% (seven and one-half percent) of the respective Bid price corrected for arithmetic errors, including unconditional discounts but excluding provisional sums and the cost of dayworks, if any, shall be added to the evaluated cost offered in each Bid from Group B. If the Bid from Group A is the lowest, it shall be selected for award. If not, the lowest evaluated cost from Group B based on the first evaluation step shall be selected.

The Employer shall use the criteria and methodologies listed in this Section to evaluate Bids. By applying these criteria and methodologies, the Employer shall determine the Most Advantageous Bid. This is the Bid that has been determined to be:

- (a) substantially responsive to the bidding document, and
- (b) the lowest evaluated cost.

## **Evaluation**

In addition to the criteria listed in ITB 35.2 (a) – (e) the following criteria shall apply:

### **2.1 Adequacy of Technical Proposal**

Evaluation of the Bidder's Technical Proposal will include an assessment of the Bidder's technical capacity to mobilize key equipment and personnel for the contract consistent with its proposal regarding work methods, scheduling, and material sourcing in sufficient detail and fully in accordance with the requirements stipulated in Section VII, Works' Requirements.

**2.3 Alternative Completion Times (N/A)**

.....  
.....

**2.4 Sustainable Procurement (N/A)**

.....  
.....  
.....

**2.5 Alternative Technical Solutions for specified parts of the Works**

If permitted under ITB 13.4, will be evaluated as follows: (N/A)

.....  
.....  
.....

**2.6 Specialized Subcontractors**

If permitted under ITB 34, only the specific experience of Subcontractors for specialized works permitted by the Employer will be considered. The general experience of the Specialized Subcontractors listed in ITB 11.1 shall be added to those of the Bidder for purposes of qualification of the Bidder

## 2. Qualification

Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All Members Combined	Each Member	One Member	
<b>1. Eligibility</b>							
1.1	<b>Nationality</b>	Nationality in accordance with ITB 4.4	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Forms ELI – 1.1 and 1.2, with attachments
1.2	<b>Conflict of Interest</b>	No conflicts of interest in accordance with ITB 4.2	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Letter of Bid
1.3	<b>Bank Eligibility</b>	Not having been declared ineligible by the Bank, as described in ITB 4.5.	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Letter of Bid
1.4	<b>State- owned Enterprise or Institution of the Borrower country</b>	Meets conditions of ITB 4.6	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Forms ELI – 1.1 and 1.2, with attachments
1.5	<b>United Nations resolution or Borrower's country law</b>	Not having been excluded as a result of prohibition in the Borrower's country laws or official regulations against commercial relations with the Bidder's country, or by an act of compliance with UN Security Council resolution, both in accordance with ITB 4.8 and Section V.	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Forms ELI – 1.1 and 1.2, with attachments

Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All Members Combined	Each Member	One Member	
<b>2. Historical Contract Non-Performance</b>							
2.1	<b>History of Non-Performing Contracts</b>	Non-performance of a contract <sup>1</sup> did not occur as a result of contractor default since 1 <sup>st</sup> January <b>2019</b> .	Must meet requirement	Must meet requirement	Must meet requirement <sup>2</sup>	N/A	Form CON-2
2.2	<b>Suspension Based on Execution of Bid/Proposal Securing Declaration by the Employer</b>	Not under suspension based on-execution of a Bid/Proposal Securing Declaration pursuant to ITB 4.7 and ITB 19.9	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Letter of Bid
2.3	<b>Pending Litigation</b>	Bid's financial position and prospective long term profitability still sound according to criteria established in 3.1 below and assuming that all pending litigation will be resolved against the Bidder	Must meet requirement	N/A	Must meet requirement	N/A	Form CON – 2
2.4	<b>Litigation</b>	No consistent history of	Must meet	Must meet	Must meet	N/A	Form CON – 2

<sup>1</sup> Non performance, as decided by the Employer, shall include all contracts where (a) non performance was not challenged by the contractor, including through referral to the dispute resolution mechanism under the respective contract, and (b) contracts that were so challenged but fully settled against the contractor. Non performance shall not include contracts where Employers decision was overruled by the dispute resolution mechanism. Non performance must be based on all information on fully settled disputes or litigation, i.e. dispute or litigation that has been resolved in accordance with the dispute resolution mechanism under the respective contract and where all appeal instances available to the Bidder have been exhausted.

<sup>2</sup> This requirement also applies to contracts executed by the Bidder as JV member.

Eligibility and Qualification Criteria			Compliance Requirements			Documentation	
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All Members Combined	Each Member	One Member	
	<b>History</b>	court/arbitral award decisions against the Bidder <sup>3</sup> since 1 <sup>st</sup> January 2019	requirement	requirement	requirement		
2.5	<b>Declaration: Environmental, Social, Health, and Safety (ESHS) past performance</b>	Declare any civil work contracts that have been suspended or terminated and/or performance security called by an employer for reasons related to the non-compliance of any environmental, or social (including sexual exploitation and abuse (SEA) and gender based violence (GBV)), or health or safety requirements or safeguard in the past five years <sup>4</sup> .	Must make the declaration. Where there are Specialized Sub-contractor/s, the Specialized Sub-contractor/s must also make the declaration.	N/A	Each must make the declaration. Where there are Specialized Sub-contractor/s, the Specialized Sub-contractor/s must also make the declaration.	N/A	Form CON-3 ESHS Performance Declaration
<b>3. Financial Situation and Performance</b>							
3.1	<b>Financial Capabilities</b>	(i) The Bidder shall demonstrate that it has access to, or has available, liquid assets,	Must meet requirement	Must meet requirement	N/A	N/A	Form FIN – 3.1, with attachments

<sup>3</sup> The Bidder shall provide accurate information on the related Bid Form about any litigation or arbitration resulting from contracts completed or ongoing under its execution over the last five years. A consistent history of awards against the Bidder or any member of a joint venture may result in failure of the Bid.

<sup>4</sup> The Employer may use this information to seek further information or clarifications in carrying out its due diligence.

Eligibility and Qualification Criteria			Compliance Requirements			Documentation	
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All Members Combined	Each Member	One Member	
		unencumbered real assets, lines of credit, and other financial means (independent of any contractual advance payment) sufficient to meet the construction cash flow requirements estimated as <b>Kenya Shillings 50,000,000.00</b> for the subject contract(s) net of the Bidder's other commitments (ii) The Bidders shall also demonstrate, to the satisfaction of the Employer, that it has adequate sources of finance to meet the cash flow requirements on works currently in progress and for future contract commitments. (iii) The audited balance sheets or, if not required by the laws of the Bidder's country, other financial statements acceptable to the Employer, for the last <b>3 years (2021-2023)</b> shall be submitted	Must meet requirement	Must meet requirement	N/A	N/A	
			Must meet requirement	N/A	Must meet requirement	N/A	

Eligibility and Qualification Criteria			Compliance Requirements			Documentation	
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All Members Combined	Each Member	One Member	
		and must demonstrate the current soundness of the Bidder's financial position and indicate its prospective long-term profitability.					
3.2	<b>Average Annual Construction Turnover</b>	Minimum average annual construction turnover of <b>Kenya Shilling 100,000,000.00</b> calculated as total certified payments received for contracts in progress and/or completed within the last 3 years, divided by 3 years	Must meet requirement	Must meet requirement	Must meet <b>25%</b> , Twenty percent of the requirement	Must meet <b>50%</b> , Forty percent of the requirement	Form FIN – 3.2
<b>4. Experience</b>							
4.1 (a)	<b>General Construction Experience</b>	Experience under construction contracts in the role of prime contractor, JV member, sub-contractor, or management contractor for at least the last <b>5 years</b> , starting 1 <sup>st</sup> January <b>2019</b> .	Must meet requirement	N/A	Must meet requirement	N/A	Form EXP – 4.1

Eligibility and Qualification Criteria			Compliance Requirements			Documentation	
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All Members Combined	Each Member	One Member	
4.2 (a)	<b>Specific Construction &amp; Contract Management Experience</b>	(i) A minimum number of <b>Three (3)</b> similar contracts specified below that have been satisfactorily and substantially <sup>5</sup> completed as a prime contractor, joint venture member <sup>6</sup> , management contractor or sub-contractor between 1st January <b>2019</b> and bid submission deadline: (i) 3 contracts, <b>each of</b> minimum value V; <b>Kenya Shilling 50,000,000.00</b> The similarity of the Contracts shall be based on the following: <b>Modern Multi Storey Building Electrical and Mechanical Installation works</b>	Must meet requirement	Must meet requirement <sup>7</sup>	N/A	N/A	Form EXP 4.2(a)
4.2 (b)		For the above and any other contracts [substantially completed and under implementation] as prime contractor, joint venture member, or sub-contractor between 1st January 2019 and	Must meet requirements	Must meet requirements	N/A	Must meet requirements	Form EXP – 4.2 (b)

		Application submission deadline, a minimum construction experience in the following key activities successfully completed <sup>1</sup> : - Installation of 300Kva generator - Installation of a 600 Amps LV board - Installation of a 50 KW Air conditioners -Installation of a Fire Suppression system for an area not less than 60SM					
--	--	--	--	--	--	--	--

<sup>5</sup> Substantial completion shall be based on 80% or more works completed under the contract.

<sup>6</sup> For contracts under which the Bidder participated as a joint venture member or sub-contractor, only the Bidder’s share, by value, shall be considered to meet this requirement

<sup>7</sup> In the case of JV, the value of contracts completed by its members shall not be aggregated to determine whether the requirement of the minimum value of a single contract has been met. Instead, each contract performed by each member shall satisfy the minimum value of a single contract as required for single entity. In determining whether the JV meets the requirement of total number of contracts, only the number of contracts completed by all members each of value equal or more than the minimum value required shall be aggregated.

---

<sup>1</sup> Volume, number or rate of production of any key activity can be demonstrated in one or more contracts combined if executed during same time period.

### 3. Key Personnel

The Bidder must demonstrate that it will have a suitably qualified (and in adequate numbers) minimum Key Personnel, as described in the table below, that are required to perform the Contract.

The Bidder shall provide details of the Key Personnel and such other Key Personnel that the Bidder considers appropriate, together with their academic qualifications and work experience. The Bidder shall complete the relevant Forms in Section IV, Bidding Forms.

The Contractor shall require the Employer's consent to substitute or replace the Key Personnel (reference the Particular Conditions of Contract 9.1).

#### Key Personnel

Item No.	Position/specialization	Relevant academic qualifications	Minimum years of relevant work experience
1	Project Manager	BSc in Electrical Engineering, Mechanical Engineering, Architecture, Quantity Surveying, Construction Management or Equivalent	5
2	1 No. Electrical works Site Agents / Assistant Project Managers	BSc in Electrical Engineering or Higher Diploma in Building Construction or Equivalent	5
3	1 No. Mechanical works Site Agents / Assistant Project Managers	BSc in Mechanical Engineering or Higher Diploma in Building Construction or Equivalent	5
4	6 No. Supervisors; specialized in Electrical Installations, Generator Installations, Structured cabling installations, Security installations, HVAC installations & Fire Suppression works	Minimum qualification is to possess Grade I Test Certificates	5

4	Health and Safety Officer	Minimum Higher Diploma in Occupational Health and Safety or Equivalent	3
5	Environmental Specialist	Minimum Higher Diploma in Relevant Environmental Sciences as well as registration by NEMA	3
6	Social Safeguards Officer	Certificate in Social Work or Equivalent	3
7	Gender Based Violence Officer	Certificate in Relevant Gender Studies	3

## 4. Equipment

The Bidder must demonstrate that it will have access to the key Contractor's equipment listed hereafter:

<b>No.</b>	<b>Equipment Type and Characteristics</b>	<b>Minimum Number required</b>
1	Lorries minimum capacity of 5 tonnes	2
2	Welding machines	3
3	Hand Pumps	2
4	Scaffolding	1 Set

The Bidder shall provide further details of proposed items of equipment using the relevant Form in Section IV.

## Section IV - Bidding Forms

### Table of Forms

<b>Letter of Bid</b> .....	<b>56</b>
2. Schedule of Payment Currencies.....	59
3. Schedule(s) of Adjustment Data .....	60
<b>Forms of Bid Security</b> .....	<b>61</b>
Form of Bid Security - Bank Guarantee.....	61
Form of Bid Security – Bid Bond .....	63
Form of Bid-Securing Declaration .....	65
<b>Technical Proposal</b> .....	<b>63</b>
Technical Proposal Forms.....	67
Equipment For Each Lot .....	72
Site Organization .....	73
Method Statement .....	74
Mobilization Schedule .....	75
Construction Schedule .....	76
ESHS Management Strategies and Implementation Plans.....	77
Code of Conduct: Environmental, Social, Health and Safety (ESHS).....	78
Others .....	79
<b>Bidder’s Qualification</b> .....	<b>80</b>
Form ELI -1.1: Bidder Information Form.....	81
Form ELI -1.2: Information Form for JV Bidders .....	82
Form CON – 2: Historical Contract Non-Performance, Pending Litigation and Litigation History .....	83
Form CON – 3:Environmental, Social, Health, and Safety .....	86
Form CCC: Current Contract Commitments / Works in Progress.....	88
Form FIN – 3.1: Financial Situation and Performance .....	89
Form FIN - 3.2: Average Annual Construction Turnover .....	91
Form FIN - 3.3: Financial Resources .....	92
Form EXP - 4.1: General Construction Experience .....	93
Form EXP - 4.2(a): Specific Construction and Contract Management Experience.....	94
Form EXP - 4.2(b): Construction Experience in Key Activities .....	96

## Letter of Bid

***INSTRUCTIONS TO BIDDERS: DELETE THIS BOX ONCE YOU HAVE COMPLETED THE DOCUMENT***

*The Bidder must prepare this Letter of Bid on stationery with its letterhead clearly showing the Bidder's complete name and business address.*

*Note: All italicized text is to help Bidders in preparing this form.*

**Date of this Bid submission:** *[insert date (as day, month and year) of Bid submission]*

**RFB No.:** *[insert number of RFB process]*

**Alternative No.:** *[insert identification No. if this is a Bid for an alternative]*

To: *[insert complete name of Employer]*

- (a) **No reservations:** We have examined and have no reservations to the bidding document, including Addenda issued in accordance with ITB 8;
- (b) **Eligibility:** We meet the eligibility requirements and have no conflict of interest in accordance with ITB 4;
- (c) **Bid-Securing Declaration:** We have not been suspended nor declared ineligible by the Employer based on execution of a Bid-Securing Declaration or Proposal-Securing Declaration in the Employer's Country in accordance with ITB 4.7;
- (d) **Conformity:** We offer to execute in conformity with the bidding document the following Works: *[insert a brief description of the Works]*
- (e) **Bid Price:** The total price of our Bid, excluding any discounts offered in item (f) below is: *[Insert one of the options below as appropriate]*

*[Option 1, in case of one lot:] Total price is: [insert the total price of the Bid in words and figures, indicating the various amounts and the respective currencies];*

Or

*[Option 2, in case of multiple lots:] (a) Total price of each lot [insert the total price of each lot in words and figures, indicating the various amounts and the respective currencies]; and (b) Total price of all lots (sum of all lots) [insert the total price of all lots in words and figures, indicating the various amounts and the respective currencies];*

- (f) **Discounts:** The discounts offered and the methodology for their application are:

- (i) The discounts offered are: *[Specify in detail each discount offered.]*

- (ii) The exact method of calculations to determine the net price after application of discounts is shown below: [*Specify in detail the method that shall be used to apply the discounts*];
- (g) **Bid Validity Period:** Our Bid shall be valid for a period specified in BDS ITB 18.1 of days from the date fixed for the Bid submission deadline in accordance with the bidding document, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;
- (h) **Performance Security:** If our Bid is accepted, we commit to obtain a performance security [*and an Environmental, Social, Health and Safety (ESHS) Performance Security, Delete if not applicable*] in accordance with the bidding document;
- (i) **One Bid Per Bidder:** We are not submitting any other Bid(s) as an individual Bidder or as a subcontractor, and we are not participating in any other Bid(s) as a Joint Venture member, and meet the requirements of ITB 4.3, other than alternative Bids submitted in accordance with ITB 13;
- (j) **Suspension and Debarment:** We, along with any of our subcontractors, suppliers, consultants, manufacturers, or service providers for any part of the contract, are not subject to, and not controlled by any entity or individual that is subject to, a temporary suspension or a debarment imposed by the World Bank Group or a debarment imposed by the World Bank Group in accordance with the Agreement for Mutual Enforcement of Debarment Decisions between the World Bank and other development banks. Further, we are not ineligible under the Employer's Country laws or official regulations or pursuant to a decision of the United Nations Security Council;
- (k) **State-owned enterprise or institution:** [*select the appropriate option and delete the other*] [*We are not a state-owned enterprise or institution*] / [*We are a state-owned enterprise or institution but meet the requirements of ITB 4.6*];
- (l) **Commissions, gratuities and fees:** We have paid, or will pay the following commissions, gratuities, or fees with respect to the Bidding process or execution of the Contract: [*insert complete name of each Recipient, its full address, the reason for which each commission or gratuity was paid and the amount and currency of each such commission or gratuity*]

Name of Recipient	Address	Reason	Amount

(If none has been paid or is to be paid, indicate "none.")

- (m) **Binding Contract:** We understand that this Bid, together with your written acceptance thereof included in your Letter of Acceptance, shall constitute a binding contract between us, until a formal contract is prepared and executed;
- (n) **Not Bound to Accept:** We understand that you are not bound to accept the lowest evaluated cost Bid, the Most Advantageous Bid or any other Bid that you may receive; and
- (o) **Fraud and Corruption:** We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf engages in any type of Fraud and Corruption; and
- (p) **Adjudicator:** We accept the appointment of *[insert name proposed in Bid Data Sheet]* as the Adjudicator.

*[or]*

We do not accept the appointment of *[insert name proposed in Bid Data Sheet]* as the Adjudicator, and propose instead that *[insert name]* be appointed as Adjudicator, whose daily fees and biographical data are attached.

**Name of the Bidder:** *\*[insert complete name of person signing the Bid]*

**Name of the person duly authorized to sign the Bid on behalf of the Bidder:\*\****[insert complete name of person duly authorized to sign the Bid]*

**Title of the person signing the Bid:** *[insert complete title of the person signing the Bid]*

**Signature of the person named above:** *[insert signature of person whose name and capacity are shown above]*

**Date signed** *[insert date of signing]* **day of** *[insert month]*, *[insert year]*

\*: In the case of the Bid submitted by joint venture specify the name of the Joint Venture as Bidder

\*\* : Person signing the Bid shall have the power of attorney given by the Bidder to be attached with the Bid

## 2. Schedule of Payment Currencies

**For.....insert name of Section of the Works**

Separate tables may be required if the various sections of the Works (or of the Bill of Quantities) will have substantially different foreign and local currency requirements. The Employer should insert the names of each section of the Works

	A	B	C	D
Name of Payment Currency	Amount of Currency	Rate of Exchange to Local Currency	Local Currency Equivalent ( $C = A \times B$ )	Percentage of Total Bid Price (TBP) $\frac{100 \times C}{TBP}$
Local currency _____		1.00		
Foreign Currency #1 _____				
Foreign Currency #2 _____				
Foreign Currency #3 _____				
Total Bid Price				100.00
Provisional Sum Expressed in Local Currency		1.00		
<b>TOTAL BID PRICE</b> (Including provisional sum)				

NOT APPLICABLE

### 3. Schedule(s) of Adjustment Data

**Table A - Local Currency**

Index Code	Index Description	Source of Index	Base Value and Date	Bidder's Local Currency Amount	Bidder's Proposed Weighting
	Nonadjustable	—	—	—	A: _____* B: _____* C: _____* D: _____* E: _____*
<b>Total</b>					<b>1.00</b>

[\* To be entered by the Employer. Whereas "A" should a fixed percentage, B, C, D and E should specify a range of values and the Bidder will be required to specify a value within the range such that the total weighting = 1.00]

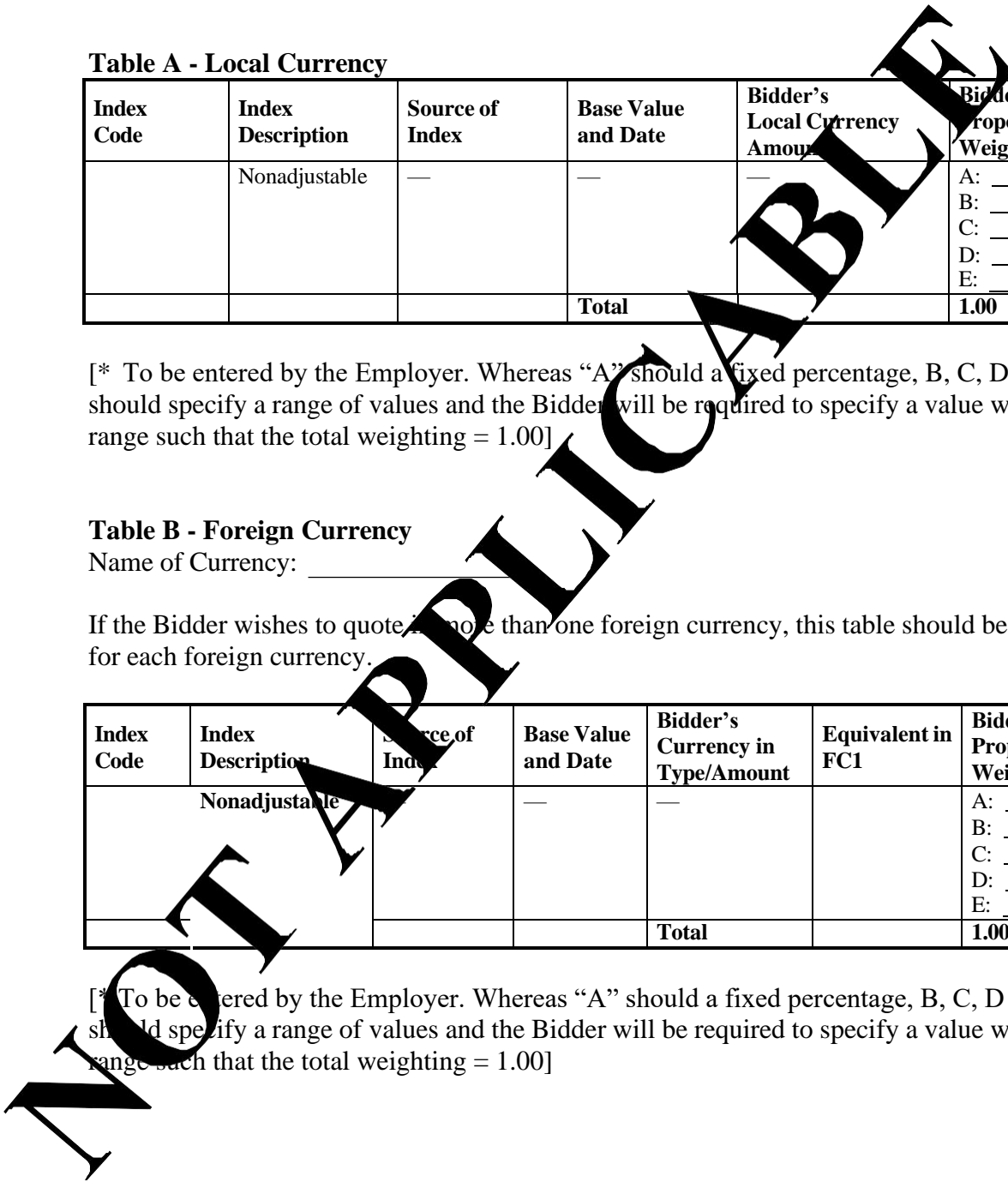
**Table B - Foreign Currency**

Name of Currency: \_\_\_\_\_

If the Bidder wishes to quote in more than one foreign currency, this table should be repeated for each foreign currency.

Index Code	Index Description	Source of Index	Base Value and Date	Bidder's Currency in Type/Amount	Equivalent in FC1	Bidder's Proposed Weighting
	Nonadjustable	—	—	—		A: _____* B: _____* C: _____* D: _____* E: _____*
<b>Total</b>						<b>1.00</b>

[\* To be entered by the Employer. Whereas "A" should a fixed percentage, B, C, D and E should specify a range of values and the Bidder will be required to specify a value within the range such that the total weighting = 1.00]



## Forms of Bid Security

### Form of Bid Security - Bank Guarantee

*[Guarantor letterhead or SWIFT identifier code]*

**Beneficiary:**

*[Insert name and address of the Employer]*

**Request for Bids No:** *\_[Insert reference number for the Request for Bids]*

**Date:** *[Insert date of issue]*

**BID GUARANTEE No.:** *[Insert guarantee reference number]*

**Guarantor:** *\_[Insert name and address of place of issue, unless indicated in the letterhead]*

We have been informed that *[insert name of the Bidder, which in the case of a joint venture shall be the name of the joint venture (whether legally constituted or prospective) or the names of all members thereof]* (hereinafter called "the Applicant") has submitted or will submit to the Beneficiary its Bid (hereinafter called "the Bid") for the execution of *[insert description of contract]* under Request for Bids No. *[insert number]* ("the RFB").

Furthermore, we understand that, according to the Beneficiary's conditions, Bids must be supported by a Bid guarantee.

At the request of the Applicant, we, as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of *[insert amount in letters]* (*insert amount in numbers*) upon receipt by us of the Beneficiary's complying supported by the Beneficiary's statement, whether in the demand itself or a separate signed document accompanying or identifying the demand, stating either that the Applicant:

- (a) has withdrawn its Bid during the period of Bid validity specified by the Applicant in the Letter of Bid ("the Bid Validity Period"), or any extension thereto provided by the Applicant; or
- (b) having been notified of the acceptance of its Bid by the Beneficiary during the period of Bid validity, (i) fails to execute the contract agreement or (ii) fails to furnish the performance security and, if required, the Environmental, Social, Health and Safety (ESHS) Performance Security, in accordance with the Instructions to Bidders ("ITB") of the Beneficiary's bidding document.

This guarantee will expire: (a) if the Applicant is the successful Bidder, upon our receipt of copies of the contract agreement signed by the Applicant and the performance security and, if required, the Environmental, Social, Health and Safety (ESHS) Performance Security, issued to the Beneficiary in relation to such contract agreement; and (b) if the Applicant is not the successful Bidder, upon the earlier of (i) our receipt of a copy of the Beneficiary's notification to the Applicant of the results of the Bidding process; or (ii) twenty-eight days after the end of the Bid Validity Period.

Consequently, any demand for payment under this guarantee must be received by us at the office indicated above on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758.

---

*[signature(s)]*

***Note: All italicized text is for use in preparing this form and shall be deleted from the final product.***

## Form of Bid Security – Bid Bond

*[The Surety shall fill in this Bid Bond Form in accordance with the instructions indicated.]*

BOND NO. \_\_\_\_\_

BY THIS BOND *[name of Bidder]* as Principal (hereinafter called “the Principal”) and *[name, legal title, and address of surety]*, authorized to transact business in *[name of country of Employer]*, as Surety (hereinafter called “the Surety”), are held and firmly bound unto *[name of Employer]* as Obligee (hereinafter called “the Employer”) in the sum of *[amount in words]* of Bond<sup>1</sup> *[amount in words]*, for the payment of which sum, well and truly to be made, we, the said Principal and Surety, bind ourselves, our successors and assigns, jointly and severally, firmly by these presents.

WHEREAS the Principal has submitted a written Bid to the Employer dated the \_\_\_ day of \_\_\_\_\_, 20\_\_\_, for the execution of *[name of Contract]* (hereinafter called the “Bid”).

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Principal:

- (a) has withdrawn its Bid during the period of bid validity set forth in the Principal’s Letter of Bid (“the Bid Validity Period”), or any extension thereto provided by the Principal; or
- (b) having been notified of the acceptance of its bid by the Employer during the Bid Validity Period or any extension thereto provided by the Principal: (i) failed to execute the contract agreement; or (ii) has failed to furnish the Performance Security and, if required, the Environmental, Social, Health and Safety (ESHS) Performance Security, in accordance with the Instructions to Bidders (“ITB”) of the Employer’s bidding document.

then the Surety undertakes to immediately pay to the Employer up to the above amount upon receipt of the Employer’s first written demand, without the Employer having to substantiate its demand, provided that in its demand the Employer shall state that the demand arises from the occurrence of one of the above events, specifying which event(s) has occurred.

The Surety hereby agrees that its obligation will remain in full force and effect up to and including the date 28 days after the date of expiration Bid Validity Period set forth in the Principal’s Letter of Bid or any extension thereto provided by the Principal.

IN TESTIMONY WHEREOF, the Principal and the Surety have caused these presents to be executed in their respective names this \_\_\_ day of \_\_\_\_\_ 20\_\_\_.

<sup>1</sup> The amount of the Bond shall be denominated in the currency of the Employer’s country or the equivalent amount in a freely convertible currency.

Principal: \_\_\_\_\_  
Corporate Seal (where appropriate)

Surety: \_\_\_\_\_

\_\_\_\_\_  
(Signature)  
(Printed name and title)

\_\_\_\_\_  
(Signature)  
(Printed name and title)

**NOT APPLICABLE**

## Form of Bid-Securing Declaration

Date: *[insert date (as day, month and year)]*

RFB No.: *[insert number of Bidding process]*

Alternative No.: *[insert identification No if this is a Bid for an alternative]*

To: *[insert complete name of Employer]*

We, the undersigned, declare that:

We understand that, according to your conditions, bids must be supported by a Bid-Securing Declaration.

We accept that we will automatically be suspended from being eligible for bidding or submitting proposals in any contract with the Employer for the period of time of *[insert number of months or years]* starting on *[insert date]*, if we are in breach of our obligation(s) under the bid conditions, because we:

- (a) have withdrawn our Bid during the period of Bid validity specified in the Letter of Bid; or
- (b) having been notified of the acceptance of our Bid by the Employer during the period of bid validity, (i) fail or refuse to execute the Contract, if required, or (ii) fail or refuse to furnish the Performance Security and, if required, the Environmental, Social, Health and Safety (ESHS) Performance Security, in accordance with the ITB.

We understand this Bid-Securing Declaration shall expire if we are not the successful Bidder, upon the earlier of (i) our receipt of your notification to us of the name of the successful Bidder; or (ii) twenty-eight days after the expiration of our Bid.

Name of the Bidder\* \_\_\_\_\_ *[insert complete name of person signing the Bid]*

Name of the person duly authorized to sign the Bid on behalf of the Bidder\*\* *[insert complete name of person duly authorized to sign the Bid]*

Title of the person signing the Bid *[insert complete title of the person signing the Bid]*

Signature of the person named above \_\_\_\_\_ *[insert signature of person whose name and capacity are shown above]*

Date signed *[insert date of signing]* day of *[insert month]*, *[insert year]*

\*: In the case of the Bid submitted by joint venture specify the name of the Joint Venture as Bidder

\*\**: Person signing the Bid shall have the power of attorney given by the Bidder to be attached with the Bid [Note: In case of a Joint Venture, the Bid-Securing Declaration must be in the name of all members to the Joint Venture that submits the Bid.]*

**NOT APPLICABLE**

## **Technical Proposal**

### **Technical Proposal Forms**

- **Key Personnel Schedule**
- **Equipment**
- **Site Organization**
- **Method Statement**
- **Mobilization Schedule**
- **Construction Schedule**
- **ESHS Management Strategies and Implementation Plans**
- **Code of Conduct (ESHS)**
- **Others**

## FORM PER -1

### Key Personnel Schedule

Bidders should provide the names and details of the suitably qualified Key Personnel to perform the Contract. The data on their experience should be supplied using the Form PER-2 below for each candidate.

#### Key Personnel

1.	<b>Title of position:</b>	
	<b>Name of candidate:</b>	
	<b>Duration of appointment:</b>	<i>[insert the whole period (start and end dates) for which this position will be engaged]</i>
	<b>Time commitment for this position:</b>	<i>[insert the number of days/week/months/ that has been scheduled for this position]</i>
	<b>Expected time schedule for this position:</b>	<i>[insert the expected time schedule for this position (e.g. attach high level Gantt chart)]</i>
2.	<b>Title of position:</b> <i>[Environmental Specialist]</i>	
	<b>Name of candidate:</b>	
	<b>Duration of appointment:</b>	<i>[insert the whole period (start and end dates) for which this position will be engaged]</i>
	<b>Time commitment for this position:</b>	<i>[insert the number of days/week/months/ that has been scheduled for this position]</i>
	<b>Expected time schedule for this position:</b>	<i>[insert the expected time schedule for this position (e.g. attach high level Gantt chart)]</i>
3.	<b>Title of position:</b> <i>[Health and Safety Specialist]</i>	
	<b>Name of candidate:</b>	
	<b>Duration of appointment:</b>	<i>[insert the whole period (start and end dates) for which this position will be engaged]</i>
	<b>Time commitment for this position:</b>	<i>[insert the number of days/week/months/ that has been scheduled for this position]</i>

	<b>Expected time schedule for this position:</b>	<i>[insert the expected time schedule for this position (e.g. attach high level Gantt chart)]</i>
<b>4.</b>	<b>Title of position:</b> <i>[Social Specialist]</i>	
	<b>Name of candidate:</b>	
	<b>Duration of appointment:</b>	<i>[insert the whole period (start and end dates) for which this position will be engaged]</i>
	<b>Time commitment for this position:</b>	<i>[insert the number of days/week/months/ that has been scheduled for this position]</i>
	<b>Expected time schedule for this position:</b>	<i>[insert the expected time schedule for this position (e.g. attach high level Gantt chart)]</i>
<b>5.</b>	<b>Title of position:</b> <i>[insert title]</i>	
	<b>Name of candidate</b>	
	<b>Duration of appointment:</b>	<i>[insert the whole period (start and end dates) for which this position will be engaged]</i>
	<b>Time commitment for this position:</b>	<i>[insert the number of days/week/months/ that has been scheduled for this position]</i>
	<b>Expected time schedule for this position:</b>	<i>[insert the expected time schedule for this position (e.g. attach high level Gantt chart)]</i>

**Form PER-2:  
Resume and Declaration  
Key Personnel**

<b>Name of Bidder</b>
-----------------------

<b>Position [#1]: [title of position from Form PER-1]</b>											
<b>Personnel information</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;"><b>Name:</b></td> <td style="width: 50%; padding: 5px;"><b>Date of birth:</b></td> </tr> <tr> <td style="padding: 5px;"><b>Address:</b></td> <td style="padding: 5px;"><b>E-mail:</b></td> </tr> <tr> <td colspan="2" style="padding: 5px;"><b>Professional qualifications:</b></td> </tr> <tr> <td colspan="2" style="padding: 5px;"><b>Academic qualifications:</b></td> </tr> <tr> <td colspan="2" style="padding: 5px;"><b>Language proficiency: [language and levels of speaking, reading and writing skills]</b></td> </tr> </table>	<b>Name:</b>	<b>Date of birth:</b>	<b>Address:</b>	<b>E-mail:</b>	<b>Professional qualifications:</b>		<b>Academic qualifications:</b>		<b>Language proficiency: [language and levels of speaking, reading and writing skills]</b>	
<b>Name:</b>	<b>Date of birth:</b>										
<b>Address:</b>	<b>E-mail:</b>										
<b>Professional qualifications:</b>											
<b>Academic qualifications:</b>											
<b>Language proficiency: [language and levels of speaking, reading and writing skills]</b>											
<b>details</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="padding: 5px;"><b>Address of employer:</b></td> </tr> <tr> <td style="width: 50%; padding: 5px;"><b>Telephone:</b></td> <td style="width: 50%; padding: 5px;"><b>Contact (manager / personnel officer):</b></td> </tr> <tr> <td style="padding: 5px;"><b>Fax:</b></td> <td style="padding: 5px;"></td> </tr> <tr> <td style="padding: 5px;"><b>Job title:</b></td> <td style="padding: 5px;"><b>Years with present employer:</b></td> </tr> </table>	<b>Address of employer:</b>		<b>Telephone:</b>	<b>Contact (manager / personnel officer):</b>	<b>Fax:</b>		<b>Job title:</b>	<b>Years with present employer:</b>		
<b>Address of employer:</b>											
<b>Telephone:</b>	<b>Contact (manager / personnel officer):</b>										
<b>Fax:</b>											
<b>Job title:</b>	<b>Years with present employer:</b>										

Summarize professional experience in reverse chronological order. Indicate particular technical and managerial experience relevant to the project.

<b>Project</b>	<b>Role</b>	<b>Duration of involvement</b>	<b>Relevant experience</b>
<i>[main project details]</i>	<i>[role and responsibilities on the project]</i>	<i>[time in role]</i>	<i>[describe the experience relevant to this position]</i>

## Declaration

I, the undersigned Key Personnel, certify that to the best of my knowledge and belief, the information contained in this Form PER-2 correctly describes myself, my qualifications and my experience.

I confirm that I am available as certified in the following table and throughout the expected time schedule for this position as provided in the Bid:

Commitment	Details
<b>Commitment to duration of contract:</b>	<i>[insert period (start and end dates) for which this Key Personnel is available to work on this contract]</i>
<b>Time commitment:</b>	<i>[insert the number of days/week/months/ that this Key Personnel will be engaged]</i>

I understand that any misrepresentation or omission in this Form may:

- (a) be taken into consideration during Bid evaluation;
- (b) my disqualification from participating in the Bid;
- (c) my dismissal from the contract.

**Name of Key Personnel:** *[insert name]*

Signature: \_\_\_\_\_

Date: (day month year): \_\_\_\_\_

**Countersignature of authorized representative of the Bidder:**

Signature: \_\_\_\_\_

Date: (day month year): \_\_\_\_\_

## Equipment For Each Lot

The Bidder shall provide adequate information to demonstrate clearly that it has the capability to meet the requirements for the key equipment listed in Section III (Evaluation and Qualification Criteria). A separate Form shall be prepared for each item of equipment listed, or for alternative equipment proposed by the Bidder. The Bidder shall provide all the information requested below, to the extent possible. Fields with asterisk (\*) shall be used for evaluation.

<b>Type of Equipment*</b>	
<b>Equipment Information</b>	<b>Name of manufacturer,</b>
	<b>Capacity*</b>
	<b>Model and power rating</b>
	<b>Year of manufacture*</b>
<b>Current Status</b>	<b>Current location</b>
	<b>Details of current commitments</b>
<b>Source</b>	<b>Indicate source of the equipment</b> <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured

The following information shall be provided only for equipment not owned by the Bidder.

<b>Owner</b>	<b>Name of owner</b>	
	<b>Address of owner</b>	
	<b>Telephone</b>	<b>Contact name and title</b>
	<b>Fax</b>	<b>Telex</b>
<b>Agreements</b>	<b>Details of rental / lease / manufacture agreements specific to the project</b>	

---

## **Site Organization**

*[insert Site Organization information]*

## **Method Statement**

*[insert Method Statement]*

## **Mobilization Schedule**

*[insert Mobilization Schedule]*

---

## **Construction Schedule**

*[insert Construction Schedule]*

## **ESHS Management Strategies and Implementation Plans**

### **(ESHS-MSIP)**

The Bidder shall submit comprehensive and concise Environmental, Social, Health and Safety Management Strategies and Implementation Plans (ESHS-MSIP) as required by ITB 11.1 (i) of the Bid Data Sheet. These strategies and plans shall describe in detail the actions, materials, equipment, management processes etc. that will be implemented by the Contractor, and its subcontractors.

In developing these strategies and plans, the Bidder shall have regard to the ESHS provisions of the contract including those as may be more fully described in the Works Requirements in Section VII.

**NOTE: THE BIDDER IS REQUIRED TO REFER TO THE ESMP PLAN ANNEXED AND CONFIRM ADHERANCE**

## **Code of Conduct: Environmental, Social, Health and Safety (ESHS)**

The Bidder shall submit the Code of Conduct that will apply to the Contractor's employees and subcontractors as required by ITB 11.1 (i) of the Bid Data Sheet. The Code of Conduct shall ensure compliance with the ESHS provisions of the contract, including those as may be more fully described in the Works Requirements in Section VII.

In addition, the Bidder shall submit an outline of how this Code of Conduct will be implemented. This will include: how it will be introduced into conditions of employment/engagement, what training will be provided, how it will be monitored and how the Contractor proposes to deal with any breaches.

**NOTE: THE BIDDER IS REQUIRED TO REFER TO THE ANNEXED CODE OF CONDUCT AND CONFIRM ADHERANCE**

---

## Others

## **Bidder's Qualification**

To establish its qualifications to perform the contract in accordance with Section III (Evaluation and Qualification Criteria) the Bidder shall provide the information requested in the corresponding Information Sheets included hereunder

## Form ELI -1.1: Bidder Information Form

Date: \_\_\_\_\_  
 RFB No. and title: \_\_\_\_\_  
 Page \_\_\_\_\_ of \_\_\_\_\_ pages

Bidder's name
In case of Joint Venture (JV), name of each member:
Bidder's actual or intended country of registration: <i>[indicate country of Constitution]</i>
Bidder's actual or intended year of incorporation:
Bidder's legal address [in country of registration]:
Bidder's authorized representative information Name: _____ Address: _____ Telephone/Fax numbers: _____ E-mail address: _____
1. Attached are copies of original documents of <ul style="list-style-type: none"> <li><input type="checkbox"/> Articles of Incorporation (or equivalent documents of constitution or association), and/or documents of registration of the legal entity named above, in accordance with ITB 4.4.</li> <li><input type="checkbox"/> In case of JV, letter of intent to form JV or JV agreement, in accordance with ITB 4.1.</li> <li><input type="checkbox"/> In case of state-owned enterprise or institution, in accordance with ITB 4.6 documents establishing:             <ul style="list-style-type: none"> <li>• Legal and financial autonomy</li> <li>• Operation under commercial law</li> <li>• Establishing that the Bidder is not under the supervision of the Employer</li> </ul> </li> </ul>
2. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership. <i>[If required under BDS ITB 47.1, the successful Bidder shall provide additional information on beneficial ownership, using the Beneficial Ownership Disclosure Form.]</i>

## Form ELI -1.2: Information Form for JV Bidders

(to be completed for each member of Joint Venture)

Date: \_\_\_\_\_

RFB No. and title: \_\_\_\_\_

Page \_\_\_\_\_ of \_\_\_\_\_ pages

Bidder's Joint Venture name:
JV member's name:
JV member's country of registration:
JV member's year of constitution:
JV member's legal address in country of constitution:
JV member's authorized representative information Name: _____ Address: _____ Telephone/Fax numbers: _____ E-mail address: _____
1. Attached are copies of original documents of <input type="checkbox"/> Articles of Incorporation (or equivalent documents of constitution or association), and/or registration documents of the legal entity named above, in accordance with ITB 4.4. <input type="checkbox"/> In case of a state-owned enterprise or institution, documents establishing legal and financial autonomy, operation in accordance with commercial law, and is not under the supervision of the Employer, in accordance with ITB 4.6.
2. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership. <i>[If required under BDS ITB 47.1, the successful Bidder shall provide additional information on beneficial ownership for each JV member using the Beneficial Ownership Disclosure Form.]</i>

## Form CON – 2: Historical Contract Non-Performance, Pending Litigation and Litigation History

Bidder's Name: \_\_\_\_\_

Date: \_\_\_\_\_

Joint Venture Member's Name \_\_\_\_\_

RFB No. and title: \_\_\_\_\_

Page \_\_\_\_\_ of \_\_\_\_\_ pages

Non-Performed Contracts in accordance with Section III, Evaluation and Qualification Criteria			
<input type="checkbox"/> Contract non-performance did not occur since 1 <sup>st</sup> January [ <i>insert year</i> ] specified in Section III, Evaluation and Qualification Criteria, Sub-Factor 2.1.			
<input type="checkbox"/> Contract(s) not performed since 1 <sup>st</sup> January [ <i>insert year</i> ] specified in Section III, Evaluation and Qualification Criteria, requirement 2.1			
Year	Non-performed portion of contract	Contract Identification	Total Contract Amount (current value, currency, and Kenya Shilling equivalent)
<i>[insert year]</i>	<i>[insert amount and percentage]</i>	Contract Identification: [ <i>indicate complete contract name/ number, and any other identification</i> ] Name of Employer: [ <i>insert full name</i> ] Address of Employer: [ <i>insert street/city/country</i> ] Reason(s) for nonperformance: [ <i>indicate main reason(s)</i> ]	<i>[insert amount]</i>
Pending Litigation, in accordance with Section III, Evaluation and Qualification Criteria			
<input type="checkbox"/> No pending litigation in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.3.			
<input type="checkbox"/> Pending litigation in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.3 as indicated below.			

<b>Year of dispute</b>	<b>Amount in dispute (currency)</b>	<b>Contract Identification</b>	<b>Total Contract Amount (currency), Kenya Shilling Equivalent (exchange rate)</b>
		Contract Identification: _____ Name of Employer: _____ Address of Employer: _____ Matter in dispute: _____ Party who initiated the dispute: ____  Status of dispute: _____	
		Contract Identification: Name of Employer: Address of Employer: Matter in dispute: Party who initiated the dispute: Status of dispute:	
<b>Litigation History in accordance with Section III, Evaluation and Qualification Criteria</b>			
<input type="checkbox"/> No Litigation History in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.4.			
<input type="checkbox"/> Litigation History in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.4 as indicated below.			
<b>Year of award</b>	<b>Outcome as percentage of Net Worth</b>	<b>Contract Identification</b>	<b>Total Contract Amount (currency), Kenya Shilling Equivalent (exchange rate)</b>

<i>[insert year]</i>	<i>[insert percentage]</i>	Contract Identification: [indicate complete contract name, number, and any other identification] Name of Employer: <i>[insert full name]</i> Address of Employer: <i>[insert street/city/country]</i> Matter in dispute: <i>[indicate main issues in dispute]</i> Party who initiated the dispute: <i>[indicate "Employer" or "Contractor"]</i> Reason(s) for Litigation and award decision <i>[indicate main reason(s)]</i>	<i>[insert amount]</i>
----------------------	----------------------------	---	------------------------

## Form CON – 3: Environmental, Social, Health, and Safety Performance Declaration

*[The following table shall be filled in for the Bidder, each member of a Joint Venture and each Specialized Subcontractor]*

Bidder's Name: *[insert full name]*

Date: *[insert day, month, year]*

Joint Venture Member's or Specialized Subcontractor's Name: *[insert full name]*

RFB No. and title: *[insert RFB number and title]*

Page *[insert page number]* of *[insert total number]* pages

Environmental, Social, Health, and Safety Performance Declaration in accordance with Section III, Qualification Criteria, and Requirements			
<input type="checkbox"/> <b>No suspension or termination of contract:</b> An employer has not suspended or terminated a contract and/or called the performance security for a contract for reasons related to Environmental, Social, Health, or Safety (ESHS) performance since the date specified in Section III, Qualification Criteria, and Requirements, Sub-Factor 2.5.			
<input type="checkbox"/> <b>Declaration of suspension or termination of contract:</b> The following contract(s) has/have been suspended or terminated and/or Performance Security called by an employer(s) for reasons related to Environmental, Social, Health, or Safety (ESHS) performance since the date specified in Section III, Qualification Criteria, and Requirements, Sub-Factor 2.5. Details are described below:			
Year	Suspended or terminated portion of contract	Contract Identification	Total Contract Amount (current value, currency, and Kenya Shilling equivalent)
<i>[insert year]</i>	<i>[insert amount and percentage]</i>	Contract Identification: <i>[indicate complete contract name/ number, and any other identification]</i> Name of Employer: <i>[insert full name]</i> Address of Employer: <i>[insert street/city/country]</i> Reason(s) for suspension or termination: <i>[indicate main reason(s) e.g. for GBV/SEA breaches]</i>	<i>[insert amount]</i>
<i>[insert year]</i>	<i>[insert amount and percentage]</i>	Contract Identification: <i>[indicate complete contract name/ number, and any other identification]</i> Name of Employer: <i>[insert full name]</i> Address of Employer: <i>[insert street/city/country]</i>	<i>[insert amount]</i>

		Reason(s) for suspension or termination: <i>[indicate main reason(s)]</i>	
...	...	<i>[list all applicable contracts]</i>	...
<b>Performance Security called by an employer(s) for reasons related to ESHS performance</b>			
Year	Contract Identification		Total Contract Amount (current value, currency, and Kenya Shilling equivalent)
<i>[insert year]</i>	Contract Identification: <i>[indicate complete contract name/ number, and any other identification]</i> Name of Employer: <i>[insert full name]</i> Address of Employer: <i>[insert street/city/country]</i> Reason(s) for calling of performance security: <i>[indicate main reason(s) e.g. for GBV/ SEA breaches]</i>		<i>[insert amount]</i>

## Form CCC: Current Contract Commitments / Works in Progress

Bidders and each member of a JV should provide information on their current commitments on all contracts that have been awarded, or for which a letter of intent or acceptance has been received, or for contracts approaching completion, but for which an unqualified, full completion certificate has yet to be issued.

Name of contract	Employer, contact address/tel/fax	Value of outstanding work (Kenya Shillings)	Estimated completion date	Average monthly invoicing over last six months (Kenya Shillings/month)
1.				
2.				
3.				
4.				
5.				
etc.				

## Form FIN – 3.1: Financial Situation and Performance

Bidder's Name: \_\_\_\_\_

Date: \_\_\_\_\_

Joint Venture Member's Name \_\_\_\_\_

RFB No. and title: \_\_\_\_\_

Page \_\_\_\_\_ of \_\_\_\_\_ pages

### 1. Financial data

Type of Financial information in (currency)	Historic information for previous _____ years, (amount in currency, currency, exchange rate, Kenya Shilling equivalent)				
	Year 1	Year 2	Year 3	Year 4	Year 5
Statement of Financial Position (Information from Balance Sheet)					
Total Assets (TA)					
Total Liabilities (TL)					
Total Equity/Net Worth (NW)					
Current Assets (CA)					
Current Liabilities (CL)					
Working Capital (WC)					
Information from Income Statement					
Total Revenue (TR)					
Profits Before Taxes (PBT)					
Cash Flow Information					
Cash Flow from Operating Activities					

## 2. Sources of Finance

Specify sources of finance to meet the cash flow requirements on works currently in progress and for future contract commitments.

No.	Source of finance	Amount (Kenya Shilling equivalent)
1		
2		
3		

## 3. Financial documents

The Bidder and its parties shall provide copies of financial statements for \_\_\_\_\_ years pursuant Section III, Evaluation and Qualifications Criteria, Sub-factor 3.2. The financial statements shall:

- (a) reflect the financial situation of the Bidder or in case of JV member , and not an affiliated entity (such as parent company or group member).
  - (b) be independently audited or certified in accordance with local legislation.
  - (c) be complete, including all notes to the financial statements.
  - (d) correspond to accounting periods already completed and audited.
- Attached are copies of financial statements<sup>2</sup> for the \_\_\_\_\_ years required above; and complying with the requirements

---

<sup>2</sup> If the most recent set of financial statements is for a period earlier than 12 months from the date of bid, the reason for this should be justified.

## Form FIN - 3.2: Average Annual Construction Turnover

Bidder's Name: \_\_\_\_\_

Date: \_\_\_\_\_

Joint Venture Member's Name \_\_\_\_\_

RFB No. and title: \_\_\_\_\_

Page \_\_\_\_\_ of \_\_\_\_\_ pages

		<b>Annual turnover data (construction only)</b>	
<b>Year</b>	<b>Amount Currency</b>	<b>Exchange rate</b>	<b>Kenya Shilling equivalent</b>
<i>[indicate year]</i>	<i>[insert amount and indicate currency]</i>		
Average Annual Construction Turnover *			

\* See Section III, Evaluation and Qualification Criteria, Sub-Factor 3.2.

### Form FIN - 3.3: Financial Resources

Specify proposed sources of financing, such as liquid assets, unencumbered real assets, lines of credit, and other financial means, net of current commitments, available to meet the total construction cash flow demands of the subject contract or contracts as specified in Section III, Evaluation and Qualification Criteria.

Source of financing	Amount (Kenya Shilling equivalent)
1.	
2.	
3.	
4.	

## Form EXP - 4.1: General Construction Experience

Bidder's Name: \_\_\_\_\_  
 Date: \_\_\_\_\_  
 Joint Venture Member's Name \_\_\_\_\_  
 RFB No. and title: \_\_\_\_\_  
 Page \_\_\_\_\_ of \_\_\_\_\_ pages

Starting Year	Ending Year	Contract Identification	Role of Bidder
		Contract name: _____ Brief Description of the Works performed by the Bidder: _____ Amount of contract: _____ Name of Employer: _____ Address: _____	
		Contract name: _____ Brief Description of the Works performed by the Bidder: _____ Amount of contract: _____ Name of Employer: _____ Address: _____	
		Contract name: _____ Brief Description of the Works performed by the Bidder: _____ Amount of contract: _____ Name of Employer: _____ Address: _____	

## Form EXP - 4.2(a): Specific Construction and Contract Management Experience

Bidder's Name: \_\_\_\_\_

Date: \_\_\_\_\_

Joint Venture Member's Name \_\_\_\_\_

RFB No. and title: \_\_\_\_\_

Page \_\_\_\_\_ of \_\_\_\_\_ pages

Similar Contract No.	Information			
Contract Identification				
Award date				
Completion date				
Role in Contract	Prime Contractor <input type="checkbox"/>	Member in JV <input type="checkbox"/>	Management Contractor <input type="checkbox"/>	Sub- contractor <input type="checkbox"/>
Total Contract Amount			Kenya Shiling *	
If member in a JV or subcontractor, specify participation in total Contract amount			*	
Employer's Name:				
Address:				
Telephone/fax number				
E-mail:				

**Form EXP - 4.2(a) (cont.)**  
**Specific Construction and Contract Management Experience**  
**(cont.)**

<b>Similar Contract No.</b>	<b>Information</b>
Description of the similarity in accordance with Sub-Factor 4.2(a) of Section III:	
1. Amount	
2. Physical size of required works items	
3. Complexity	
4. Methods/Technology	
5. Construction rate for key activities	
6. Other Characteristics	

## Form EXP - 4.2(b): Construction Experience in Key Activities

Bidder's Name: \_\_\_\_\_

Date: \_\_\_\_\_

Joint Venture Member's Name \_\_\_\_\_

Subcontractor's Name<sup>3</sup> (as per ITB 34.2 and 34.3): \_\_\_\_\_

RFB No. and title: \_\_\_\_\_

Page \_\_\_\_\_ of \_\_\_\_\_ pages

Subcontractor's Name (as per ITB 34.2 and 34.3): \_\_\_\_\_

All subcontractors for key activities must complete the information in this form as per ITB 34.2 and 34.3 and Section III, Qualification Criteria and Requirements, Sub-Factor 4.2.

1. Key Activity No One: \_\_\_\_\_

	<b>Information</b>			
Contract Identification				
Award date				
Completion date				
Role in Contract	Prime Contractor <input type="checkbox"/>	Member in JV <input type="checkbox"/>	Management Contractor <input type="checkbox"/>	Sub-contractor <input type="checkbox"/>
Total Contract Amount			Kenya Shilling	
Quantity (Volume, number or rate of production, as applicable) performed under the contract per year or part of the year	Total quantity in the contract (i)	Percentage participation (ii)		Actual Quantity Performed (i) x (ii)
Year 1				
Year 2				
Year 3				
Year 4				

<sup>3</sup> If applicable.

Employer's Name:	
Address:	
Telephone/fax number	
E-mail:	

	<b>Information</b>
Employer's Name:	
Address:	
Telephone/fax number	
E-mail:	

	<b>Information</b>
Description of the key activities in accordance with Sub-Factor 4.2(b) of Section III:	

2. Activity No. Two

3. ....

## **Section V - Eligible Countries**

### **Eligibility for the Provision of Goods, Works and Services in Bank-Financed Procurement**

In reference to ITB 4.8, and 5.1, for the information of the Bidders, at the present time firms, goods and services from the following countries are excluded from this Bidding process:

Under ITB 4.8 (a) and 5.1: **None**

Under ITB 4.8 (b) and 5.1: **None**

## **Section VI - Fraud and Corruption**

**(Section VI shall not be modified)**

### **1. Purpose**

1.1 The Bank’s Anti-Corruption Guidelines and this annex apply with respect to procurement under Bank Investment Project Financing operations.

### **2. Requirements**

2.1 The Bank requires that Borrowers (including beneficiaries of Bank financing); bidders (applicants/proposers), consultants, contractors and suppliers; any sub-contractors, sub-consultants, service providers or suppliers; any agents (whether declared or not); and any of their personnel, observe the highest standard of ethics during the procurement process, selection and contract execution of Bank-financed contracts, and refrain from Fraud and Corruption.

2.2 To this end, the Bank:

a. Defines, for the purposes of this provision, the terms set forth below as follows:

- i. “corrupt practice” is the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;
- ii. “fraudulent practice” is any act or omission, including misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain financial or other benefit or to avoid an obligation;
- iii. “collusive practice” is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;
- iv. “coercive practice” is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;
- v. “obstructive practice” is:
  - (a) deliberately destroying, falsifying, altering, or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Bank investigation into allegations of a corrupt, fraudulent, coercive, or collusive practice; and/or threatening, harassing, or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or

- (b) acts intended to materially impede the exercise of the Bank’s inspection and audit rights provided for under paragraph 2.2 e. below.
- b. Rejects a proposal for award if the Bank determines that the firm or individual recommended for award, any of its personnel, or its agents, or its sub-consultants, sub-contractors, service providers, suppliers and/ or their employees, has, directly or indirectly, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for the contract in question;
- c. In addition to the legal remedies set out in the relevant Legal Agreement, may take other appropriate actions, including declaring misprocurement, if the Bank determines at any time that representatives of the Borrower or of a recipient of any part of the proceeds of the loan engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices during the procurement process, selection and/or execution of the contract in question, without the Borrower having taken timely and appropriate action satisfactory to the Bank to address such practices when they occur, including by failing to inform the Bank in a timely manner at the time they knew of the practices;
- d. Pursuant to the Bank’s Anti- Corruption Guidelines and in accordance with the Bank’s prevailing sanctions policies and procedures, may sanction a firm or individual, either indefinitely or for a stated period of time, including by publicly declaring such firm or individual ineligible (i) to be awarded or otherwise benefit from a Bank-financed contract, financially or in any other manner;<sup>1</sup> (ii) to be a nominated<sup>2</sup> sub-contractor, consultant, manufacturer or supplier, or service provider of an otherwise eligible firm being awarded a Bank-financed contract; and (iii) to receive the proceeds of any loan made by the Bank or otherwise to participate further in the preparation or implementation of any Bank-financed project;
- e. Requires that a clause be included in bidding/request for proposals documents and in contracts financed by a Bank loan, requiring (i) bidders (applicants/proposers), consultants, contractors, and suppliers, and their sub-contractors, sub-consultants, service providers, suppliers, agents personnel, permit the Bank to inspect<sup>3</sup> all

---

<sup>1</sup> For the avoidance of doubt, a sanctioned party’s ineligibility to be awarded a contract shall include, without limitation, (i) applying for pre-qualification, expressing interest in a consultancy, and bidding, either directly or as a nominated sub-contractor, nominated consultant, nominated manufacturer or supplier, or nominated service provider, in respect of such contract, and (ii) entering into an addendum or amendment introducing a material modification to any existing contract.

<sup>2</sup> A nominated sub-contractor, nominated consultant, nominated manufacturer or supplier, or nominated service provider (different names are used depending on the particular bidding document) is one which has been: (i) included by the bidder in its pre-qualification application or bid because it brings specific and critical experience and know-how that allow the bidder to meet the qualification requirements for the particular bid; or (ii) appointed by the Borrower.

<sup>3</sup> Inspections in this context usually are investigative (i.e., forensic) in nature. They involve fact-finding activities undertaken by the Bank or persons appointed by the Bank to address specific matters related to investigations/audits, such as evaluating the veracity of an allegation of possible Fraud and Corruption, through the appropriate mechanisms. Such activity includes but is not limited to: accessing and examining a firm’s or individual’s financial records and information, and making copies thereof as relevant; accessing and examining any other documents, data and information (whether in hard copy or electronic format) deemed relevant for the investigation/audit, and making copies thereof as relevant; interviewing staff and other relevant individuals; performing physical inspections and site visits; and obtaining third party verification of information.

accounts, records and other documents relating to the procurement process, selection and/or contract execution, and to have them audited by auditors appointed by the Bank.

---

## **PART 2 – Works' Requirements**

## **Section VII - Works’ Requirements**

### **Table of Contents**

<b>Specifications .....</b>	<b>104</b>
<b>Environmental, social, health and safety requirements.....</b>	<b>105</b>
<b>Drawings... ..</b>	<b>104</b>

## **Specifications**

**Specifications applicable are those by the Ministry of Public Works General Specifications dated March 1976 (together with any amendments issued thereof). The Contractor should obtain a copy from the Ministry of Public Works. No liability will be admitted nor claim allowed in respect of errors in Contractors tender arising from the lack of knowledge on the said specification.**

**Goods, materials and workmanship meeting other authoritative standards and which promise to ensure equal or higher quality than the standards specified, will also be acceptable**

## **Environmental, social, health and safety requirements**

The Bidder to refer to ESHS and ESMP policies drafted by the Employer and confirm adherence.

### **MINIMUM REQUIREMENTS FOR THE BIDDER'S CODE OF CONDUCT**

A satisfactory code of conduct will contain obligations on all Contractor's personnel (including sub-contractors and day workers) that are suitable to address the following issues, as a minimum. Additional obligations may be added to respond to particular concerns of the region, the location and the project sector or to specific project requirements. The code of conduct shall contain a statement that the term "child" / "children" means any person(s) under the age of 18 years.

The issues to be addressed include:

1. Compliance with applicable laws, rules, and regulations
2. Compliance with applicable health and safety requirements to protect the local community (including vulnerable and disadvantaged groups), the Employer's and Project Manager's personnel, and the Contractor's personnel, including sub-contractors and day workers, (including wearing prescribed personal protective equipment, preventing avoidable accidents and a duty to report conditions or practices that pose a safety hazard or threaten the environment)
3. The use of illegal substances
4. Non-Discrimination in dealing with the local community (including vulnerable and disadvantaged groups), the Employer's and Project Manager's personnel, and the Contractor's personnel, including sub-contractors and day workers (for example on the basis of family status, ethnicity, race, gender, religion, language, marital status, age, disability (physical and mental), sexual orientation, gender identity, political conviction or social, civic, or health status)
5. Interactions with the local community(ies), members of the local community (ies), and any affected person(s) (for example to convey an attitude of respect, including to their culture and traditions)
6. Sexual harassment (for example to prohibit use of language or behavior, in particular towards women and/or children, that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate)
7. Violence including sexual and/or gender based violence (for example acts that inflict physical, mental or sexual harm or suffering, threats of such acts, coercion, and deprivation of liberty)
8. Exploitation including sexual exploitation and abuse (for example the prohibition of the exchange of money, employment, goods, or services for sex, including sexual favors or other forms of humiliating, degrading behavior, exploitative behavior or abuse of power)

9. Protection of children (including prohibitions against sexual activity or abuse, or otherwise unacceptable behavior towards children, limiting interactions with children, and ensuring their safety in project areas)
10. Sanitation requirements (for example, to ensure workers use specified sanitary facilities provided by their employer and not open areas)
11. Avoidance of conflicts of interest (such that benefits, contracts, or employment, or any sort of preferential treatment or favors, are not provided to any person with whom there is a financial, family, or personal connection)
12. Respecting reasonable work instructions (including regarding environmental and social norms)
13. Protection and proper use of property (for example, to prohibit theft, carelessness or waste)
14. Duty to report violations of this Code
15. Non retaliation against workers who report violations of the Code, if that report is made in good faith.

The Code of Conduct should be written in plain language and signed by each worker to indicate that they have:

- received a copy of the code;
- had the code explained to them;
- acknowledged that adherence to this Code of Conduct is a condition of employment; and
- understood that violations of the Code can result in serious consequences, up to and including dismissal, or referral to legal authorities.

**NOTE: THE BIDDER IS REQUIRED TO REFER TO THE ANNEXED CODE OF CONDUCT AND CONFIRM ADHERANCE**

*A copy of the code shall be displayed in a location easily accessible to the community and project affected people. It shall be provided in languages comprehensible to the local community, Contractor's personnel (including sub-contractors and day workers), Employer's and Project Manager's personnel, and affected persons.*

**PAYMENT FOR ESHS REQUIREMENTS**

**NOTE: THE BIDDER IS REQUIRED TO COST FOR ESHS REQUIREMENTS DELIVERY AS PROVIDED IN THE GENERAL PRELIMINARIES.**

# Drawings

## SCHEDULE OF DRAWINGS

NO.	DESCRIPTION	DRAWING NO.
	<b><u>ARCHITECTURAL DRAWING</u></b>	
	Location and Master Plan	A-100
	Site Plan	A-101
	Ground Floor Plan	A-102
	First Floor Plan	A-103
	Basement 01 Floor Plan	A-104
	Attic Floor Plan	A-106
	Roof Plan	A-107
	North and East Elevations	A-200
	South and West Elevations	A-201
	Part Section AA, BB & YY	A-300
	Part Section XX	A-301
	Section CC	A-302
	Section DD	A-303
	<b><u>MECHANICAL DRAWINGS</u></b>	
	Basement 02 Drainage Layout	MC/231/03-01MD
	Basement 01 Drainage Layout	MC/231/03-02MD
	Ground Floor Drainage Layout	MC/231/03-03MD
	First Floor Drainage Layout	MC/231/03-04MD
	Attic Floor Drainage Layout	MC/231/03-05MD
	Basement 02 Plumbing & Fire Fighting Layout	MC/231/03-06MD
	Basement 01 Plumbing & Fire Fighting Layout	MC/231/03-07MD
	First Floor Plumbing & Fire Fighting Layout	MC/231/03-08MD
	Attic Floor Plumbing & Solar Water Heating Layout	MC/231/03-09MD
	Attic Floor Plumbing & Solar Water Heating Layout	MC/231/03-10MD
	Basement 02 HVAC Layout	MC/231/03-11MD
	Basement 01 HVAC Layout	MC/231/03-12MD
	Ground Floor HVAC Layout	MC/231/03-13MD
	First Floor HVAC Layout	MC/231/03-14MD
	Attic Floor HVAC Layout	MC/231/03-15MD



## **PART 3 – Conditions of Contract and Contract Forms**

## **Section VIII - General Conditions of Contract**

These General Conditions of Contract (GCC), read in conjunction with the Particular Conditions of Contract (PCC) and other documents listed therein, should be a complete document expressing fairly the rights and obligations of both parties.

These General Conditions of Contract have been developed on the basis of considerable international experience in the drafting and management of contracts, bearing in mind a trend in the construction industry towards simpler, more straightforward language.

The GCC can be used for both smaller admeasurement contracts and lump sum contracts.

**Table of Clauses**

<b>A. General .....</b>	<b>114</b>
1. Definitions .....	114
2. Interpretation .....	116
3. Language and Law .....	117
4. Project Manager’s Decisions .....	117
5. Delegation .....	118
6. Communications .....	118
7. Subcontracting .....	118
8. Other Contractors .....	118
9. Personnel and Equipment .....	118
10. Employer’s and Contractor’s Risks .....	118
11. Employer’s Risks .....	118
12. Contractor’s Risks .....	119
13. Insurance .....	119
14. Site Data .....	120
15. Contractor to Construct the Works .....	120
16. The Works to Be Completed by the Intended Completion Date .....	120
17. Approval by the Project Manager .....	120
18. Safety and Protection of the Environment .....	121
19. Discoveries .....	121
20. Possession of the Site .....	121
21. Access to the Site .....	121
22. Instructions, Inspections and Audits .....	121
23. Appointment of the Adjudicator .....	122
24. Procedure for Disputes .....	122
25. Fraud and Corruption .....	123
<b>B. Time Control .....</b>	<b>123</b>
26. Program .....	123
27. Extension of the Intended Completion Date .....	123
28. Acceleration .....	124
29. Delays Ordered by the Project Manager .....	124
30. Management Meetings .....	124
31. Early Warning .....	124
<b>C. Quality Control .....</b>	<b>125</b>
32. Identifying Defects .....	125
33. Tests .....	125
34. Correction of Defects .....	125
35. Uncorrected Defects .....	125
<b>D. Cost Control .....</b>	<b>126</b>

36.	Contract Price.....	126
37.	Changes in the Contract Price .....	126
38.	Variations .....	126
39.	Cash Flow Forecasts.....	128
40.	Payment Certificates.....	128
41.	Payments .....	129
42.	Compensation Events.....	129
43.	Tax.....	130
44.	Currencies.....	131
45.	Price Adjustment .....	131
46.	Retention .....	131
47.	Liquidated Damages.....	132
48.	Bonus .....	132
49.	Advance Payment.....	132
50.	Securities .....	133
51.	Dayworks .....	133
52.	Cost of Repairs.....	133
<b>E. Finishing the Contract .....</b>		<b>133</b>
53.	Completion .....	133
54.	Taking Over.....	134
55.	Final Account .....	134
56.	Operating and Maintenance Manuals.....	134
57.	Termination .....	134
58.	Payment upon Termination .....	135
59.	Property .....	136
60.	Release from Performance .....	136
61.	Suspension of Bank Loan or Credit .....	136

## General Conditions of Contract

### A. General

#### 1. Definitions

- 1.1 Boldface type is used to identify defined terms.
- (a) The Accepted Contract Amount means the amount accepted in the Letter of Acceptance for the execution and completion of the Works and the remedying of any defects.
  - (b) The Activity Schedule is a schedule of the activities comprising the construction, installation, testing, and commissioning of the Works in a lump sum contract. It includes a lump sum price for each activity, which is used for valuations and for assessing the effects of Variations and Compensation Events.
  - (c) The Adjudicator is the person appointed jointly by the Employer and the Contractor to resolve disputes in the first instance, as provided for in GCC 23.
  - (d) Bank means the financing institution **named in the PCC**.
  - (e) Bill of Quantities means the priced and completed Bill of Quantities forming part of the Bid.
  - (f) Compensation Events are those defined in GCC Clause 42 hereunder.
  - (g) The Completion Date is the date of completion of the Works as certified by the Project Manager, in accordance with GCC Sub-Clause 53.1.
  - (h) The Contract is the Contract between the Employer and the Contractor to execute, complete, and maintain the Works. It consists of the documents listed in GCC Sub-Clause 2.3 below.
  - (i) The Contractor is the party whose Bid to carry out the Works has been accepted by the Employer.
  - (j) The Contractor's Bid is the completed bidding document submitted by the Contractor to the Employer.
  - (k) The Contract Price is the Accepted Contract Amount stated in the Letter of Acceptance and thereafter as adjusted in accordance with the Contract.

- (l) Days are calendar days; months are calendar months.
- (m) Dayworks are varied work inputs subject to payment on a time basis for the Contractor's employees and Equipment, in addition to payments for associated Materials and Plant.
- (n) A Defect is any part of the Works not completed in accordance with the Contract.
- (o) The Defects Liability Certificate is the certificate issued by Project Manager upon correction of defects by the Contractor.
- (p) The Defects Liability Period is the period **named in the PCC** pursuant to Sub-Clause 34.1 and calculated from the Completion Date.
- (q) Drawings means the drawings of the Works, as included in the Contract, and any additional and modified drawings issued by (or on behalf of) the Employer in accordance with the Contract, include calculations and other information provided or approved by the Project Manager for the execution of the Contract.
- (r) The Employer is the party who employs the Contractor to carry out the Works, **as specified in the PCC**.
- (s) Equipment is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works.
- (t) "In writing" or "written" means hand-written, type-written, printed or electronically made, and resulting in a permanent record;
- (u) The Initial Contract Price is the Contract Price listed in the Employer's Letter of Acceptance.
- (v) The Intended Completion Date is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is **specified in the PCC**. The Intended Completion Date may be revised only by the Project Manager by issuing an extension of time or an acceleration order.
- (w) Materials are all supplies, including consumables, used by the Contractor for incorporation in the Works.
- (x) Plant is any integral part of the Works that shall have a

mechanical, electrical, chemical, or biological function.

- (y) The Project Manager is the person **named in the PCC** (or any other competent person appointed by the Employer and notified to the Contractor, to act in replacement of the Project Manager) who is responsible for supervising the execution of the Works and administering the Contract.
- (z) PCC means Particular Conditions of Contract.
- (aa) The Site is the area **defined as such in the PCC**.
- (bb) Site Investigation Reports are those that were included in the bidding document and are factual and interpretative reports about the surface and subsurface conditions at the Site.
- (cc) Specification means the Specification of the Works included in the Contract and any modification or addition made or approved by the Project Manager.
- (dd) The Start Date is **given in the PCC**. It is the latest date when the Contractor shall commence execution of the Works. It does not necessarily coincide with any of the Site Possession Dates.
- (ee) A Subcontractor 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.
- (ff) Temporary Works are works designed, constructed, installed, and removed by the Contractor that are needed for construction or installation of the Works.
- (gg) A Variation is an instruction given by the Project Manager which varies the Works.
- (hh) The Works are what the Contract requires the Contractor to construct, install, and turn over to the Employer, **as defined in the PCC**.

## 2. Interpretation

- 2.1 In interpreting these GCC, words indicating one gender include all genders. Words indicating the singular also include the plural and words indicating the plural also include the singular. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Project Manager shall provide instructions clarifying queries about these GCC.

- 2.2 If sectional completion is **specified in the PCC**, references in the GCC to the Works, the Completion Date, and the Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended Completion Date for the whole of the Works).
- 2.3 The documents forming the Contract shall be interpreted in the following order of priority:
- (a) Agreement,
  - (b) Letter of Acceptance,
  - (c) Contractor’s Bid,
  - (d) Particular Conditions of Contract,
  - (e) General Conditions of Contract, including Appendices,
  - (f) Specifications,
  - (g) Drawings,
  - (h) Bill of Quantities,<sup>1</sup> and
  - (i) any other document **listed in the PCC** as forming part of the Contract.
- 3. Language and Law**
- 3.1 The language of the Contract and the law governing the Contract are **stated in the PCC**.
- 3.2 Throughout the execution of the Contract, the Contractor shall comply with the import of goods and services prohibitions in the Employer’s Country when
- (a) as a matter of law or official regulations, the Borrower’s country prohibits commercial relations with that country; or
  - (b) by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, the Borrower’s Country prohibits any import of goods from that country or any payments to any country, person, or entity in that country.
- 4. Project**
- 4.1 Except where otherwise specifically stated, the Project **Manager’s** Manager shall decide contractual matters between the **Decisions** Employer and the Contractor in the role representing the Employer.

---

<sup>1</sup> In lump sum contracts, delete “Bill of Quantities” and replace with “Activity Schedule.”

- 5. Delegation** 5.1 Otherwise **specified in the PCC**, the Project Manager may delegate any of his duties and responsibilities to other people, except to the Adjudicator, after notifying the Contractor, and may revoke any delegation after notifying the Contractor.
- 6. Communications** 6.1 Communications between parties that are referred to in the Conditions shall be effective only when in writing. A notice shall be effective only when it is delivered.
- 7. Subcontracting** 7.1 The Contractor may subcontract with the approval of the Project Manager, but may not assign the Contract without the approval of the Employer in writing. Subcontracting shall not alter the Contractor's obligations.
- 8. Other Contractors** 8.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Employer between the dates given in the Schedule of Other Contractors, as **referred to in the PCC**. The Contractor shall also provide facilities and services for them as described in the Schedule. The Employer may modify the Schedule of Other Contractors, and shall notify the Contractor of any such modification.
- 9. Personnel and Equipment** 9.1 The Contractor shall employ the key personnel and use the equipment identified in its Bid, to carry out the Works or other personnel and equipment approved by the Project Manager. The Project Manager shall approve any proposed replacement of key personnel and equipment only if their relevant qualifications or characteristics are substantially equal to or better than those proposed in the Bid.
- 9.2 If the Project Manager asks the Contractor to remove a person who is a member of the Contractor's staff or work force, stating the reasons, the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.
- 9.3 If the Employer, Project Manager or Contractor determines, that any employee of the Contractor be determined to have engaged in Fraud and Corruption during the execution of the Works, then that employee shall be removed in accordance with Clause 9.2 above.
- 10. Employer's and Contractor's Risks** 10.1 The Employer carries the risks which this Contract states are Employer's risks, and the Contractor carries the risks which this Contract states are Contractor's risks.
- 11. Employer's** 11.1 From the Start Date until the Defects Liability Certificate has

**Risks**

been issued, the following are Employer's risks:

- (a) The risk of personal injury, death, or loss of or damage to property (excluding the Works, Plant, Materials, and Equipment), which are due to
  - (i) use or occupation of the Site by the Works or for the purpose of the Works, which is the unavoidable result of the Works or
  - (ii) negligence, breach of statutory duty, or interference with any legal right by the Employer or by any person employed by or contracted to him except the Contractor.
- (b) The risk of damage to the Works, Plant, Materials, and Equipment to the extent that it is due to a fault of the Employer or in the Employer's design, or due to war or radioactive contamination directly affecting the country where the Works are to be executed.

11.2 From the Completion Date until the Defects Liability Certificate has been issued, the risk of loss of or damage to the Works, Plant, and Materials is an Employer's risk except loss or damage due to

- (a) a Defect which existed on the Completion Date,
- (b) an event occurring before the Completion Date, which was not itself an Employer's risk, or
- (c) the activities of the Contractor on the Site after the Completion Date.

**12. Contractor's Risks**

12.1 From the Starting Date until the Defects Liability Certificate has been issued, the risks of personal injury, death, and loss of or damage to property (including, without limitation, the Works, Plant, Materials, and Equipment) which are not Employer's risks are Contractor's risks.

**13. Insurance**

13.1 The Contractor shall provide, in the joint names of the Employer and the Contractor, insurance cover from the Start Date to the end of the Defects Liability Period, in the amounts and deductibles **stated in the PCC** for the following events which are due to the Contractor's risks:

- (a) loss of or damage to the Works, Plant, and Materials;
- (b) loss of or damage to Equipment;

- (c) loss of or damage to property (except the Works, Plant, Materials, and Equipment) in connection with the Contract; and
  - (d) personal injury or death.
- 13.2 Policies and certificates for insurance shall be delivered by the Contractor to the Project Manager for the Project Manager's approval before the Start Date. All such insurance shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred.
- 13.3 If the Contractor does not provide any of the policies and certificates required, the Employer may effect the insurance which the Contractor should have provided and recover the premiums the Employer has paid from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.
- 13.4 Alterations to the terms of an insurance shall not be made without the approval of the Project Manager.
- 13.5 Both parties shall comply with any conditions of the insurance policies.
- 14. Site Data**
- 14.1 The Contractor shall be deemed to have examined any Site Data **referred to in the PCC**, supplemented by any information available to the Contractor.
- 15. Contractor to Construct the Works**
- 15.1 The Contractor shall construct and install the Works in accordance with the Specifications and Drawings.
- 16. The Works to Completed by the Intended Completion Date**
- 16.1 The Contractor may commence execution of the Works on the **Be** Start Date and shall carry out the Works in accordance with the Program submitted by the Contractor, as updated with the approval of the Project Manager, and complete them by the Intended Completion Date.
- 17. Approval by Project**
- 17.1 The Contractor shall submit Specifications and Drawings **the** showing the proposed Temporary Works to the Project **Manager** Manager, for his approval.
- 17.2 The Contractor shall be responsible for design of Temporary Works.
- 17.3 The Project Manager's approval shall not alter the Contractor's responsibility for design of the Temporary Works.

- 17.4 The Contractor shall obtain approval of third parties to the design of the Temporary Works, where required.
- 17.5 All Drawings prepared by the Contractor for the execution of the temporary or permanent Works, are subject to prior approval by the Project Manager before this use.
- 18. Safety and Protection of the Environment**
- 18.1 The Contractor shall be responsible for the safety of all activities on the Site.
- 18.2 The Contractor shall take all reasonable steps to protect the environment (both on and off the Site) and to limit damage and nuisance to people and property resulting from pollution, noise and other results of his operations.
- 19. Discoveries**
- 19.1 Anything of historical or other interest or of significant value unexpectedly discovered on the Site shall be the property of the Employer. The Contractor shall notify the Project Manager of such discoveries and carry out the Project Manager's instructions for dealing with them.
- 20. Possession of the Site**
- 20.1 The Employer shall give possession of all parts of the Site to the Contractor. If possession of a part is not given by the date **stated in the PCC**, the Employer shall be deemed to have delayed the start of the relevant activities, and this shall be a Compensation Event.
- 21. Access to the Site**
- 21.1 The Contractor shall allow the Project Manager and any person authorized by the Project Manager 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.
- 22. Instructions, Inspections and Audits**
- 22.1 The Contractor shall carry out all instructions of the Project Manager which comply with the applicable laws where the Site is located.
- 22.2 The Contractor shall keep, and shall make all reasonable efforts to cause its Subcontractors and subconsultants to keep, accurate and systematic accounts and records in respect of the Works in such form and details as will clearly identify relevant time changes and costs.
- 22.3 Pursuant to paragraph 2.2 e. of Appendix B to the General Conditions, the Contractor shall permit and shall cause its subcontractors and subconsultants to permit, the Bank and/or persons appointed by the Bank to inspect the Site and/or the accounts and records relating to the procurement process, selection and/or contract execution, and to have such accounts and records audited by auditors appointed by the Bank if

requested by the Bank. The Contractor's and its Subcontractors' and subconsultants' attention is drawn to Sub- Clause 25.1 (Fraud and Corruption) which provides, inter alia, that acts intended to materially impede the exercise of the Bank's inspection and audit rights constitute a prohibited practice subject to contract termination (as well as to a determination of ineligibility pursuant to the Bank's prevailing sanctions procedures).]

**23. Appointment of the Adjudicator**

- 23.1 The Adjudicator shall be appointed jointly by the Employer and the Contractor, at the time of the Employer's issuance of the Letter of Acceptance. If, in the Letter of Acceptance, the Employer does not agree on the appointment of the Adjudicator, the Employer will request the Appointing Authority **designated in the PCC**, to appoint the Adjudicator within 14 days of receipt of such request.
- 23.2 Should the Adjudicator resign or die, or should the Employer and the Contractor agree that the Adjudicator is not functioning in accordance with the provisions of the Contract, a new Adjudicator shall be jointly appointed by the Employer and the Contractor. In case of disagreement between the Employer and the Contractor, within 30 days, the Adjudicator shall be designated by the Appointing Authority **designated in the PCC** at the request of either party, within 14 days of receipt of such request.

**24. Procedure for Disputes**

- 24.1 If the Contractor believes that a decision taken by the Project Manager was either outside the authority given to the Project Manager by the Contract or that the decision was wrongly taken, the decision shall be referred to the Adjudicator within 14 days of the notification of the Project Manager's decision.
- 24.2 The Adjudicator shall give a decision in writing within 28 days of receipt of a notification of a dispute.
- 24.3 The Adjudicator shall be paid by the hour at the **rate specified in the PCC**, together with reimbursable expenses of the types **specified in the PCC**, and the cost shall be divided equally between the Employer and the Contractor, whatever decision is reached by the Adjudicator. Either party may refer a decision of the Adjudicator to an Arbitrator within 28 days of the Adjudicator's written decision. If neither party refers the dispute to arbitration within the above 28 days, the Adjudicator's decision shall be final and binding.
- 24.4 The arbitration shall be conducted in accordance with the arbitration procedures published by the institution named and

in the place **specified in the PCC**.

## **25. Fraud and Corruption**

- 25.1 The Bank requires compliance with the Bank's Anti-Corruption Guidelines and its prevailing sanctions policies and procedures as set forth in the WBG's Sanctions Framework, as set forth in Appendix A to the GCC.
- 25.2 The Employer requires the Contractor to disclose any commissions or fees that may have been paid or are to be paid to agents or any other party with respect to the bidding process or execution of the Contract. The information disclosed must include at least the name and address of the agent or other party, the amount and currency, and the purpose of the commission, gratuity or fee.

## **B. Time Control**

## **26. Program**

- 26.1 Within the time **stated in the PCC**, after the date of the Letter of Acceptance, the Contractor shall submit to the Project Manager for approval a Program showing the general methods, arrangements, order, and timing for all the activities in the Works. In the case of a lump sum contract, the activities in the Program shall be consistent with those in the Activity Schedule.
- 26.2 An update of the Program shall be a program showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work, including any changes to the sequence of the activities.
- 26.3 The Contractor shall submit to the Project Manager for approval an updated Program at intervals no longer than the period **stated in the PCC**. If the Contractor does not submit an updated Program within this period, the Project Manager may withhold the amount **stated in the PCC** from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Program has been submitted. In the case of a lump sum contract, the Contractor shall provide an updated Activity Schedule within 14 days of being instructed to by the Project Manager.
- 26.4 The Project Manager's approval of the Program shall not alter the Contractor's obligations. The Contractor may revise the Program and submit it to the Project Manager again at any time. A revised Program shall show the effect of Variations and Compensation Events.

## **27. Extension of the Intended**

- 27.1 The Project Manager shall extend the Intended Completion Date if a Compensation Event occurs or a Variation is issued

- Completion Date** which makes it impossible for Completion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining work, which would cause the Contractor to incur additional cost.
- 27.2 The Project Manager shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Project Manager for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date.
- 28. Acceleration**
- 28.1 When the Employer wants the Contractor to finish before the Intended Completion Date, the Project Manager shall obtain priced proposals for achieving the necessary acceleration from the Contractor. If the Employer accepts these proposals, the Intended Completion Date shall be adjusted accordingly and confirmed by both the Employer and the Contractor.
- 28.2 If the Contractor's priced proposals for an acceleration are accepted by the Employer, they are incorporated in the Contract Price and treated as a Variation.
- 29. Delays Ordered by the Project Manager**
- 29.1 The Project Manager may instruct the Contractor to delay the start or progress of any activity within the Works.
- 30. Management Meetings**
- 30.1 Either the Project Manager or the Contractor may require the other to attend a management meeting. The business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.
- 30.2 The Project Manager shall record the business of management meetings and provide copies of the record to those attending the meeting and to the Employer. The responsibility of the parties for actions to be taken shall be decided by the Project Manager either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.
- 31. Early Warning**
- 31.1 The Contractor shall warn the Project Manager at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the work, increase the Contract Price, or delay the execution of the Works. The Project Manager may require the Contractor to provide an

estimate of the expected effect of the future event or circumstance on the Contract Price and Completion Date. The estimate shall be provided by the Contractor as soon as reasonably possible.

- 31.2 The Contractor shall cooperate with the Project Manager in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Project Manager.

### C. Quality Control

#### 32. Identifying Defects

- 32.1 The Project Manager shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. The Project Manager may instruct the Contractor to search for a Defect and to uncover and test any work that the Project Manager considers may have a Defect.

#### 33. Tests

- 33.1 If the Project Manager instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no Defect, the test shall be a Compensation Event.

#### 34. Correction of Defects

- 34.1 The Project Manager 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 PCC**. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.
- 34.2 Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Project Manager's notice.

#### 35. Uncorrected Defects

- 35.1 If the Contractor has not corrected a Defect within the time specified in the Project Manager's notice, the Project Manager shall assess the cost of having the Defect corrected, and the Contractor shall pay this amount.

## D. Cost Control

- 36. Contract Price<sup>2</sup>**      36.1 The Bill of Quantities shall contain priced items for the Works to be performed by the Contractor. The Bill of Quantities is used to calculate the Contract Price. The Contractor will be paid for the quantity of the work accomplished at the rate in the Bill of Quantities for each item.
- 37. Changes in the Contract Price<sup>3</sup>**      37.1 If the final quantity of the work done differs from the quantity in the Bill of Quantities for the particular item by more than 25 percent, provided the change exceeds 1 percent of the Initial Contract Price, the Project Manager shall adjust the rate to allow for the change. The Project Manager shall not adjust rates from changes in quantities if thereby the Initial Contract Price is exceeded by more than 15 percent, except with the prior approval of the Employer.
- 37.2 If requested by the Project Manager, the Contractor shall provide the Project Manager with a detailed cost breakdown of any rate in the Bill of Quantities.
- 38. Variations**      38.1 All Variations shall be included in updated Programs<sup>4</sup> produced by the Contractor.
- 38.2 The Contractor shall provide the Project Manager with a quotation for carrying out the Variation when requested to do so by the Project Manager. The Project Manager shall assess the quotation, which shall be given within seven (7) days of the request or within any longer period stated by the Project Manager and before the Variation is ordered.
- 38.3 If the Contractor's quotation is unreasonable, the Project Manager may order the Variation and make a change to the Contract Price, which shall be based on the Project Manager's own forecast of the effects of the Variation on the Contractor's costs.

---

<sup>2</sup> In lump sum contracts, replace GCC Sub-Clauses 36.1 as follows:  
36.1 The Contractor shall provide updated Activity Schedules within 14 days of being instructed to by the Project Manager. The Activity Schedule shall contain the priced activities for the Works to be performed by the Contractor. The Activity Schedule is used to monitor and control the performance of activities on which basis the Contractor will be paid. If payment for materials on site shall be made separately, the Contractor shall show delivery of Materials to the Site separately on the Activity Schedule.

<sup>3</sup> In lump sum contracts, replace entire GCC Clause 37 with new GCC Sub-Clause 37.1, as follows:  
37.1 The Activity Schedule shall be amended by the Contractor to accommodate changes of Program or method of working made at the Contractor's own discretion. Prices in the Activity Schedule shall not be altered when the Contractor makes such changes to the Activity Schedule.

<sup>4</sup> In lump sum contracts, add "and Activity Schedules" after "Programs."

- 38.4 If the Project Manager decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event.
- 38.5 The Contractor shall not be entitled to additional payment for costs that could have been avoided by giving early warning.
- 38.6 If the work in the Variation corresponds to an item description in the Bill of Quantities and if, in the opinion of the Project Manager, the quantity of work above the limit stated in Sub- Clause 39.1 or the timing of its execution do not cause the cost per unit of quantity to change, the rate in the Bill of Quantities shall be used to calculate the value of the Variation. If the cost per unit of quantity changes, or if the nature or timing of the work in the Variation does not correspond with items in the Bill of Quantities, the quotation by the Contractor shall be in the form of new rates for the relevant items of work.<sup>5</sup>
- 38.7 Value Engineering: The Contractor may prepare, at its own cost, a value engineering proposal at any time during the performance of the contract. The value engineering proposal shall, at a minimum, include the following;
- (a) the proposed change(s), and a description of the difference to the existing contract requirements;
  - (b) a full cost/benefit analysis of the proposed change(s) including a description and estimate of costs (including life cycle costs) the Employer may incur in implementing the value engineering proposal; and
  - (c) a description of any effect(s) of the change on performance/functionality.

The Employer may accept the value engineering proposal if the proposal demonstrates benefits that:

- (a) accelerate the contract completion period; or
- (b) reduce the Contract Price or the life cycle costs to the Employer; or
- (c) improve the quality, efficiency, safety or sustainability of the Facilities; or

---

<sup>5</sup> In lump sum contracts, delete this paragraph.

- (d) yield any other benefits to the Employer,  
without compromising the functionality of the Works.

If the value engineering proposal is approved by the Employer and results in:

- (a) a reduction of the Contract Price; the amount to be paid to the Contractor shall be the **percentage specified in the PCC** of the reduction in the Contract Price; or
- (b) an increase in the Contract Price; but results in a reduction in life cycle costs due to any benefit described in (a) to (d) above, the amount to be paid to the Contractor shall be the full increase in the Contract Price.

### **39. Cash Flow Forecasts**

39.1 When the Program,<sup>6</sup> is updated, the Contractor shall provide the Project Manager with an updated cash flow forecast. The cash flow forecast shall include different currencies, as defined in the Contract, converted as necessary using the Contract exchange rates.

### **40. Payment Certificates**

40.1 The Contractor shall submit to the Project Manager monthly statements of the estimated value of the work executed less the cumulative amount certified previously.

40.2 The Project Manager shall check the Contractor's monthly statement and certify the amount to be paid to the Contractor.

40.3 The value of work executed shall be determined by the Project Manager.

40.4 The value of work executed shall comprise the value of the quantities of work in the Bill of Quantities that have been completed.<sup>7</sup>

40.5 The value of work executed shall include the valuation of Variations and Compensation Events.

40.6 The Project Manager may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later

---

<sup>6</sup> In lump sum contracts, add "or Activity Schedule" after "Program."

<sup>7</sup> In lump sum contracts, replace this paragraph with the following: "The value of work executed shall comprise the value of completed activities in the Activity Schedule."

information.

#### **41. Payments**

- 4 .1 Payments shall be adjusted for deductions for advance payments and retention. The Employer shall pay the Contractor the amounts certified by the Project Manager within 28 days of the date of each certificate. If the Employer makes a late payment, the Contractor shall be paid interest on the late payment in the next payment. Interest shall be calculated from the date by which the payment should have been made up to the date when the late payment is made at the prevailing rate of interest for commercial borrowing for each of the currencies in which payments are made.
- 4 .2 If an amount certified is increased in a later certificate or as a result of an award by the Adjudicator or an Arbitrator, the Contractor shall be paid interest upon the delayed payment as set out in this clause. Interest shall be calculated from the date upon which the increased amount would have been certified in the absence of dispute.
- 4 .3 Unless otherwise stated, all payments and deductions shall be paid or charged in the proportions of currencies comprising the Contract Price.
- 4 .4 Items of the Works for which no rate or price has been entered in shall not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.

#### **42. Compensation Events**

- 4 .1 The following shall be Compensation Events:
  - (a) The Employer does not give access to a part of the Site by the Site Possession Date pursuant to GCC Sub-Clause 20.1.
  - (b) The Employer modifies the Schedule of Other Contractors in a way that affects the work of the Contractor under the Contract.
  - (c) The Project Manager orders a delay or does not issue Drawings, Specifications, or instructions required for execution of the Works on time.
  - (d) The Project Manager instructs the Contractor to uncover or to carry out additional tests upon work, which is then found to have no Defects.
  - (e) The Project Manager unreasonably does not approve a subcontract to be let.

- (f) Ground conditions are substantially more adverse than could reasonably have been assumed before issuance of the Letter of Acceptance from the information issued to bidders (including the Site Investigation Reports), from information available publicly and from a visual inspection of the Site.
- (g) The Project Manager gives an instruction for dealing with an unforeseen condition, caused by the Employer, or additional work required for safety or other reasons.
- (h) Other contractors, public authorities, utilities, or the Employer does not work within the dates and other constraints stated in the Contract, and they cause delay or extra cost to the Contractor.
- (i) The advance payment is delayed.
- (j) The effects on the Contractor of any of the Employer's Risks.
- (k) The Project Manager unreasonably delays issuing a Certificate of Completion.

42.2 If a Compensation Event would cause additional cost or would prevent the work being completed before the Intended Completion Date, the Contract Price shall be increased and/or the Intended Completion Date shall be extended. The Project Manager shall decide whether and by how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended.

42.3 As soon as information demonstrating the effect of each Compensation Event upon the Contractor's forecast cost has been provided by the Contractor, it shall be assessed by the Project Manager, and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed unreasonable, the Project Manager shall adjust the Contract Price based on the Project Manager's own forecast. The Project Manager shall assume that the Contractor shall react competently and promptly to the event.

42.4 The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the Contractor's not having given early warning or not having cooperated with the Project Manager.

#### **43. Tax**

43.1 The Project Manager shall adjust the Contract Price if taxes, duties, and other levies are changed between the date 28 days

before the submission of bids for the Contract and the date of the last Completion certificate. The adjustment shall be the change in the amount of tax payable by the Contractor, provided such changes are not already reflected in the Contract Price or are a result of GCC Clause 44.

#### 44. Currencies

44.1 Where payments are made in currencies other than the currency of the Employer's Country **specified in the PCC**, the exchange rates used for calculating the amounts to be paid shall be the exchange rates stated in the Contractor's Bid.

#### 45. Price Adjustment

45.1 Prices shall be adjusted for fluctuations in the cost of inputs only if **provided for in the PCC**. If so provided, the amounts certified in each payment certificate, before deducting for Advance Payment, shall be adjusted by applying the respective price adjustment factor to the payment amounts due in each currency. A separate formula of the type specified below applies to each Contract currency:

$$P_c = A_c + B_c \text{ Imc/Ioc}$$

where:

$P_c$  is the adjustment factor for the portion of the Contract Price payable in a specific currency "c."

$A_c$  and  $B_c$  are coefficients<sup>8</sup> **specified in the PCC**, representing the nonadjustable and adjustable portions, respectively, of the Contract Price payable in that specific currency "c;" and

$\text{Imc}$  is the index prevailing at the end of the month being invoiced and  $\text{Ioc}$  is the index prevailing 28 days before Bid opening for inputs payable; both in the specific currency "c."

45.2 If the value of the index is changed after it has been used in a calculation, the calculation shall be corrected and an adjustment

deemed to take account of all changes in cost due to fluctuations in costs.

#### 46. Retention

46.1 The Employer shall retain from each payment due to the Contractor the proportion **stated in the PCC** until Completion

<sup>8</sup> The sum of the two coefficients  $A_c$  and  $B_c$  should be 1 (one) in the formula for each currency. Normally, both coefficients shall be the same in the formulae for all currencies, since coefficient A, for the nonadjustable portion of the payments, is a very approximate figure (usually 0.15) to take account of fixed cost elements or other nonadjustable components. The sum of the adjustments for each currency are added to the Contract Price.

of the whole of the Works.

46.2 Upon the issue of a Certificate of Completion of the Works by the Project Manager, in accordance with GCC 53.1, half the total amount retained shall be repaid to the Contractor and half when the Defects Liability Period has passed and the Project Manager has certified that all Defects notified by the Project Manager to the Contractor before the end of this period have been corrected. The Contractor may substitute retention money with an “on demand” Bank guarantee.

#### **47. Liquidated Damages**

47.1 The Contractor shall pay liquidated damages to the Employer at the rate per day **stated in the PCC** for each day that the Completion Date is later than the Intended Completion Date. The total amount of liquidated damages shall not exceed the amount **defined in the PCC**. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages shall not affect the Contractor’s liabilities.

47.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Project Manager shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall be paid interest on the overpayment, calculated from the date of payment to the date of repayment, at the rates specified in GCC Sub-Clause 41.1.

#### **48. Bonus**

48.1 The Contractor shall be paid a Bonus calculated at the rate per calendar day **stated in the PCC** for each day (less any days for which the Contractor is paid for acceleration) that the Completion is earlier than the Intended Completion Date. The Project Manager shall certify that the Works are complete, although they may not be due to be complete.

#### **49. Advance Payment**

49.1 The Employer shall make advance payment to the Contractor of the amounts **stated in the PCC** by the date **stated in the PCC**, against provision by the Contractor of an Unconditional Bank Guarantee in a form and by a bank acceptable to the Employer in amounts and currencies equal to the advance payment. The Guarantee shall remain effective until the advance payment has been repaid, but the amount of the Guarantee shall be progressively reduced by the amounts repaid by the Contractor. Interest shall not be charged on the advance payment.

49.2 The Contractor is to use the advance payment only to pay for Equipment, Plant, Materials, and mobilization expenses required specifically for execution of the Contract. The Contractor shall

demonstrate that advance payment has been used in this way by supplying copies of invoices or other documents to the Project Manager.

49.3 The advance payment shall be repaid by deducting proportionate amounts from payments otherwise due to the Contractor, following the schedule of completed percentages of the Works on a payment basis. No account shall be taken of the advance payment or its repayment in assessing valuations of work done, Variations, price adjustments, Compensation Events, Bonuses, or Liquidated Damages.

#### **50. Securities**

50.1 The Performance Security shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount **specified in the PCC**, by a bank or surety acceptable to the Employer, and denominated in the types and proportions of the currencies in which the Contract Price is payable. The Performance Security shall be valid until a date 28 days from the date of issue of the Certificate of Completion in the case of a Bank Guarantee, and until one year from the date of issue of the Completion Certificate in the case of a Performance Bond.

#### **51. Dayworks**

51.1 If applicable, the Dayworks rates in the Contractor's Bid shall be used only when the Project Manager has given written instructions in advance for additional work to be paid for in that way.

51.2 All work to be paid for as Dayworks shall be recorded by the Contractor on forms approved by the Project Manager. Each completed form shall be verified and signed by the Project Manager within two days of the work being done.

51.3 The Contractor shall be paid for Dayworks subject to obtaining signed Dayworks forms.

#### **52. Cost of Repairs**

52.1 Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.

### **E. Finishing the Contract**

#### **53. Completion**

53.1 The Contractor shall request the Project Manager to issue a Certificate of Completion of the Works, and the Project Manager shall do so upon deciding that the whole of the Works is

completed.

**54. Taking Over** 54.1 The Employer shall take over the Site and the Works within seven days of the Project Manager’s issuing a certificate of Completion.

**55. Final Account** 55.1 The Contractor shall supply the Project Manager with a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Project Manager shall issue a Defects Liability Certificate and certify any final payment that is due to the Contractor within 56 days of receiving the Contractor’s account if it is correct and complete. If it is not, the Project Manager shall issue within 56 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 Project Manager shall decide on the amount payable to the Contractor and issue a payment certificate.

**56. Operating and Maintenance Manuals** 56.1 If “as built” Drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by the dates **stated in the PCC**.

56.2 If the Contractor does not supply the Drawings and/or manuals by the dates **stated in the PCC** pursuant to GCC Sub-Clause

Project Manager shall withhold the amount **stated in the PCC** from payments due to the Contractor.

**57. Termination** 57.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.

limited to, the following:

- (a) the Contractor stops work for 28 days when no stoppage of work is shown on the current Program and the stoppage has not been authorized by the Project Manager;
- (b) the Project Manager instructs the Contractor to delay the progress of the Works, and the instruction is not withdrawn within 28 days;
- (c) the Employer or the Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation;
- (d) a payment certified by the Project Manager is not paid by the Employer to the Contractor within 84 days of the date

of the Project Manager's certificate;

- (e) the Project Manager 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 determined by the Project Manager;
- (f) the Contractor does not maintain a Security, which is required;
- (g) the Contractor has delayed the completion of the Works by the number of days for which the maximum amount of liquidated damages can be paid, as **defined in the PCC**; or
- (h) if the Contractor, in the judgment of the Employer has engaged in Fraud and Corruption, as defined in paragraph 2.2 a of the Appendix A to the GCC, in competing for or in executing the Contract, then the Employer may, after giving fourteen (14) days written notice to the Contractor, terminate the Contract and expel him from the Site.

57.3 Notwithstanding the above, the Employer may terminate the Contract for convenience.

57.4 If the Contract is terminated, the Contractor shall stop work immediately, make the Site safe and secure, and leave the Site as soon as reasonably possible.

57.5 When either party to the Contract gives notice of a breach of Contract to the Project Manager for a cause other than those listed under GCC Sub-Clause 56.2 above, the Project Manager shall decide whether the breach is fundamental or not.

## **58. Payment upon Termination**

58.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Project Manager shall issue a certificate for the value of the work done and Materials ordered less advance payments received up to the date of the issue of the certificate and less the percentage to apply to the value of the work not completed, as **specified in the PCC**. Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be a debt payable to the Employer.

58.2 If the Contract is terminated for the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Project Manager shall issue a certificate for the value of the work done, Materials ordered, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works, and less advance payments received up to

the date of the certificate.

- 59. Property** 59.1 All Materials on the Site, Plant, Equipment, Temporary Works, and Works shall be deemed to be the property of the Employer if the Contract is terminated because of the Contractor's default.
- 60. Release from Performance** 60.1 If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the Employer or the Contractor, the Project Manager shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which a commitment was made.
- 61. Suspension of Bank Loan or Credit** 61.1 In the event that the Bank suspends the Loan or Credit to the Employer, from which part of the payments to the Contractor are being made:
- (a) The Employer is obligated to notify the Contractor of such suspension within 7 days of having received the Bank's suspension notice.
  - (b) If the Contractor has not received sums due to it within the 28 days for payment provided for in Sub-Clause 40.1, the Contractor may immediately issue a 14-day termination notice.

## **APPENDIX A TO GENERAL CONDITIONS**

### **Fraud and Corruption** *(Text in this Appendix shall not be modified)*

#### **1. Purpose**

1.1 The Bank's Anti-Corruption Guidelines and this annex apply with respect to procurement under Bank Investment Project Financing operations.

#### **2. Requirements**

2.1 The Bank requires that Borrowers (including beneficiaries of Bank financing); bidders (applicants/proposers), consultants, contractors and suppliers; any sub-contractors, sub-consultants, service providers or suppliers; any agents (whether declared or not); and any of their personnel, observe the highest standard of ethics during the procurement process, selection and contract execution of Bank-financed contracts, and refrain from Fraud and Corruption.

2.2 To this end, the Bank:

- a. Defines, for the purposes of this provision, the terms set forth below as follows:
  - i. "corrupt practice" is the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;
  - ii. "fraudulent practice" is any act or omission, including misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain financial or other benefit or to avoid an obligation;
  - iii. "collusive practice" is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;
  - iv. "coercive practice" is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;
  - v. "obstructive practice" is:
    - (a) deliberately destroying, falsifying, altering, or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Bank investigation into allegations of a corrupt, fraudulent, coercive, or collusive practice; and/or threatening, harassing, or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or

- (b) acts intended to materially impede the exercise of the Bank's inspection and audit rights provided for under paragraph 2.2 e. below.
- b. Rejects a proposal for award if the Bank determines that the firm or individual recommended for award, any of its personnel, or its agents, or its sub-consultants, sub-contractors, service providers, suppliers and/ or their employees, has, directly or indirectly, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for the contract in question;
- c. In addition to the legal remedies set out in the relevant Legal Agreement, may take other appropriate actions, including declaring mis procurement, if the Bank determines at any time that representatives of the Borrower or of a recipient of any part of the proceeds of the loan engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices during the procurement process, selection and/or execution of the contract in question, without the Borrower having taken timely and appropriate action satisfactory to the Bank to address such practices when they occur, including by failing to inform the Bank in a timely manner at the time they knew of the practices;
- d. Pursuant to the Bank's Anti- Corruption Guidelines and in accordance with the Bank's prevailing sanctions policies and procedures, may sanction a firm or individual, either indefinitely or for a stated period of time, including by publicly declaring such firm or individual ineligible (i) to be awarded or otherwise benefit from a Bank-financed contract, financially or in any other manner;<sup>1</sup> (ii) to be a nominated<sup>2</sup> sub-contractor, consultant, manufacturer or supplier, or service provider of an otherwise eligible firm being awarded a Bank-financed contract; and (iii) to receive the proceeds of any loan made by the Bank or otherwise to participate further in the preparation or implementation of any Bank-financed project;
- e. Requires that a clause be included in bidding/request for proposals documents and in contracts financed by a Bank loan, requiring (i) bidders(applicants/proposers), consultants, contractors, and suppliers, and their sub-contractors, sub-consultants, service providers, suppliers, agents personnel, permit the Bank to inspect<sup>3</sup> all accounts, records and other documents relating to the procurement process, selection

---

<sup>1</sup> For the avoidance of doubt, a sanctioned party's ineligibility to be awarded a contract shall include, without limitation, (i) applying for pre-qualification, expressing interest in a consultancy, and bidding, either directly or as a nominated sub-contractor, nominated consultant, nominated manufacturer or supplier, or nominated service provider, in respect of such contract, and (ii) entering into an addendum or amendment introducing a material modification to any existing contract.

<sup>2</sup> A nominated sub-contractor, nominated consultant, nominated manufacturer or supplier, or nominated service provider (different names are used depending on the particular bidding document) is one which has been: (i) included by the bidder in its pre-qualification application or bid because it brings specific and critical experience and know-how that allow the bidder to meet the qualification requirements for the particular bid; or (ii) appointed by the Borrower.

<sup>3</sup> Inspections in this context usually are investigative (i.e., forensic) in nature. They involve fact-finding activities undertaken by the Bank or persons appointed by the Bank to address specific matters related to investigations/audits, such as evaluating the veracity of an allegation of possible Fraud and Corruption, through the appropriate mechanisms. Such activity includes but is not limited to: accessing and examining a firm's or individual's financial records and information, and making copies thereof as relevant; accessing and examining any other documents, data and information (whether in hard copy or electronic format) deemed relevant for the investigation/audit, and making copies thereof as relevant; interviewing staff and other relevant individuals; performing physical inspections and site visits; and obtaining third party verification of information.

---

and/or contract execution, and to have them audited by auditors appointed by the Bank.

## APPENDIX B

### Environmental, Social, Health and Safety (ESHS)

#### Metrics for Progress Reports

*Metrics for regular reporting:*

- a. *environmental incidents or non-compliances with contract requirements, including contamination, pollution or damage to ground or water supplies;*
- b. *health and safety incidents, accidents, injuries and all fatalities that require treatment;*
- c. *interactions with regulators: identify agency, dates, subjects, outcomes (report the negative if none);*
- d. *status of all permits and agreements:*
  - i. *work permits: number required, number received, actions taken for those not received;*
  - ii. *status of permits and consents:*
  - iii. *list areas/facilities with permits required (quarries, asphalt & batch plants), dates of application, dates issued (actions to follow up if not issued), dates submitted to resident engineer (or equivalent), status of area (waiting for permits, working, abandoned without reclamation, decommissioning plan being implemented, etc.);*
    - *list areas with landowner agreements required (borrow and spoil areas, camp sites), dates of agreements, dates submitted to resident engineer (or equivalent);*
    - *identify major activities undertaken in each area in the reporting period and highlights of environmental and social protection (land clearing, boundary marking, topsoil salvage, traffic management, decommissioning planning, decommissioning implementation);*
    - *for quarries: status of relocation and compensation (completed, or details of activities and current status in the reporting period).*
- e. *health and safety supervision:*
  - i. *safety officer: number days worked, number of full inspections & partial inspections, reports to construction/project management;*

- ii. number of workers, work hours, metric of PPE use (percentage of workers with full personal protection equipment (PPE), partial, etc.), worker violations observed (by type of violation, PPE or otherwise), warnings given, repeat warnings given, follow-up actions taken (if any);
- f. *worker accommodations:*
- i. number of expats housed in accommodations, number of locals;
  - ii. date of last inspection, and highlights of inspection including status of accommodations' compliance with national and local law and good practice, including sanitation, space, etc.;
  - iii. actions taken to recommend/require improved conditions, or to improve conditions.
- g. *HIV/AIDS: provider of health services, information and/or training, location of clinic, number of non-safety disease or illness treatments and diagnoses (no names to be provided);*
- h. *gender (for expats and locals separately): number of female workers, percentage of workforce, gender issues raised and dealt with (cross-reference grievances or other sections as needed);*
- i. *training:*
- i. number of new workers, number receiving induction training, dates of induction training;
  - ii. number and dates of toolbox talks, number of workers receiving Occupational Health and Safety (OHS), environmental and social training;
  - iii. number and dates of HIV/AIDS sensitization and/or training, no. workers receiving training (this reporting period and in the past); same questions for gender sensitization, flag person training.
  - iv. number and date of GBV /SEA sensitization and/or training, number of workers receiving training on code of conduct (in the reporting period and in the past), etc.
- j. *environmental and social supervision:*
- i. environmentalist: days worked, areas inspected and numbers of inspections of each (road section, work camp, accommodations, quarries, borrow areas, spoil areas, swamps, forest crossings, etc.), highlights of activities/findings (including violations of environmental and/or social best practices, actions taken), reports to environmental and/or social specialist/construction/site management;
  - ii. sociologist: days worked, number of partial and full site inspections (by area: road section, work camp, accommodations, quarries, borrow areas, spoil

- areas, clinic, HIV/AIDS center, community centers, etc.), highlights of activities (including violations of environmental and/or social requirements observed, actions taken), reports to environmental and/or social specialist/construction/site management; and
- iii. community liaison person(s): days worked (hours community center open), number of people met, highlights of activities (issues raised, etc.), reports to environmental and/or social specialist /construction/site management.
- k. *Grievances*: list new grievances (e.g. allegations of GBV / SEA) received in the reporting period and unresolved past grievances by date received, complainant, how received, to whom referred to for action, resolution and date (if completed), data resolution reported to complainant, any required follow-up (Cross-reference other sections as needed):
- i. Worker grievances;
  - ii. Community grievances
- l. *Traffic and vehicles/equipment*:
- i. traffic accidents involving project vehicles & equipment: provide date, location, damage, cause, follow-up;
  - ii. accidents involving non-project vehicles or property (also reported under immediate metrics): provide date, location, damage, cause, follow-up;
  - iii. overall condition of vehicles/equipment (subjective judgment by environmentalist); non-routine repairs and maintenance needed to improve safety and/or environmental performance (to control smoke, etc.).
- m. *Environmental mitigations and issues (what has been done)*:
- i. dust: number of working bowsers, number of waterings/day, number of complaints, warnings given by environmentalist, actions taken to resolve; highlights of quarry dust control (covers, sprays, operational status); % of rock/spoil lorries with covers, actions taken for uncovered vehicles;
  - ii. erosion control: controls implemented by location, status of water crossings, environmentalist inspections and results, actions taken to resolve issues, emergency repairs needed to control erosion/sedimentation;
  - iii. quarries, borrow areas, spoil areas, asphalt plants, batch plants: identify major activities undertaken in the reporting period at each, and highlights of environmental and social protection: land clearing, boundary marking, topsoil salvage, traffic management, decommissioning planning, decommissioning implementation;
  - iv. blasting: number of blasts (and locations), status of implementation of blasting plan (including notices, evacuations, etc.), incidents of off-site damage or complaints (cross-reference other sections as needed);

- v. spill cleanups, if any: material spilled, location, amount, actions taken, material disposal (report all spills that result in water or soil contamination);
- vi. waste management: types and quantities generated and managed, including amount taken offsite (and by whom) or reused/recycled/disposed on-site;
- vii. details of tree plantings and other mitigations required undertaken in the reporting period;
- viii. details of water and swamp protection mitigations required undertaken in the reporting period.

*n. compliance:*

- i. compliance status for conditions of all relevant consents/permits, for the Work, including quarries, etc.): statement of compliance or listing of issues and actions taken (or to be taken) to reach compliance;
- ii. compliance status of C-ESMP/ESIP requirements: statement of compliance or listing of issues and actions taken (or to be taken) to reach compliance
- iii. compliance status of GBV/SEA prevention and response action plan: statement of compliance or listing of issues and actions taken (or to be taken) to reach compliance
- iv. compliance status of Health and Safety Management Plan re: statement of compliance or listing of issues and actions taken (or to be taken) to reach compliance
- v. other unresolved issues from previous reporting periods related to environmental and social: continued violations, continued failure of equipment, continued lack of vehicle covers, spills not dealt with, continued compensation or blasting issues, etc. Cross-reference other sections as needed.

## Section IX - Particular Conditions of Contract

<b>A. General</b>	
<b>GCC 1.1 (d)</b>	World Bank
<b>GCC 1.1 (r)</b>	The Employer is <b>The Principal Secretary, Ministry of Education State Department for Basic Education, P.O. BOX 30040-00100 Nairobi</b>
<b>GCC 1.1 (v)</b>	The Intended Completion Date for the whole of the Works shall be <b><u>4</u></b> <b><u>Calendar months starting from Start Date</u></b>
<b>GCC 1.1 (y)</b>	<b>Project Manager</b> Dama Services Ltd. P.O. Box 9656- 00100, Nairobi, Kenya. Tel. Nos.+254 020-2628155 or +254-722 299466 Email: damaservices@gmail.com
<b>GCC 1.1 (aa)</b>	The Site is located at: <b>CEMASTE A Institution, Karen, Nairobi</b> , and is defined in drawings No. : <b>Refer to List of Drawings herein before</b>
<b>GCC 1.1 (dd)</b>	The Start Date shall be <b>as agreed with the Employer</b>
<b>GCC 1.1 (hh)</b>	The Works consist of <b>Data Center Mechanical and Electrical Installations at The Ultra-Modern Training Centre-Cemastea, in Karen, Nairobi County.</b>
<b>GCC 1.1 (ii)</b>	The following is added as GCC 1.1. (ii)  “ESHS” means environmental, social (including sexual exploitation and abuse (SEA) and gender based violence (GBV)), health and safety.
<b>GCC 2.2</b>	Sectional Completions are: Not applicable

<b>GCC 2.3(i)</b>	<p>The following documents also form part of the Contract:</p> <ul style="list-style-type: none"> <li>(i) the ESHS Management Strategies and Implementation Plans; and</li> <li>(ii) Code of Conduct (ESHS).</li> </ul>
<b>GCC 3.1</b>	<p>The language of the contract is <b>English</b></p> <p>The law that applies to the Contract is the law of <b>Kenya</b></p>
<b>GCC 5.1</b>	<p>The Project manager <b>may</b> delegate any of his duties and responsibilities.</p>
<b>GCC 8.1</b>	<p>Schedule of other contractors: <b>Not applicable</b></p>
<b>GCC 9.1</b>	<p><b>Key Personnel</b> GCC 9.1 is replaced with the following:</p> <p>9.1 Key Personnel are the Contractor’s personnel named in this GCC 9.1 of the Particular Conditions of Contract. The Contractor shall employ the Key Personnel and use the equipment identified in its Bid, to carry out the Works or other personnel and equipment approved by the Project Manager. The Project Manager shall approve any proposed replacement of Key Personnel and equipment only if their relevant qualifications or characteristics are substantially equal to or better than those proposed in the Bid.</p>
<b>GCC 9.2</b>	<p><b>Code of Conduct (ESHS)</b></p> <p>The following is inserted at the end of GCC 9.2:</p> <p>“The reasons to remove a person include behavior which breaches the Code of Conduct (ESHS) (e.g. spreading communicable diseases, sexual harassment, gender based violence (GBV), sexual exploitation or abuse, illicit activity or crime).”</p>
<b>GCC 13.1</b>	<p>The minimum insurance amounts and deductibles shall be:</p> <ul style="list-style-type: none"> <li>(a) for loss or damage to the Works, Plant and Materials: Full Value of the Works, Plant and Materials</li> <li>(b) For loss or damage to Equipment: Full Value of the Equipment</li> <li>(c) For loss or damage to property (except the Works, Plant, Materials, and Equipment) in connection with Contract: Full Value of the Property</li> </ul>

	<p>(d) or personal injury or death:</p> <ul style="list-style-type: none"> <li>i. of the Contractor’s employees: As per applicable laws of Kenya</li> <li>ii. of other people: As per applicable laws of Kenya</li> </ul>
<b>GCC 14.1</b>	Site Data are: <b>None</b>
<b>GCC 16.1 (add new 16.2)</b>	<p><b>ESHS Management Strategies and Implementation Plans</b></p> <p>The following is inserted as a new sub-clause 16.2:</p> <p>“ <b>16.2</b> The Contractor shall not carry out any Works, including mobilization and/or pre-construction activities (e.g. limited clearance for haul roads, site accesses and work site establishment, geotechnical investigations or investigations to select ancillary features such as quarries and borrow pits), unless the Project Manager is satisfied that appropriate measures are in place to address environmental, social, health and safety risks and impacts. At a minimum, the Contractor shall apply the Management Strategies and Implementation Plans and Code of Conduct, submitted as part of the Bid and agreed as part of the Contract. The Contractor shall submit, on a continuing basis, for the Project Manager’s prior approval, such supplementary Management Strategies and Implementation Plans as are necessary to manage the ESHS risks and impacts of ongoing works. These Management Strategies and Implementation Plans collectively comprise the Contractor’s Environmental and Social Management Plan (C-ESMP). The C-ESMP shall be approved prior to the commencement of construction activities (e.g. excavation, earth works, bridge and structure works, stream and road diversions, quarrying or extraction of materials, concrete batching and asphalt manufacture). The approved C-ESMP shall be reviewed, periodically (but not less than every six (6) months), and updated in a timely manner, as required, by the Contractor to ensure that it contains measures appropriate to the Works activities to be undertaken. The updated C-ESMP shall be subject to prior approval by the Project Manager.”</p>
<b>GCC 20.1</b>	The Site Possession Date(s) shall be: <b>To be agreed with the Employer</b>
<b>GCC 23.1 &amp; GCC 23.2</b>	Appointing Authority for the Adjudicator: <b>Chartered Institute of Arbitrators (CIArb) Kenyan Chapter, AAK, or IQSK</b>
<b>GCC 24.3</b>	Hourly rate and types of reimbursable expenses to be paid to the Adjudicator: <b>As per the standard fees of the proposed bodies above of the Appointing</b>

	<b>Authority.</b>
<b>GCC 24.4</b>	Institution whose arbitration procedures shall be used: <b>Chartered Institute of Arbitrators (CI Arb) Kenyan Chapter</b>
<b>B. Time Control</b>	
<b>GCC 26.1</b>	The Contractor shall submit for approval a Program for the Works within <b>14 (Fourteen) days</b> from the date of the Letter of Acceptance.
<b>GCC 26.2</b>	<p><b>ESHS Reporting</b></p> <p>Inserted at the end of GCC 26.2:</p> <p>“In addition to the progress report, the Contractor shall also provide a report on the Environmental, Social, Health and Safety (ESHS) metrics set out in Appendix B. In addition to Appendix B reports, the Contractor shall also provide immediate notification to the Project Manager of incidents in the following categories. Full details of such incidents shall be provided to the Project Manager within the timeframe agreed with the Project Manager.</p> <ul style="list-style-type: none"> <li>(e) confirmed or likely violation of any law or international agreement;</li> <li>(f) any fatality or serious (lost time) injury;</li> <li>(g) significant adverse effects or damage to private property (e.g. vehicle accident, damage from fly rock, working beyond the boundary)</li> <li>(h) major pollution of drinking water aquifer or damage or destruction of rare or endangered habitat (including protected areas) or species; or</li> <li>(i) any allegation of gender based violence (GBV), sexual exploitation or abuse, sexual harassment or sexual misbehavior, rape, sexual assault, child abuse or defilement, or other violations involving children.</li> </ul>
<b>GCC 26.3</b>	<p>The period between Program updates is 30 (Thirty) days.</p> <p>The amount to be withheld for late submission of an updated Program is: <b>20% (Twenty Percent) of the amount due in the interim payment certificate.</b></p>

<b>C. Quality Control</b>	
<b>GCC 34.1</b>	The Defects Liability Period is: <b>6 (Six) months.</b>
<b>D. Cost Control</b>	
<b>GCC 38.2</b>	At the end of 38.2 add after the first sentence:  “The Contractor shall also provide information of any ESHS risks and impacts of the Variation.”
<b>GCC 38.7</b>	If the value engineering proposal is approved by the Employer the amount to be paid to the Contractor shall be: <b>Not Applicable</b>
<b>GCC 38.7</b>	In the first paragraph insert new sub-paragraph (d):  “(d) a description of the proposed work to be performed, a programme for its execution and sufficient ESHS information to enable an evaluation of ESHS risks and impacts;”
<b>GCC 40</b>	Add new GCC 40.7:  40.7 if the Contractor was, or is, failing to perform any ESHS obligations or work under the Contract, the value of this work or obligation, as determined by the Project Manager, may be withheld until the work or obligation has been performed, and/or the cost of rectification or replacement, as determined by the Project Manager, may be withheld until rectification or replacement has been completed. Failure to perform includes, but is not limited to the following:  <ul style="list-style-type: none"> <li>(i) failure to comply with any ESHS obligations or work described in the Works’ Requirements which may include: working outside site boundaries, excessive dust, failure to keep public roads in a safe usable condition, damage to offsite vegetation, pollution of water courses from oils or sedimentation, contamination of land e.g. from oils, human waste, damage to archeology or cultural heritage features, air pollution as a result of unauthorized and/or inefficient combustion;</li> <li>(ii) failure to regularly review C-ESMP and/or update it in a timely manner to address emerging ESHS issues, or anticipated risks or impacts;</li> <li>(iii) failure to implement the C-ESMP e.g. failure to provide required training or sensitization;</li> </ul>

	<ul style="list-style-type: none"> <li>(iv) failing to have appropriate consents/permits prior to undertaking Works or related activities;</li> <li>(v) failure to submit ESHS report/s (as described in Appendix C), or failure to submit such reports in a timely manner;</li> <li>(vi) failure to implement remediation as instructed by the Engineer within the specified timeframe (e.g. remediation addressing non-compliance/s).</li> </ul>
<b>GCC 44.1</b>	The currency of the Employer's Country is: <b>Kenya Shillings</b>
<b>GCC 45.1</b>	The Contract <b>is not</b> subject to price adjustment in accordance with GCC Clause 45, and the following information regarding coefficients does not apply.
<b>GCC 46.1</b>	The proportion of payments retained is: <b>10 (Ten) Percent</b>
<b>GCC 47.1</b>	The liquidated damages for the whole of the Works are <b>0.03% of the contract amount</b> per day. The maximum amount of liquidated damages for the whole of the Works is ten percent (10%) of the final Contract Price.
<b>GCC 48.1</b>	<p>The Bonus for the whole of the Works is <b>Not Applicable</b>.</p> <p>The maximum amount of Bonus for the whole of the Works is <b>Not Applicable</b>.</p>
<b>GCC 49.1</b>	The Advance Payments shall be: <b>a maximum of 10% of the contract amount if need be on condition that the contractor gives a sound security (in form of approved bank guarantee) of the same</b> . And shall be paid to the Contractor no later than: <b>A date agreed between both parties on application</b> .
<b>GCC 49.3</b>	the advance payment shall be repaid through percentage deductions from the interim payments determined by the Architect as follows; Deductions shall commence in the next interim Payment Certificate following that in which the total of all certified interim payments (excluding the advance payment and deductions and repayments of retention) exceeds 30 percent (30%) of the Accepted Contract Amount less Provisional Sums; and deductions shall be made at the amortization rate stated in the Special Conditions of Contract of the amount of each Interim Payment Certificate

	<p>(excluding the advance payment and deductions for its repayments as well as deductions for retention money) in the currencies and proportions of the advance payment until such time as the advance payment has been repaid; provided that the advance payment shall be completely repaid prior to the time when 90 percent (90%) of the Accepted Contract Amount less Provisional Sums has been certified for payment.</p> <p>The following formular shall apply</p> $R = \frac{A(XII-XI)}{90\%-60\%}$ <p>Where  R= Amount to be reimbursed  A= Amount of Advance Payment Granted  XII= Amount of Proposed cumulative payments as a percentage of the original contract amount. Should be &gt;30% but not &gt;90%  XI= Amount of previous cumulative payments as a percentage of the original contract amount. Should be &lt;90% but not &lt;30%</p>
<b>GCC 50.1</b>	An Environmental, Social, Safety and Health (ESHS) Performance Security shall not be provided to the Employer.
<b>GCC 50.1</b>	<p>The Performance Security amount is 10% (Ten Percent) of the accepted contract sum.</p> <p>(a) Performance Security – Accepted Bank Guarantee: in the amount(s) of 10% (Ten Percent) of the Accepted Contract Amount and in the same currency (ies) of the Accepted Contract Amount.</p>
<b>E. Finishing the Contract</b>	
<b>GCC 56.1</b>	<p>The date by which operating and maintenance manuals are required is: <b>Completion date.</b></p> <p>The date by which “as built” drawings are required is <b>Completion date.</b></p>
<b>GCC 56.2</b>	The amount to be withheld for failing to produce “as built” drawings and/or operating and maintenance manuals by the date required in GCC 58.1 is Retention money.
<b>GCC 57.2 (g)</b>	The maximum number of days is: 334 (Three Hundred Thirty Four) Days.
<b>GCC 58.1</b>	The percentage to apply to the value of the work not completed, representing the Employer’s additional cost for completing the Works, is 20%

---

## **Section X - Contract Forms**

### **Table of Forms**

<b>Notification of Intention to Award.....</b>	<b>152</b>
<b>Beneficial Ownership Disclosure Form.....</b>	<b>156</b>
<b>Letter of Acceptance .....</b>	<b>158</b>
<b>Contract Agreement.....</b>	<b>159</b>
<b>Performance Security - Bank Guarantee.....</b>	<b>161</b>
<b>Performance Security - Performance Bond.....</b>	<b>163</b>
<b>Environmental, Social, Health and Safety (ESHS) Performance Security .....</b>	<b>165</b>
<b>Advance Payment Security.....</b>	<b>167</b>

## Notification of Intention to Award

***[This Notification of Intention to Award shall be sent to each Bidder that submitted a Bid.]***

***[Send this Notification to the Bidder's Authorized Representative named in the Bidder Information Form]***

For the attention of Bidder's Authorized Representative

Name: *[insert Authorized Representative's name]*

Address: *[insert Authorized Representative's Address]*

Telephone/Fax numbers: *[insert Authorized Representative's telephone/fax numbers]*

Email Address: *[insert Authorized Representative's email address]*

***[IMPORTANT: insert the date that this Notification is transmitted to Bidders. The Notification must be sent to all Bidders simultaneously. This means on the same date and as close to the same time as possible.]***

**DATE OF TRANSMISSION:** This Notification is sent by: *[email/fax]* on *[date]* (local time)

## Notification of Intention to Award

**Employer:** *[insert the name of the Employer]*

**Project:** *[insert name of project]*

**Contract title:** *[insert the name of the contract]*

**Country:** *[insert country where RFB is issued]*

**Loan No. /Credit No. / Grant No.:** *[insert reference number for loan/credit/grant]*

**RFB No:** *[insert RFB reference number from Procurement Plan]*

This Notification of Intention to Award (Notification) notifies you of our decision to award the above contract. The transmission of this Notification begins the Standstill Period. During the Standstill Period, you may:

- a) request a debriefing in relation to the evaluation of your Bid, and/or
- b) submit a Procurement-related Complaint in relation to the decision to award the contract.

### 1. The successful Bidder

<b>Name:</b>	<i>[insert name of successful Bidder]</i>
<b>Address:</b>	<i>[insert address of the successful Bidder]</i>
<b>Contract price:</b>	<i>[insert contract price of the successful Bid]</i>

**2. Other Bidders** *[INSTRUCTIONS: insert names of all Bidders that submitted a Bid. If the Bid's price was evaluated include the evaluated price as well as the Bid price as read out.]*

<b>Name of Bidder</b>	<b>Bid price</b>	<b>Evaluated Bid price (if applicable)</b>
[insert name]	[insert Bid price]	[insert evaluated price]
[insert name]	[insert Bid price]	[insert evaluated price]
[insert name]	[insert Bid price]	[insert evaluated price]
[insert name]	[insert Bid price]	[insert evaluated price]
[insert name]	[insert Bid price]	[insert evaluated price]

**3. Reason/s why your Bid was unsuccessful**

*[INSTRUCTIONS: State the reason/s why this Bidder's Bid was unsuccessful. Do NOT include: (a) a point by point comparison with another Bidder's Bid or (b) information that is marked confidential by the Bidder in its Bid.]*

**4. How to request a debriefing**

**DEADLINE:** The deadline to request a debriefing expires at midnight on [insert date] (local time).

You may request a debriefing in relation to the results of the evaluation of your Bid. If you decide to request a debriefing your written request must be made within three (3) Business Days of receipt of this Notification of Intention to Award.

Provide the contract name, reference number, name of the Bidder, contact details; and address the request for debriefing as follows:

**Attention:** [insert full name of person, if applicable]

**Title/position:** [insert title/position]

**Agency:** [insert name of Employer]

**Email address:** [insert email address]

**Fax number:** [insert fax number] *delete if not used*

If your request for a debriefing is received within the 3 Business Days deadline, we will provide the debriefing within five (5) Business Days of receipt of your request. If we are unable to provide the debriefing within this period, the Standstill Period shall be extended by five (5) Business Days after the date that the debriefing is provided. If this happens, we will notify you and confirm the date that the extended Standstill Period will end.

The debriefing may be in writing, by phone, video conference call or in person. We shall

promptly advise you in writing how the debriefing will take place and confirm the date and time.

If the deadline to request a debriefing has expired, you may still request a debriefing. In this case, we will provide the debriefing as soon as practicable, and normally no later than fifteen (15) Business Days from the date of publication of the Contract Award Notice.

## 5. How to make a complaint

**Period: Procurement-related Complaint challenging the decision to award shall be submitted by midnight, [insert date] (local time).**

Provide the contract name, reference number, name of the Bidder, contact details; and address the Procurement-related Complaint as follows:

**Attention:** [insert full name of person, if applicable]

**Title/position:** [insert title/position]

**Agency:** [insert name of Employer]

**Email address:** [insert email address]

**Fax number:** [insert fax number] *delete if not used*

At this point in the procurement process, you may submit a Procurement-related Complaint challenging the decision to award the contract. You do not need to have requested, or received, a debriefing before making this complaint. Your complaint must be submitted within the Standstill Period and received by us before the Standstill Period ends.

### Further information:

For more information see the [Procurement Regulations for IPF Borrowers \(Procurement Regulations\)](https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=4005) [https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=4005] (Annex III). You should read these provisions before preparing and submitting your complaint. In addition, the World Bank's Guidance "[How to make a Procurement-related Complaint](http://www.worldbank.org/en/projects-operations/products-and-services/brief/procurement-new-framework#framework)" [http://www.worldbank.org/en/projects-operations/products-and-services/brief/procurement-new-framework#framework] provides a useful explanation of the process, as well as a sample letter of complaint.

In summary, there are four essential requirements:

1. You must be an 'interested party'. In this case, that means a Bidder who submitted a Bid in this bidding process, and is the recipient of a Notification of Intention to Award.
2. The complaint can only challenge the decision to award the contract.
3. You must submit the complaint within the period stated above.
4. You must include, in your complaint, all of the information required by the Procurement Regulations (as described in Annex III).

**6. Standstill Period**

**DEADLINE: The Standstill Period is due to end at midnight on [insert date] (local time).**

The Standstill Period lasts ten (10) Business Days after the date of transmission of this Notification of Intention to Award.

The Standstill Period may be extended as stated in Section 4 above.

If you have any questions regarding this Notification, please do not hesitate to contact us.

On behalf of the Employer:

**Signature:** \_\_\_\_\_

**Name:** \_\_\_\_\_

**Title/position:** \_\_\_\_\_

**Telephone:** \_\_\_\_\_

**Email:** \_\_\_\_\_

## Beneficial Ownership Disclosure Form

**INSTRUCTIONS TO BIDDERS: DELETE THIS BOX ONCE YOU HAVE COMPLETED THE FORM**

*This Beneficial Ownership Disclosure Form (“Form”) is to be completed by the successful Bidder<sup>1</sup>. In case of joint venture, the Bidder must submit a separate Form for each member. The beneficial ownership information to be submitted in this Form shall be current as of the date of its submission.*

*For the purposes of this Form, a Beneficial Owner of a Bidder is any natural person who ultimately owns or controls the Bidder by meeting one or more of the following conditions:*

- *directly or indirectly holding 25% or more of the shares*
- *directly or indirectly holding 25% or more of the voting rights*
- *directly or indirectly having the right to appoint a majority of the board of directors or equivalent governing body of the Bidder*

**RFB No.:** *[insert number of RFB process]*

**Request for Bid No.:** *[insert identification]*

**To:** *[insert complete name of Employer]*

In response to your request in the Letter of Acceptance dated *[insert date of letter of Acceptance]* to furnish additional information on beneficial ownership: *[select one option as applicable and delete the options that are not applicable]*

(i) we hereby provide the following beneficial ownership information.

### Details of beneficial ownership

Identity of Beneficial Owner	Directly or indirectly holding 25% or more of the shares (Yes / No)	Directly or indirectly holding 25 % or more of the Voting Rights (Yes / No)	Directly or indirectly having the right to appoint a majority of the board of the directors or an equivalent governing body of the Bidder (Yes / No)
<i>[include full name (last, middle, first), nationality, country]</i>			

<i>of residence]</i>			
----------------------	--	--	--

**OR**

(ii) *We declare that there is no Beneficial Owner meeting one or more of the following conditions:*

- directly or indirectly holding 25% or more of the shares
- directly or indirectly holding 25% or more of the voting rights
- directly or indirectly having the right to appoint a majority of the board of directors or equivalent governing body of the Bidder

**OR**

(iii) *We declare that we are unable to identify any Beneficial Owner meeting one or more of the following conditions. [If this option is selected, the Bidder shall provide explanation on why it is unable to identify any Beneficial Owner]*

- directly or indirectly holding 25% or more of the shares
- directly or indirectly holding 25% or more of the voting rights
- directly or indirectly having the right to appoint a majority of the board of directors or equivalent governing body of the Bidder]”

**Name of the Bidder:** \**[insert complete name of the Bidder]*\_\_\_\_\_

**Name of the person duly authorized to sign the Bid on behalf of the Bidder:** \*\**[insert complete name of person duly authorized to sign the Bid]*\_\_\_\_\_

**Title of the person signing the Bid:** *[insert complete title of the person signing the Bid]*\_\_\_\_\_

**Signature of the person named above:** *[insert signature of person whose name and capacity are shown above]*\_\_\_\_\_

**Date signed** *[insert date of signing]* **day of** *[insert month]*, *[insert year]*\_\_\_\_\_

\* In the case of the Bid submitted by a Joint Venture specify the name of the Joint Venture as Bidder. In the event that the Bidder is a joint venture, each reference to “Bidder” in the Beneficial Ownership Disclosure Form (including this Introduction thereto) shall be read to refer to the joint venture member.

\*\* Person signing the Bid shall have the power of attorney given by the Bidder. The power of attorney shall be attached with the Bid Schedules.

# Letter of Acceptance

*[on letterhead paper of the Employer]*

..... *[date]* .....

To: ..... *[ name and address of the Contractor]* .....

Subject: ..... *[Notification of Award Contract No.]* .....

This is to notify you that your Bid dated . . . . *[insert date]* . . . . for execution of the . . . . .  
. . . . *[insert name of the contract and identification number, as given in the PCC]*..... for  
the Accepted Contract Amount of .....*[insert amount in numbers and words and name of  
currency]*, as corrected and modified in accordance with the Instructions to Bidders is  
hereby accepted by our Agency.

You are requested to furnish (i) the Performance Security and an Environmental, Social,  
Health and Safety Performance Security *[Delete ESHS Performance Security if it is not  
required under the contract]* within 28 days in accordance with the Conditions of  
Contract, using for that purpose the of the Performance Security Form and the ESHS  
Performance Security Form, *[Delete reference to the ESHS Performance Security Form  
if it is not required under the contract]* and (ii) the additional information on beneficial  
ownership in accordance with BDS ITB 47.1, within eight (8) Business days using the  
Beneficial Ownership Disclosure Form, included in Section X - Contract Forms, of the  
bidding document.

***[Choose one of the following statements:]***

We accept that \_\_\_\_\_ *[insert the name of Adjudicator proposed by  
the Bidder]* be appointed as the Adjudicator.

***[or]***

We do not accept that \_\_\_\_\_ *[insert the name of the Adjudicator  
proposed by the Bidder]* be appointed as the Adjudicator, and by sending a copy of this Letter  
of Acceptance to \_\_\_\_\_ *[insert name of  
the Appointing Authority]*, the Appointing Authority, we are hereby requesting such  
Authority to appoint the Adjudicator in accordance with ITB 48.1 and GCC 23.1.

Authorized Signature: .....

Name and Title of Signatory: .....

Name of Agency: .....

**Attachment: Contract Agreement**

## Contract Agreement

THIS AGREEMENT made the . . . . .day of . . . . ., . . . . ., between . . . . .  
 . [name of the Employer]. . . . . (hereinafter “the Employer”), of the one part, and . . . . .  
 [name of the Contractor] . . . . . (hereinafter “the Contractor”), of the other part:

WHEREAS the Employer desires that the Works known as . . . . . [name of the Contract]. . . . .  
 . should be executed by the Contractor, and has accepted a Bid by the Contractor for the  
 execution and completion of these Works and the remedying of any defects therein,

The Employer and the Contractor agree as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Contract documents referred to.
2. The following documents shall be deemed to form and be read and construed as part of this Agreement. This Agreement shall prevail over all other Contract documents.
  - (a) the Letter of Acceptance
  - (b) the Letter of Bid
  - (c) the addenda Nos \_\_\_\_\_ (if any)
  - (d) the Particular Conditions
  - (e) the General Conditions of Contract, including appendix;
  - (f) the Specification
  - (g) the Drawings
  - (h) Bill of Quantities;<sup>1</sup> and
  - (i) any other document **listed in the PCC** as forming part of the Contract;
3. In consideration of the payments to be made by the Employer to the Contractor as specified in this Agreement, the Contractor hereby covenants with the Employer to execute the Works and to remedy defects therein in conformity in all respects with the provisions of the Contract.
4. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

---

<sup>1</sup> In lump sum contracts, delete “Bill of Quantities” and replace with “Activity Schedule.”

IN WITNESS whereof the parties hereto have caused this Agreement to be executed in accordance with the laws of . . . . *[name of the borrowing country]*..... on the day, month and year specified above.

Signed by: .....  
for and on behalf of the Employer

Signed by:.....  
for and on behalf the Contractor

in the  
presence of:.....  
Witness, Name, Signature, Address, Date

in the  
presence of:.....  
Witness, Name, Signature, Address, Date

## Performance Security - Bank Guarantee

*[Guarantor letterhead or SWIFT identifier code]*

**Beneficiary:** *[insert name and Address of Employer]*

**Date:** *\_ [Insert date of issue]*

**PERFORMANCE GUARANTEE No.:** *[Insert guarantee reference number]*

**Guarantor:** *[Insert name and address of place of issue, unless indicated in the letterhead]*

We have been informed that *\_ [insert name of Contractor, which in the case of a joint venture shall be the name of the joint venture]* (hereinafter called "the Applicant") has entered into Contract No. *[insert reference number of the contract]* dated *[insert date]* with the Beneficiary, for the execution of *\_ [insert name of contract and brief description of Works]* (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, a performance guarantee is required.

At the request of the Applicant, we as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of *[insert amount in figures]* ( *\_\_\_\_\_* ) *[insert amount in words]*,<sup>1</sup> such sum being payable in the types and proportions of currencies in which the Contract Price is payable, upon receipt by us of the Beneficiary's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating that the Applicant is in breach of its obligation(s) under the Contract, without the Beneficiary needing to prove or to show grounds for your demand or the sum specified therein.

This guarantee shall expire, no later than the .... Day of ....., 2...<sup>2</sup>, and any demand for payment under it must be received by us at this office indicated above on or before that date.

---

<sup>1</sup> *The Guarantor shall insert an amount representing the percentage of the Accepted Contract Amount specified in the Letter of Acceptance, less provisional sums, if any, and denominated either in the currency(ies) of the Contract or a freely convertible currency acceptable to the Beneficiary.*

<sup>2</sup> *Insert the date twenty-eight days after the expected completion date as described in GC Clause 53.1. The Employer should note that in the event of an extension of this date for completion of the Contract, the Employer would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the Employer might consider adding the following text to the form, at the end of the penultimate paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [six months][one year], in response to the Beneficiary's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee."*

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

---

*[signature(s)]*

*Note: All italicized text (including footnotes) is for use in preparing this form and shall be deleted from the final product.*

## Performance Security - Performance Bond

By this Bond [*insert name of Principal*] as Principal (hereinafter called “the Contractor”) and [*insert name of Surety*] as Surety (hereinafter called “the Surety”), are held and firmly bound unto [*insert name of Employer*] as Obligee (hereinafter called “the Employer”) in the amount of [*insert amount in words and figures*], for the payment of which sum well and truly to be made in the types and proportions of currencies in which the Contract Price is payable, the Contractor and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS the Contractor has entered into a written Agreement with the Employer dated the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_, for [*name of contract and brief description of Works*] in accordance with the documents, plans, specifications, and amendments thereto, which to the extent herein provided for, are by reference made part hereof and are hereinafter referred to as the Contract.

NOW, THEREFORE, the Condition of this Obligation is such that, if the Contractor shall promptly and faithfully perform the said Contract (including any amendments thereto), then this obligation shall be null and void; otherwise, it shall remain in full force and effect. Whenever the Contractor shall be, and declared by the Employer to be, in default under the Contract, the Employer having performed the Employer’s obligations thereunder, the Surety may promptly remedy the default, or shall promptly:

- (1) complete the Contract in accordance with its terms and conditions; or
- (2) obtain a Bid or Bids from qualified Bidders for submission to the Employer for completing the Contract in accordance with its terms and conditions, and upon determination by the Employer and the Surety of the lowest responsive Bidder, arrange for a Contract between such Bidder and Employer and make available as work progresses (even though there should be a default or a succession of defaults under the Contract or Contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the Balance of the Contract Price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term “Balance of the Contract Price,” as used in this paragraph, shall mean the total amount payable by Employer to Contractor under the Contract, less the amount properly paid by Employer to Contractor; or
- (3) pay the Employer the amount required by Employer to complete the Contract in accordance with its terms and conditions up to a total not exceeding the amount of this Bond.

The Surety shall not be liable for a greater sum than the specified penalty of this Bond.

Any suit under this Bond must be instituted before the expiration of one year from the date of the issuing of the Taking-Over Certificate.

No right of action shall accrue on this Bond to or for the use of any person or corporation other than the Employer named herein or the heirs, executors, administrators, successors, and assigns of the Employer.

In testimony whereof, the Contractor has hereunto set his hand and affixed his seal, and the Surety has caused these presents to be sealed with his corporate seal duly attested by the signature of his legal representative, this \_\_\_\_\_ day of \_\_\_\_\_ 20 \_\_\_\_.

SIGNED ON \_\_\_\_\_ on behalf of \_\_\_\_\_

By \_\_\_\_\_ in the capacity of \_\_\_\_\_

In the presence of \_\_\_\_\_

SIGNED ON \_\_\_\_\_ on behalf of \_\_\_\_\_

By \_\_\_\_\_ in the capacity of \_\_\_\_\_

In the presence of \_\_\_\_\_

# Environmental, Social, Health and Safety (ESHS) Performance Security

## ESHS Demand Guarantee

*[Guarantor letterhead or SWIFT identifier code]*

**Beneficiary:** *[insert name and Address of Employer]*

**Date:** *\_ [Insert date of issue]*

**ESHS PERFORMANCE GUARANTEE No.:** *[Insert guarantee reference number]*

**Guarantor:** *[Insert name and address of place of issue, unless indicated in the letterhead]*

We have been informed that \_\_\_\_\_ (hereinafter called "the Applicant") has entered into Contract No. \_\_\_\_\_ dated \_\_\_\_\_ with the Beneficiary, for the execution of \_\_\_\_\_ (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, a performance guarantee is required.

At the request of the Applicant, we as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of \_\_\_\_\_ (\_\_\_\_\_) ,<sup>1</sup> such sum being payable in the types and proportions of currencies in which the Contract Price is payable, upon receipt by us of the Beneficiary's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating that the Applicant is in breach of its Environmental, Social, Health and/or Safety (ESHS) obligation(s) under the Contract, without the Beneficiary needing to prove or to show grounds for your demand or the sum specified therein.

This guarantee shall expire, no later than the .... Day of ....., 2...<sup>2</sup>, and any demand for payment under it must be received by us at this office indicated above on or before that date.

<sup>1</sup> *The Guarantor shall insert an amount representing the percentage of the Accepted Contract Amount specified in the Letter of Acceptance, less provisional sums, if any, and denominated either in the currency (cies) of the Contract or a freely convertible currency acceptable to the Beneficiary.*

<sup>2</sup> *Insert the date twenty-eight days after the expected completion date as described in GC Clause 53.1. The Employer should note that in the event of an extension of this date for completion of the Contract, the Employer would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the Employer might consider adding the following text to the form, at the end of the penultimate paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed*

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

---

*[signature(s)]*

***Note: All italicized text (including footnotes) is for use in preparing this form and shall be deleted from the final product.***

---

*[six months] [one year], in response to the Beneficiary's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee."*

# Advance Payment Security

## Demand Guarantee

*[Guarantor letterhead or SWIFT identifier code]*

**Beneficiary:** *[Insert name and Address of Employer]*

**Date:** *[Insert date of issue]*

**ADVANCE PAYMENT GUARANTEE No.:** *[Insert guarantee reference number]*

**Guarantor:** *[Insert name and address of place of issue, unless indicated in the letterhead]*

We have been informed that *[insert name of Contractor, which in the case of a joint venture shall be the name of the joint venture]* (hereinafter called "the Applicant") has entered into Contract No. *[insert reference number of the contract]* dated *[insert date]* with the Beneficiary, for the execution of *[insert name of contract and brief description of Works]* (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, an advance payment in the sum *[insert amount in figures]* () *[insert amount in words]* is to be made against an advance payment guarantee.

At the request of the Applicant, we as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of *[insert amount in figures]* ( \_\_\_\_\_ ) *[insert amount in words]*<sup>1</sup> upon receipt by us of the Beneficiary's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating either that the Applicant:

- (a) has used the advance payment for purposes other than the costs of mobilization in respect of the Works; or
- (b) has failed to repay the advance payment in accordance with the Contract conditions, specifying the amount which the Applicant has failed to repay.

---

<sup>1</sup> *The Guarantor shall insert an amount representing the amount of the advance payment and denominated either in the currency(ies) of the advance payment as specified in the Contract, or in a freely convertible currency acceptable to the Employer.*

A demand under this guarantee may be presented as from the presentation to the Guarantor of a certificate from the Beneficiary's bank stating that the advance payment referred to above has been credited to the Applicant on its account number *[insert number]* at *[insert name and address of Applicant's bank]*..

The maximum amount of this guarantee shall be progressively reduced by the amount of the advance payment repaid by the Applicant as specified in copies of interim statements or payment certificates which shall be presented to us. This guarantee shall expire, at the latest, upon our receipt of a copy of the interim payment certificate indicating that ninety (90) percent of the Accepted Contract Amount, less provisional sums, has been certified for payment, or on the *[insert day]* day of *[insert month]*, 2 *[insert year]*,<sup>2</sup> whichever is earlier. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

---

*[signature(s)]*

***Note: All italicized text (including footnotes) is for use in preparing this form and shall be deleted from the final product***

---

<sup>2</sup> *Insert the expected expiration date of the Time for Completion. The Employer should note that in the event of an extension of the time for completion of the Contract, the Employer would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the Employer might consider adding the following text to the form, at the end of the penultimate paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [six months][one year], in response to the Beneficiary's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee."*



**BILL NO. 4**

**PARTICULAR PRELIMINARIES**

**PARTICULAR PRELIMINARIES**

ITEM	DESCRIPTION	KSHS.	CTS.
<p><b>A</b></p>	<p><b>PRICING ITEMS FOR PRELIMINARIES</b></p> <p>Prices <b>shall be inserted</b> against items of 'preliminaries' in the tenderer's priced Bill of Quantities. The Contractor is advised to read and understand all preliminaries. Preliminary items not priced shall be deemed to have been included in the rates of items in the Bill of Quantities.</p>		
<p><b>B</b></p>	<p><b>DESCRIPTION OF THE WORKS</b></p> <p>The works to be carried out under this contract comprise Supply, Installation, Testing and Commissioning of the Data Centre Services work for the Proposed Ultra-Modern Training Centre The approximate areas are as follows: -</p> <p>01. Basement           -   2780 SM  02 Ground Floor       -   2470 SM  03 First Floor           -   2497 SM  <b>TOTAL FLOOR AREA       7,747 SM</b></p>		
	<p><b>Carried to Collection</b></p>		

ITEM	DESCRIPTION		CTS.
A	<p><b>MEASUREMENTS</b></p> <p>In the event of discrepancy between the Bill of Quantities and the actual works, the site measurements shall generally take precedence. However, such discrepancies between any Contract documents shall immediately be reported to the Project Manager.</p>		
B	<p><b>LOCATION OF THE SITE</b></p> <p>The site is at Karen, Nairobi along Karen Road within the existing CEMASTEIA Institute</p>		
C	<p><b>CLEARING AWAY</b></p> <p>The Contractor shall remove all temporary works, rubbish, debris and surplus materials from the site as they accumulate and upon completion of the works, remove, clear away all plants, equipment, rubbish, unused materials, stains and leave in a clean tidy state to the satisfaction of the Project Manager.</p> <p>The whole of the works shall be delivered up clean, complete, and perfect condition in every respect to the satisfaction of the Project Manager.</p>		
D	<p><b>CLAIMS</b></p> <p>It shall be a condition of this Contract that upon it becoming reasonably apparent to the Contractor that he has incurred losses and/or expenses due to any of the Contract Conditions, or by any other reason whatsoever, he shall present such claim or intent to claim notice to the Project Manager within the Contract period. No claim shall be entertained upon the expiry of the said Contract period.</p>		
E	<p><b>PAYMENTS</b></p> <p>Payment will be done on monthly basis by the Project Manager on application by the Contactor. All payments shall be made by Client Department upon certification by the Project Manager. Subcontractors shall be paid through the Main Contractor. The Main Contractor must confirm that they have paid sub-contractors to be eligible for subsequent certificates.</p>		
F	<p><b>PREVENTION OF ACCIDENTS, DAMAGE OR LOSS</b></p> <p>The Contractor is notified that the works are to be carried out on a fairly busy, high security conscious site where the Client is going on with other normal activities. He/she is therefore instructed to take reasonable care in the execution of the works so as to prevent accidents, damage or loss and disruption of normal activities being carried out by the Client. The Contractor shall allow in his rates any expenses he deems necessary by taking such care within the site.</p>		
	<b>Carried to Collection</b>		

ITEM	DESCRIPTION	KSHS.	CTS.
<p><b>A</b></p> <p><b>WORKING CONDITIONS</b></p> <p>The Contractor shall allow in his rates for any interference that he may encounter in the course of execution of the works.</p> <p><b>B</b></p> <p><b>SIGN BOARD.</b></p> <p>Allow for providing, erecting, maintaining throughout the Contract period and clearing afterwards a sign board as designed and approved by the Project Manager</p> <p><b>C</b></p> <p><b>LABOUR CAMPS</b></p> <p>The Contractor shall <b>NOT</b> be allowed to house his labourers on site with the exemption of watchmen who will work in consultation with the Institute's authority. Allow also for transporting workers to and from site during the Contract Period as may be necessary.</p> <p><b>D</b></p> <p><b>PROJECT MANAGER'S SITE OFFICE</b></p> <p>The Contractor shall provide and maintain where directed on site, an approved weather and sun-proof lock-up office for the sole use of the PROJECT MANAGER and his representatives with a total floor area of not less than 15 square metres. The office shall be to the project manager's approval.</p> <p>The office shall be furnished with sufficient tables and chairs including sufficient stationery, airtime, printer, and laptop to be maintained throughout project period.</p> <p>The Contractor shall also provide, erect and maintain a water borne toilet facilities for the sole use of the PROJECT TEAM to the satisfaction of the Local Authorities and Public Health at his cost during the whole period of the Works. The office and closet shall be completed before the Contractor is permitted to commence the works. The office and latrine shall be removed on completion and the site made good.</p> <p><b>E</b></p> <p><b>PRICING NOTES</b></p> <p>The tenderer shall include for all cost in executing the whole of the works, including transport, replacing damaged items, fixing, all to comply with the said Conditions of Contract.</p> <p><b>F</b></p> <p><b>GENERAL SPECIFICATIONS</b></p> <p>The Contractor is referred to the Ministry of Works General Specification for Building Works 1976 Edition Pages B1 - B2 inclusive and must allow for all costs in complying with these clauses.</p> <p><b>G</b></p> <p><b>FLUCTUATIONS</b></p> <p>Shall be applicable as per GCC Clause 45.1</p>			
	<b>Carried to Collection</b>		-

ITEM	DESCRIPTION	KSHS.	CTS.
<p><b>A</b></p> <p><b>B</b></p> <p><b>C</b></p> <p><b>D</b></p> <p><b>E</b></p>	<p><b>SECURITY OF THE WORKS</b> The Contractor shall allow for providing adequate security for the works and workers during the Contract. No claim will be entertained for lack of enough security in this respect.</p> <p><b>URGENCY OF THE WORKS</b> The Contractor should note that these works are very urgent and must be completed within the agreed contract period.</p> <p><b>PAYMENT FOR MATERIALS ON SITE</b> All materials for incorporation in the works must be in the site stores before they are considered for payment, unless specifically exempted by the Project Manager. This is to include materials of the Main Contractor, Nominated Sub-Contractors and Nominated Suppliers.</p> <p><b>EXISTING SERVICES</b> Prior to the commencement of any work, the Contractor is to ascertain from the relevant authority the exact position, depth and level of all existing services in the site and he/she shall make whatever provisions that may be required by the authority for support, maintenance and protection of such services.</p> <p><b>PHASED IMPLEMENTATION AND SECTIONAL COMPLETION</b> This is one project expected to be handed over complete and no phasing can be allowed. The last of the contract works are to be completed within the overall Contract Completion Period.</p>		
	<p><b>Carried to Collection</b></p>		

ITEM	DESCRIPTION	KSHS.	CTS.
<p><b>A</b></p> <p><b>PERFORMANCE BOND</b></p> <p>A performance bond in the form of unconditional bank guarantee required is 10% of the bid price. On award of contract, no payment on account for the works executed will be made to the Contractor until he has submitted the Performance Bond to the Project Manager duly signed, sealed and stamped from an approved bank.</p> <p><b>B</b></p> <p><b>TENDER DOCUMENT</b></p> <p>Tender documents are listed in the Instruction to Tenderers and all documents in connection therewith, as specified above must be delivered in the addressed envelope which should be properly sealed and deposited at the offices as specified in the letter accompanying these documents.</p> <p>Tenders will be opened at the time specified in the letter accompanying these documents.</p> <p>Tenders delivered or received later than the above time will not be opened.</p> <p><b>C</b></p> <p><b>VALUE ADDED TAX</b></p> <p>The Contractor's attention is drawn to the Legal Notice in the Finance Act part 3 operative from 1st September, 1993 which requires payment of VAT on all contracts.</p> <p><b>The Contractor must therefore include V.A.T in their rates.</b></p> <p><b>D</b></p> <p><b>FORM OF CONTRACT</b></p> <p>The form of Contract shall be as stipulated in the Standard Procurement Document (SPD) for works (July, 2019) included under this Proposal. The Conditions of Contract are also included herein (<b>Section VIII - General Conditions GC</b>) Particulars of insertion to be made in the Particular Conditions of Contract will be found in Section IX.</p>			
	<p><b>Carried to Collection</b></p>		

ITEM	DESCRIPTION	KSHS.	CTS.
	<b>COLLECTION</b>		
	Brought Forward from Page 170		
	Brought Forward from Page 171		
	Brought Forward from Page 172		
	Brought Forward from Page 173		
	Brought Forward from Page 174		
	<b>TOTAL FOR PART NO 4 CARRIED TO MAIN SUMMARY KSHS.</b>		

**BILL NO. 5**

**GENERAL PRELIMINARIES**



ITEM	DESCRIPTION	KSHS.	CTS.
A	<p><b>ABBREVIATIONS CONTINUED..</b></p> <p>Throughout these bills, units of measurement and terms are abbreviated and shall be interpreted as follows</p> <p><b>"C-ESMP"</b>                      Shall mean Contractors' Environmental and Social Management Plan</p> <p><b>"PPE"</b>                              Shall mean Personal Protection Equipment</p> <p><b>"ESIP"</b>                              Shall mean Environmental and Social Implementation Plan</p> <p><b>"OHS"</b>                              Shall mean Occupational Health and Safety</p> <p><b>"OHSA"</b>                              Shall mean Occupational Health and Safety Authority</p> <p><b>"DOSH"</b>                              Shall mean Directorate of Occupational Safety and Health</p> <p><b>"Approved"</b>                      Shall mean approved by the Project Manager.</p> <p><b>"As directed"</b>                      Shall mean as directed by the Project Manager.</p>		
	<b>Carried to Collection</b>		

ITEM	DESCRIPTION	KSHS.	CTS.
A	<p><b>EXCEPTION TO THE STANDARD METHOD OF MEASUREMENT</b></p> <p><b>Attendance;</b>            Clause B19(a) of the Standard Method of Measurement is deleted and the following Clause is substituted:-</p> <p>Attendance on nominated Sub-Contractors shall be given as an item in each case and shall be deemed to include: allowing use of standing scaffolding, mesh rooms, sanitary accommodation and welfare facilities; provision of special scaffolding where necessary, providing space for office accommodation, and for storage of plant and materials; providing light and water for the works; clearing away rubbish; unloading checking providing electric power and removing and replacing duct covers, pipe chasings and the like necessary for the execution and testing of Sub-Contractor's work and being responsible for the accuracy of the same.</p> <p><b>Fix Only;</b>            "Fix Only" Shall mean take delivery on site where necessary, distribute to position, hoist and fix only.</p>		
B	<p><b>THE EMPLOYER</b></p> <p>The term "Employer" and "Client" wherever used in the Contract Document shall be synonymous.</p>		
C	<p><b>PROJECT MANAGER</b></p> <p>The term "PM" wherever used in this Bills of Quantities shall be deemed to imply the Project Manager as defined in Conditions of Contract or such person or persons as may be duly authorized to represent him on behalf of the Employer. The Project Manager shall be deemed to mean Messrs.. Dama Services Ltd. of P.O. Box 9656-00100, NAIROBI,            Tel. Nos. +254 020-2628155 or +254-722 299466            Email: damaservices@gmail.com</p>		
D	<p><b>ARCHITECT</b></p> <p>The term Architect shall be deemed to mean Messrs. Dama Services Ltd. of P.O. Box 9656-00100, NAIROBI,            Tel. Nos. +254 020-2628155 or +254-722 299466            Email: damaservices@gmail.com</p>		
E	<p><b>QUANTITY SURVEYOR</b></p> <p>The term "Quantity Surveyor" shall be deemed to mean the firm of Messrs. Integra Consulting Limited of address P.O. Box 27974-00100 Nairobi. Tel: 020-2713061.            Email: info@integraconsulting.co.ke</p>		
	<b>Carried to Collection</b>		

ITEM	DESCRIPTION	KSHS.	CTS.
<b>A</b>	<p><b>ELECTRICAL ENGINEER</b></p> <p>The term "Electrical Engineer" shall be deemed to mean Messrs. Metrocom Consultants limited  P.O Box 27090 - 00100, Nairobi. Tel. No. +254 20 3572724 /5 /6  Email: metrocom@tms-cgroup.com</p>		
<b>B</b>	<p><b>MECHANICAL ENGINEER/WASH ENGINEER</b></p> <p>The term "Mechanical Engineer/WASH Engineer" shall be deemed to mean Messrs. Metrocom Consultants limited  P.O Box 27090 - 00100, Nairobi. Tel. No. +254 20 3572724 /5 /6  Email: metrocom@tms-cgroup.com</p>		
<b>C</b>	<p><b>STRUCTURAL &amp; CIVIL ENGINEER</b></p> <p>The term "Structural &amp; Civil Engineer" shall be deemed to mean Messrs. Inticom Consulting Ltd, P.O Box 14105 -00100, NAIROBI, Tel. No. +245 722343406  Email: inticomltd@gmai.com</p>		
<b>D</b>	<p><b>LEAD ENVIRONMENTAL EXPERT</b></p> <p>The term "Lead Environmental Expert" shall be deemed to mean Messrs. Information for Action Enterprises, P.O Box 14665 -00100, NAIROBI. Email:</p>		
<b>E</b>	<p><b>LEAD SOCIAL EXPERT</b></p> <p>The term "Lead Social Expert" shall be deemed to mean Messrs. Almaja Services Ltd, Email: almajaservices@gmail.com</p>		
	<b>Carried to Collection</b>		

ITEM	DESCRIPTION	KSHS.	CTS.
<b>A</b>	<p><b>PLANT, TOOLS AND VEHICLES</b></p> <p>Allow for providing all scaffolding, plants, tools and vehicles required for the works except in so far as may be stated otherwise herein and except for such items specifically and only required for use of nominated Sub-Contractors as described herein. No timber used for scaffolding, formwork, or temporary works of any kind should be afterwards in the permanent works.</p>		
<b>B</b>	<p><b>TRANSPORT</b></p> <p>Allow for transport of workmen, materials, etc. to and from the site at such hours and by such routes as may be permitted by competent Authorities in liaison with the PROJECT MANAGER.</p>		
<b>C</b>	<p><b>MATERIALS AND WORKMANSHIP</b></p> <p>All materials and workmanship used in the execution of the works shall be of the best quality and description unless otherwise stated. The Contractor shall order all materials to be obtained from overseas immediately after the contract is signed and shall also order for materials to be obtained from local sources as early as necessary to ensure that they are onsite when required for use in the works. The Bills of Quantities shall not be used for the purposes of ordering materials.</p>		
<b>D</b>	<p><b>SIGN FOR MATERIALS SUPPLIED</b></p> <p>The Contractor shall be required to sign receipts for all articles and materials supplied by the Project Manager at the time of taking delivery thereof, as having received them in good order and condition, and will thereafter be responsible for any such loss or damage and for replacement of such any loss with articles and/or materials which shall be supplied by the Project Manager at the current market prices including Customs Duty and VAT, all at the Contractors own cost and expenses, to the satisfaction of the PROJECT MANAGER.</p>		
<b>E</b>	<p><b>STORAGE OF MATERIALS</b></p> <p>The Contractor shall provide at his own risk and cost where directed on the site weather proof lock-up sheds and make good damaged or disturbed surfaces upon completion to the satisfaction of the PROJECT MANAGER. NOMINATED SUB-CONTRACTORS are to be made liable for the cost of any storage accommodation provided specifically for their use.</p>		
	<b>Carried to Collection</b>		

ITEM	DESCRIPTION	KSHS.	CTS.
<p><b>A</b></p> <p><b>SAMPLES</b></p> <p>The Contractor shall furnish at his own cost any samples of materials or workmanship including concrete test cubes required for the works that may be called for by the PROJECT MANAGER for his approval. The PROJECT MANAGER may reject any materials or workmanship in his opinion not to the approved sample. The PROJECT MANAGER shall arrange for testing of such materials as he/she may at his/her discretion deem desirable, but the testing shall be made at the expense of the Contractor and not at the expense of the PROJECT MANAGER. The Contractor shall pay for the testing in accordance with the current scale of testing charges laid down by Ministry of Public Works</p> <p>The procedure for submitting samples of materials for testing and the method of marking for identification shall be laid down by the PROJECT MANAGER. The</p> <p><b>B</b></p> <p><b>GOVERNMENT ACT REGARDING WORK PEOPLE ETC.</b></p> <p>Allow for complying with Government Acts, order and Regulations in connection with the employment of Labor and other matters related to the execution of the works. In particular, the Contractor's attention is drawn to the provisions of the Factory Act of 1950 and the Occupational Safety and Health Act(OSHA) 2007 and the tenderer must include for all costs arising or resulting from compliance with any Act Order or The Contractor must make himself fully acquainted with current Acts and Regulations including police regulations regarding movements, housing, security and control of labor, labor camps, passes for transport etc. It is important that the Contractor before tendering obtain information regarding all such regulations and/or restrictions which may affect the organization of the works, supply and control of labor etc: and allow accordingly in his tender. No claim shall be entertained for lack of knowledge in this respect.</p> <p><b>C</b></p> <p><b>SECURITY OF WORKS, ETC.</b></p> <p>The Contractor shall be entirely responsible for the security of the works, materials, plant, personnel etc, both his own and subcontractor's and must provide all necessary watching, lighting and precautions necessary to ensure security against theft, loss or damage and the protection of the public.</p> <p><b>D</b></p> <p><b>PROTECTIVE CLOTHING</b></p> <p>The Contractor shall provide all protective or any other special clothing or equipment for his employees that may be necessary.</p> <p>The contractor is notified that in certain areas the workers will be required to put on special protective wear viz on the head, nose, ears, eyes, body and feet. These shall include, inter-alia, safety helmets, gloves, goggles, earmuffs, safety overalls, etc., according to the type of work. The Contractor shall ensure that safety helmets are worn by all staff at all times.</p> <p>The Contractor shall allow for providing clean lab coat, reflector jacket safety boots and helmets to the Client's representatives and Consultants whenever they visit the site. Allow for a minimum twelve people.</p>			
	<b>Carried to Collection</b>		

ITEM	DESCRIPTION	KSHS.	CTS.
<p><b>A</b></p>	<p><b>HEALTH AND SAFETY</b>  The Contractor shall comply at all times with the requirements of the Occupational Safety and Health Act (OSHA) 2007 and ensure that the safety of his work people and authorised visitors to the Site is protected at all times. In particular there shall be proper provision of planked footways and guard-rails to scaffolding, etc., protection against falling materials and tools and the Site shall be tidy and clear of debris. The Contractor shall appoint a safety officer as required by OSHA and notify the Directorate of Safety and Health Inspector of his name. The safety Officer shall be on Site at all times and all directions given by the PROJECT MANAGER to the Safety Officer shall be deemed to be Project Manager's Instructions, and shall be complied with promptly without additional cost to the contract. The PROJECT MANAGER shall be empowered to suspend work on the Site should he considers these conditions are not being observed, and no claim arising from such suspension will be allowed.</p>		
<p><b>B</b></p>	<p><b>PUBLIC AND PRIVATE ROADS</b>  Maintain as required throughout the execution of the works and make good any damage to Public or Private roads arising from or subsequent upon the execution of the works to the satisfaction of the local and other competent authority and the Project Manager.</p>		
<p><b>C</b></p>	<p><b>EXISTING PROPERTY</b>  The Contractor shall take every precaution to avoid damage to existing property including roads, cables, drains and other services and he will be held responsible for and shall make good all such damages arising from the execution of this Contract at his own expense at his own cost to the satisfaction of the Project Manager.</p>		
<p><b>D</b></p>	<p><b>VISIT THE SITE AND EXAMINE DRAWINGS</b>  The Contractor is advised to examine the drawings and visit the site location of which is described in the Particular Preliminaries hereof in liaison with PROJECT MANAGER. He shall be deemed to have acquainted him/ herself therewith as to its nature, position, means of access or any other matter which may affect his tender. No claim arising from his failure to comply with this advice shall be entertained.</p>		
<p><b>E</b></p>	<p><b>ACCESS TO SITE AND TEMPORARY ROADS</b>  Means of accessing the site shall be agreed with the PROJECT MANAGER prior to commencement of the works and the Contractor must allow for building any necessary temporary access road for the transport of materials, plant and workmen as may be required for the complete execution of the works including the provision of temporary culverts, crossings or any other means of accessing the site. Upon completing the works, the Contractor shall remove temporary access roads, temporary culverts etc; and make good, reinstate all works and surfaces disturbed to the satisfaction of the PROJECT MANAGER.</p>		
<p><b>F</b></p>	<p><b>AREA TO BE OCCUPIED BY THE CONTRACTOR</b>  The area of the site which may be occupied by the Contractor for site office, storage and for the purpose of erecting workshops etc; shall be defined on site by the PROJECT MANAGER.</p>		
	<p><b>Carried to Collection</b></p>		

ITEM	DESCRIPTION	KSHS.	CTS.
<p><b>A</b></p> <p><b>PROJECT OFFICE</b></p> <p>The Contractor shall erect and maintain where directed and afterwards dismantle the site office of the type noted in Particular Preliminaries, complete with furniture including sufficient stationery, airtime, printer, and laptop. He shall also provide strong metal trunk complete with strong hasp and staple fastening and two keys. He shall provide and maintain a lock-up type water or bucket closet for the sole use of the PROJECT MANAGER including connections to the drain where applicable in conformity with Public Health Authorities and shall provide services of a cleaner and pay all conservancy charges and keep both office and closet in a clean and sanitary condition from commencement to completion of the works and thereafter dismantle and make good disturbed surfaces. The office and the closet shall be erected before the contractor is permitted to commence the works. The Contractor shall make available on site as and when required by the PROJECT MANAGER a modern and accurate level together with leveling staff, ranging rods and 50 metre metallic or linen tape measure.</p> <p><b>B</b></p> <p><b>WATER AND ELECTRICITY SUPPLY</b></p> <p>The Contractor shall provide at his own risk all necessary water, electric light and power required for use in the works. The Contractor must make his own arrangement for connection to the nearest suitable water mains available and for metering the water used. He must also provide temporary water tank and meters as required at his own cost and clear away when no longer required and make good on completion to the entire satisfaction of the PROJECT MANAGER. The Contractor shall pay all charges in connection herewith. No guarantee is given or implied that sufficient water will be available from mains and the Contractor must make his own arrangement for augmenting this supply at his own cost.</p> <p><b>C</b></p> <p><b>SANITATION</b></p> <p>The sanitation of the works shall be arranged and maintained by the Contractor to the satisfaction of the Public Health and/or County Government, Labour Department and the PROJECT MANAGER. The contractor shall provide for site toilet facilities at a location agreed with each school authority.</p> <p><b>D</b></p> <p><b>ACCIDENTS</b></p> <p>The Contractor shall endeavour to ensure that no accident occurs at any of his sites by adopting best practices and the mitigation measures spelt out in the Environmental and Social Management Plan. One accident will be considered "one too many". However, should any accident or incident occur at any one time, the Contractor shall forthwith report the same to the Project Manager in writing, spelling out clearly the circumstances under which it occurred and await further instructions from the Project Manager. He shall forthwith report the accident to the Police and The Directorate of Occupational Safety and Health and cooperate with them to ensure thorough and conclusive investigations. All these shall be at his own cost and indemnify the affected party.</p>			
	<b>Carried to Collection</b>		

ITEM	DESCRIPTION	KSHS.	CTS.
<b>A</b>	<p><b>PRIME COST OR PC SUMS</b>  The term "Prime Cost or PC Sum" whenever used in these Bills of Quantities shall be expended upon the authority of the Project Manager.</p>		
<b>B</b>	<p><b>PROGRESS CHART</b>  The Contractor shall provide within two weeks of Possession of Site and in Agreement with the PROJECT MANAGER a Progress Chart for the whole of the works including the works of Nominated Subcontractors; one copy to be handed to the PROJECT MANAGER and a further copy to be retained on site. Progress to be recorded and chart to be amended as necessary as the work proceeds.</p>		
<b>C</b>	<p><b>ADJUSTMENT OF PC SUMS</b>  In the final account, all P.C Sums shall be deducted and the amount properly expended upon the PROJECT MANAGER'S order in respect of each of them added to the Contract Sum. The Contractor shall produce to the PROJECT MANAGER such quotations, invoices or bills, properly receipted as may be necessary to show the actual details of the sums paid by the Contractor. Items of profit upon P.C Sums shall be adjusted in the final account pro- rata to the amount paid. Items of attendance (as previously described) following P.C Sums shall be adjusted to the physical extent of the work executed (not pro-rata to the amount paid) and shall apply even though the Contractors Priced Bills shows a percentage in the rate column in respect of them.</p> <p>Should the Contractor be permitted to tender and his tender be accepted of any work for which a P.C Sum is included in the Bills of Quantities, profit and attendance will be allowed as it would be if the work were executed by a Nominated Sub-contractor.</p>		
	<b>Carried to Collection</b>		

ITEM	DESCRIPTION	KSHS.	CTS.
<b>A</b>	<p><b>ADJUSTMENT OF PROVISIONAL SUMS</b></p> <p>In the final account all Provisional Sums shall be deducted and the amount properly executed in respect of them upon the PROJECT MANAGER's order added to the Contract Sum. Such works shall be valued as described for Variations in clause no. 13 of the FIDIC general conditions of contract, but the value of such work or articles for the work to be supplied by a Nominated Subcontractor, the value of such work or article to be supplied by a Nominated Supplier, the value of such work or article shall be treated as a P.C Sum and profit and attendance comparable to that contained in the priced Bills of Quantities for similar items added.</p>		
<b>B</b>	<p><b>NOMINATED SUB-CONTRACTORS</b></p> <p>When any work is ordered by the PROJECT MANAGER to be executed by nominated Sub- contractors, the Main Contractor shall enter into a Sub-contract as described clause no. 5 of the FIDIC general conditions of contract and shall thereafter be responsible for such sub- contractors in every respect. Unless otherwise described, the Contractor is to provide for such Sub-contractors any or all the facilities in these Preliminaries. They should price for these with the nominated Subcontract Contractor's work concerned in the P.C Sums under the description "Add for Attendance".</p>		
<b>C</b>	<p><b>DIRECT CONTRACTS</b></p>		
<b>D</b>	<p>Notwithstanding the foregoing conditions, the Employer reserves the right to place a "Direct Contract" for any goods or services required in the works which are covered by a P.C Sum in the Bills of Quantities and to pay for the same direct. In any such instances, profit relative to the P.C Sum the priced Bills of Quantities will be adjusted as described for P.C Sums and allowed.</p> <p><b>ATTENDANCE UPON OTHER TRADESMEN ETC.</b></p> <p>The Contractor shall allow for the attendance of trade upon trade and shall afford any tradesmen or any other persons employed for the execution of any work not included in this Contract every facility for carrying out the work and for use in his ordinary scaffolding. The Contractor, however, shall perform such carting away for and making good after the work of such tradesmen or persons as may be ordered by the PROJECT MANAGER and the work will be measured and paid for to the extent executed at rates provided in these bills.</p>		
	<p><b>Carried to Collection</b></p>		

ITEM	DESCRIPTION	KSHS.	CTS.
<b>A</b>	<p><b>INSURANCE</b></p> <p>The Contractor shall insure as required and as outlined in the Appendix to the Conditions of Contract. No payment on account in respect of the works shall be made to the Contractor unless he/she has satisfied the PROJECT MANAGER either by production of an Insurance Policy certificate that the foregoing Insurance Clauses have been complied with in all respects. Thereafter the PROJECT MANAGER shall from time to time ascertain that premiums are duly paid up by the Contractor who shall if called upon to do so, produce receipted premium renewals for the PROJECT MANAGER's inspection.</p>		
<b>B</b>	<p><b>PROVISIONAL WORK</b></p> <p>All work described as "Provisional" in these Bills of Quantities is subject to re-measurement in order to ascertain the actual quantity executed for which payment will be made. All "Provisional" and other work liable to adjustment under this Contract be left uncovered for a reasonable period of time to enable all measurements needed to be taken by the PROJECT MANAGER. Immediately the work is ready for measuring, the Contractor shall give notice to the PROJECT MANAGER. If the Contractor makes default in these respects, he/she shall if the PROJECT MANAGER so directs uncover the work to enable all measurements to be taken afterwards reinstate at his own expense.</p>		
<b>C</b>	<p><b>ALTERATION TO BILLS, PRICING ETC.</b></p> <p>Any unauthorized alteration or qualification made to the text of the Bills of Quantities may cause the Tender to be disqualified and in any case be ignored. The Contractor shall be deemed to have made allowance in his/her prices generally to cover any items against which no price has been inserted in the Priced Bills of Quantities. All items of measured work shall be priced in detail and the Tenders containing Lump Sums to cover trades or groups of work must be broken down to show the prices of each item before they will be accepted.</p>		
<b>D</b>	<p><b>BLASTING OPERATIONS</b></p> <p>Blasting shall only be allowed with the express permission of the PROJECT MANAGER in writing. All blasting operations shall be carried out at the Contractor's sole risk and cost in accordance with any Government regulations in force for the time being and any special regulations laid down by the PROJECT MANAGER governing the use and storage of explosives.</p>		
	<b>Carried to Collection</b>		

ITEM	DESCRIPTION	KSHS.	CTS.
<p><b>A</b></p> <p><b>MATERIALS ARISING FROM EXCAVATIONS</b></p> <p>Materials of any kind obtained from excavations shall be the property of the Client. Unless the PROJECT MANAGER directs otherwise such materials shall be dealt with as provided in the Contract. Such materials shall only be used in the works, in substitution for materials which the Contractor will otherwise have had to supply with the written permission of the PROJECT MANAGER. Should such permission be given, the Contractor shall make due allowance for materials so used at a price to be agreed.</p> <p><b>B</b></p> <p><b>PROTECTION OF THE WORKS</b></p> <p>Provide protection of the whole of the works contained in the Bills of Quantities, including casing, casing up, covering or such other means as may be necessary to avoid damage to the satisfaction of the PROJECT MANAGER and remove such protection when no longer required and make good any damage which nevertheless have been done at completion free of cost to the Government.</p> <p><b>C</b></p> <p><b>REMOVAL OF RUBBISH ETC.</b></p> <p>Removal of rubbish and debris from the buildings and site as it accumulates and at the completion of the works and remove all plant, scaffolding and unused materials at completion. The contractor is required to develop an integrated solid waste management plan and allow for construction of a simple kiln as directed on site to the</p>			
	<b>Carried to Collection</b>		

ITEM	DESCRIPTION	KSHS.	CTS.
<b>A</b>	<p><b>WORKS TO BE DELIVERED UP CLEAN</b></p> <p>Clean and flush all gutters, rainwater and waste pipes, manholes and drains, wash (except where such treatment might cause damage) and clean all floors, sanitary fittings, glass inside and outside and any other parts of the works and remove all marks, blemishes, stains and defects from joinery, fittings and decorated surfaces generally, polish door furniture and bright parts of metal work and leave the whole of the buildings water tight, clean, perfect and fit for occupation to the approval of the PROJECT MANAGER.</p>		
<b>B</b>	<p><b>GENERAL SPECIFICATION.</b></p> <p>For the full description of materials and workmanship, method of execution of the works and notes for pricing, the Contractor is referred to Ministry of Public Works and Housing General Specification dated 1976 or any subsequent revision thereof, and which shall be allowed for in all respects unless it conflicts with the General Preliminaries, Trade Preambles or other items in these Bills of Quantities.</p>		
<b>C</b>	<p><b>TRAINING LEVY</b></p> <p>The Contractor's attention is drawn to legal notice No. 237 of October, 1971 which requires payment by Contractor of a Training levy at the rate of 1/4% of the Contract Sum on all Contracts of more than Kshs. 500,000.00 in value.</p>		
<b>D</b>	<p><b>MATERIALS ON SITE</b></p> <p>All materials for incorporation into the works must be stored on or adjacent to the site before payment is effected unless specifically exempted by the PROJECT MANAGER. This includes the materials of the Main Contractor, Nominated Subcontractors and Nominated Suppliers.</p>		
<b>E</b>	<p><b>HOARDING</b></p> <p>The Contractor shall enclose the site of the works under construction with a hoarding 2400mm high consisting of iron sheets on 100x50mm timber posts firmly secured at 1800mm centres with two 75x50mm timber rails. The Contractor is in addition required to take precautions necessary for the safe custody of the works, materials, plant, public and Employer's property on the site.</p>		
<b>F</b>	<p><b>CONTRACTOR'S SUPERINTENDENCE/ SITE AGENT</b></p> <p>The Contractor shall constantly keep on the works a literate English and Kiswahili speaking Agent Representative, competent and experienced in the kind of work involved who shall give his whole experience in the kind of work involved and shall give his whole time to the superintendence of the works. Such Agent or Representative shall receive on behalf of the Contractor all directions and instructions from the PROJECT MANAGER and such directions shall be deemed to have been given to the Contractor in accordance with the Conditions of Contract.</p>		
	<b>Carried to Collection</b>		

ITEM	DESCRIPTION	KSHS.	CTS
A	<p><b>COMPLIANCE TO ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN APPROVED BY NEMA</b></p> <p>The Contractor shall at his own cost fully comply with the Environmental and Social Management Plan as per the NEMA License. He shall ensure that all mitigation measures spelt out in the plan are strictly and fully adhered to. Failure to adhere to any of the terms spelt out in the plan may lead to suspension of the works by the Project Manager with all associated costs being borne by the Contractor. The contractor's attention is drawn to the annexed Generic ESMP Preliminaries Herein.</p> <p>The ESMP for this project provides all the details of project activities, impacts,</p>		
B	<p><b>ADHERENCE TO COVID-19 PREVENTION PROTOCOLS</b></p> <p>The contractor shall at his own cost put in place Covid-19 prevention Protocols and clearly elaborate them in a Covid-19 Action Plan all in compliance with Standards for Management of Construction Sites and Welfare of Workers and the Community by TheNational Construction Authority as clearly spelt out in the Ministry of Health Guidelines i.e. screening, hand wash points, mask wearing, social distance enforcement, controlled movement, communication principles etc.</p>		
	<p><b>Carried to Collection KSHS.</b></p>		

ITEM	DESCRIPTION	KSHS.	CTS.
	<p><b>COLLECTION</b></p> <p>Brought Forward from Page 177</p> <p>Brought Forward from Page 178</p> <p>Brought Forward from Page 179</p> <p>Brought Forward from Page 180</p> <p>Brought Forward from Page 181</p> <p>Brought Forward from Page 182</p> <p>Brought Forward from Page 183</p> <p>Brought Forward from Page 184</p> <p>Brought Forward from Page 185</p> <p>Brought Forward from Page 186</p> <p>Brought Forward from Page 187</p> <p>Brought Forward from Page 188</p> <p>Brought Forward from Page 189</p> <p>Brought Forward from Page190</p>		
	<b>TOTAL FOR PART NO 5 CARRIED TO MAIN SUMMARY</b>		

**BILL NO. 6**

**ELECTRICAL INSTALLATION WORKS**

# **GENERAL ELECTRICAL SPECIFICATION**

**SECTION ONE**

**QUALITY OF MATERIALS AND WORKMANSHIP**

1. **GENERAL**

This section specifies the general requirements for plant, equipment and materials forming part of the electrical contract and shall apply except where otherwise specified.

The Contract Works must be carried out strictly in accordance with the following documents: -

- I. The 17th Edition of the "Regulations for the Electrical Requirement of Buildings" issued by the Institution of Electrical Engineers of Great Britain with local amendments.
- II. The Licence's by-laws.
- III. Relevant British Standard Specifications and Codes of Practice published by the British Standards Institution (hereinafter referred to as B.S and C.P respectively).
- IV. The Specification.
- V. The working drawings, produced by the Contractor and approved by the Engineer.
- VI. The Engineer's instructions.

The Contractor shall undertake all modifications, demanded by the authorities in order to comply with the regulations, and produce all certificates, if any, from the authorities without extra charge.

Materials and/or apparatus supplied by others for installation and/or connection by the Contractor shall be carefully examined on receipt.

Should any defects be noted the Electrical Contractor shall immediately notify the Consulting Engineer.

Unless otherwise specified all materials including equipment, fittings, cables, etc., shall be in new condition. Defective equipment or that damaged in course of installation or test shall be replaced or repaired to the approval of the Consulting Engineer. Should any replacement be necessary the Electrical Contractor shall bear the cost of substitution of all associated builder's work and making good finishes.

It is particularly necessary that all the Electrical Contractor's proposals and Working Drawings for and in connection with the Works shall be submitted early in the Contract period to facilitate co-ordination with others.

All plants, apparatus, equipment, valves, distribution boards, terminals and cable cores shall be securely and properly labelled to the approval of the Engineer. The labelling shall clearly show the identification of the item and if applicable its control function and the part of the system controlled. Labels shall be of Traffalyte sheet or equal fixed with screws or rivets.

Uniformity of type and manufacture of fittings or accessories is to be preserved throughout the whole work.

The Contractor will be entirely responsible for all materials, apparatus, equipment etc., furnished by him in connection with his work, and shall take all special care to protect all parts of finished work from damage until it is handed over to the Employer.

The work shall be carried out by competent workmen under skilled Supervision. The Engineer shall have the authority to have any part of the work taken down or changed, which is executed in an unsatisfactory manner.

2. **SWITCHGEAR**

The Switchgear shall be designed throughout to secure safety during operation, inspection, cleaning and maintenance and shall be so arranged as to minimise the risk of fire arising and spreading.

Each switchboard section shall be completed, fully wired and checked out at the factory or workshop and shall require a minimum of installation work on the site. Modular construction shall be used wherever practicable and provision shall be made for simplified servicing, replacement and maintenance throughout without major dismantling.

All switches, switch fuses, circuit breakers etc., shall be labelled in agreement with the Engineer using engraved plastic labels.

Where spaces on switchboards is provided for future components to be installed as shown on the drawings all ancillary parts such as busbars shall be provided and installed so the future components may be installed and connected with the least possible inconvenience. Full safety measures shall be provided with all such spaces.

The switchboard shall comprise the equipment shown on the drawings together with all current transformers, auxiliary fuses, labels, control wiring and interconnection necessary to facilitate transport and erection. The maximum height of the switchboard is to be approximately 2.0 metre.

A suitable connection chamber containing all field terminals shall be provided at the top or bottom of the switchboard as appropriate.

Before manufacture, the Contractor shall submit to the Consulting Engineer for approval detail drawings showing the layout construction and connection of the switchboard.

All fuse switches are to comply with B.S 3185 and shall have a fault rating at least equal to the fault rating of the switchboard in which they are installed. Cartridge fuse links to B.S 88 category A.C 46, Class Q1 and fusing factor not exceeding 1.5 shall be supplied with each fused switch.

Mounting arrangements shall be such that individual complete fuse switches may be disconnected and withdrawn, when necessary, without extensive dismantling work. Where switches are arranged in tier formation all necessary horizontal and vertical barriers shall be provided to ensure segregation from adjacent units.

All busbars and busbar connection shall be clearly marked with colours according to the phases, red, yellow, blue and black for neutral.

The busbars shall be orderly arranged in the panel and furthermore so the extensions to both sides may be made in the future.

Removable insulated shields shall be provided for protection against contact with live parts. All panel arrangements shall be of sufficient mechanical strength to withstand the influences of short-circuit currents.

All wiring within each switchboard shall be orderly laced and bonded to the panel structure, the wiring insulation being coloured according to the above busbar colour scheme.

Where wiring passes through holes in metalwork protection by rubber bushes shall be provided.

Where single core cables are used care shall be taken to prevent hysteresis.

Conduit and cable entries shall be provided at top and bottom end.

Where wiring is installed to panels which are supplied and installed by others the cables shall be brought into the panel and sufficient length left to permit the making off and connection by others to the terminals.

Similarly, where wiring is installed by others to a panel supplied under this contract, the final connection of the cables of the terminals shall be carried out as part of this contract.

Standard colour phase disc shall be fixed on all panels to indicate to which phase the various components are connected.

Each panel shall be fitted internally with circuit lists and a schematic drawing showing the distribution system, mounted on a glazed frame.

Control-voltage of all contactors, automatic switchgear and motor-protection gear shall be 230/240V.

The short circuit of all circuit breakers, switchgear and motor control gear shall be in accordance with British Standard.

Where the requirement for miniature circuit breakers is indicated on the drawings, the Distribution Boards shall be fitted with moulded thermoplastic units of the combined thermal overload and magnetic short circuit tripping type B.S.S 3871 Part 1 (1984) having clearly marked "ON" and "OFF" positions. MCB's of all ratings shall have minimum short circuit current breaking capacity of 3,000 A.

### 3. **CABLES AND CONDUCTORS**

All cables shall be delivered to the site in their original packing with all seals intact.

Cable dimensions shall comply with the rules and regulations and with the information given on the drawings or in the specifications.

All cables shall conform to British Standard. No cable dimensions smaller than 1.5 sq.mm shall be used for light and control circuits.

An anti-corrosive paste shall be used where aluminium cables are connected to copper or brass elements in switchboards etc.

Cables in vertical runs shall be clamped in such a way that stresses in the cables are avoided.

Where no trays or trunking is installed, the cables shall be fixed to structures by means of screw fixed saddles.

Common saddles shall be used where cables are grouped. All cables shall be terminated with suitable compression type cable glands of the correct size.

All low voltage cables shall be of 440 volt grade unless otherwise specified.

Where specified or where installed in corrosive situations they shall be sheathed with PVC sleeves.

Cable routes are indicated on the drawings for tender purposes but the exact final routes shall be agreed with the Consulting Engineer.

All work including builder`s work shall be carried out by the Electrical Contractor, who is to include for the supply and installation of all jointing materials, cable supports, steel racking and making all the necessary cable joints. The cables shall be installed and tested in strict accordance with the appropriate clauses of the IEE Regulations, the Factories Acts and B.S 6346 P.V.C Insulated Cables.

Cables shall at all times be handled with care and every effort made to avoid damage.

Unloading, rolling to position and mounting of cable drums shall be carried out efficiently and carefully in the recognized manner and cable shall be pulled from the top of drum. Twisting shall at all times be avoided.

Adequate numbers of drum jacks, rollers and other handling accessories shall be used. Make-shift arrangements will not be tolerated. In all cases care shall be taken to break the rotation of the drum and cable shall not be dragged over loose earth, concrete or any surface but shall be adequately supported on rollers or man-handled into position.

The Electrical Contractor shall take particular care to avoid damage to other services which may run adjacent to or across the route of the cable being installed.

Cables shall be installed with a minimum of 200 mm clearance of any equipment or pipework including lagging associated with other services.

Where this condition is unavoidable or difficult to maintain the Electrical Contractor may be called upon to divert or adjust the route of any cable so affected.

Cables shall not be installed within 300 mm of a metal roof, unless clipped to the lower side of wooden joints or otherwise protected from radiant heat.

Trenching, laying, tiling and backfilling will be carried out by the Electrical Contractor.

Cables in trenches are to be laid at a minimum depth of 0.6 m for MV cables and are to be on a 100 mm bed of sifted soil or sand and a further 100 mm shall be added before laying cable covers in position. The sand bedding and covering will be carried out by the Electrical Contractor.

Where laid in trenches the cables are to be completely protected by inter-locking concrete or other approved cable covers indelibly marked "DANGER -HATARI", to be supplied and laid by the

Electrical Contractor.

Cables shall cross roads and enter buildings by means of 100 mm diameter heavy gauge PVC ducts or similar non-corrosive pipes.

These shall be laid at minimum depth of 85 mm and extend at a distance of 600 mm on either side of road, etc.

The Electrical Contractor shall supply and install concrete marker posts at each cable entry into a building, each change of direction, each road or pathway crossing and throughout the length of the cable at intervals not exceeding 50 metres.

The position of all cable marker posts shall be agreed with the Architects and Consulting Engineers before installation.

The Contractor will supply and install 100 mm diameter heavy gauge PVC ducts as indicated on the relevant drawings.

After the installation of cables all ducts shall be adequately sealed to prevent the ingress of moisture.

The sealing substances shall be of the non-hardening type.

The Electrical Contractor's attention is drawn to the fact that all cable sizes and fuse ratings given in the Specification and/or Contract Drawings are based on the use of cables with copper conductors unless specifically specified to the contrary.

An approved system of compression terminals as recommended by the cable manufacturers shall be used for all aluminium cables and all copper conductor cables above 35 sq.mm conductor size.

The greatest care shall be taken when terminating mineral insulated cables and insulating tests shall be taken 24 hours after a cable has been sealed.

Mineral insulated cables shall, where no cable trays exist, be fixed by copper clips of an approved design at maximum 35 cm centres on vertical runs and maximum 25 cm centres on horizontal runs.

Through joints will only be allowed at runs exceeding the length to which cables can be manufactured.

Sealing of mineral insulated cable ends shall be by means of cold screw-on type seals and universal glands of same manufacture as the cable.

No flexible cords smaller than 0.5 sq.mm shall be used.

#### 4. **WIRING**

Wiring shall be carried out in an approved type of PVC insulated single core copper conductor cable.

The colours of the cores shall comply with the colour code requirements of the IEE Regulations.

Cables shall be drawn in at accessories, distribution boards and switchgear after the erection of the conduit system.

Low voltage cables and medium voltage cables shall be enclosed in entirely separate conduits.

Under no circumstances shall it be permitted to draw cable into an incomplete section of the conduit

installation. The wiring looping shall be carried out on the terminals of main switches, and socketed outlets, etc., and fixed apparatus only. No joints shall be made in boxes unless approved.

The cable shall run in the conduit so as not to exceed the capacities as set out in Tables 12A, 12B, 12C and 12D of the IEE Regulations (15th Edition) with current amendments.

Where fittings and accessories require earthing, an earth continuity conductor shall be run through the conduit. The earth continuity conductor shall be a bare copper wire of minimum size 2.5 sq.mm and shall be continuous between terminals.

All metal boxes shall be equipped with an earth terminal. 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 the particular final sub-circuit.

Attention is drawn of the requirements to install earth continuity conductors when plastic conduit systems are used. The load and return conductors of the same circuits or circuit shall, in all cases, be drawn in the same conduit.

Not more than six final sub-circuit cables shall be run in conduits feeding outlet boxes without the approval of the Consulting Engineer.

Not more than eight cables running straight back to the distribution board shall be enclosed in any one conduit.

The arrangement and size of telephone conduits is to be such as will accommodate the number of circuits as indicated on the contract drawings.

Where conduits enter adaptable boxes, each conduit is to be numbered to indicate the outlet point which it feeds. Unless otherwise stated on the drawings, conduits will terminate in standard metal boxes to B.S 1363 with flush fitting cover plate. Draw wires of piano quality steel wire of not less than 22 swg. are to be left in all telephone conduits.

Draw-in boxes are required in telephone conduits on the same basis as laid down for power and lighting.

Telephone outlet boxes, draw-in boxes and the telephone distribution boxes are to be marked internally with yellow paint to distinguish them from boxes provided for other services.

Flexible cords shall be of 250-volt grade VR or PVC insulated and shall comply with B.S 6007 and 6500. No flexible cord smaller than 0.7 sq.mm shall be used. Flexible cords for pendant fittings shall be circular, heat resistant type, white finish.

## 5. **CONDUIT, TRUNKING AND ASSOCIATED FITTINGS**

Surface conduit shall be run in square symmetrical lines and shall be marked on site for approval before installation. Conduit shall be fixed by means of distance saddles spaced at not more than 1.2 m (for 20 and 25 diameter conduit) and 1.5 m for larger sizes, for steel conduits and 0.9m for PVC

conduits.

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 0.9 m. Where conduit is concealed behind plaster it shall be sunk to a depth of either 15 mm below finished plaster level, or installed flush with the structural wall level before application of plaster, whichever is the lesser depth.

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 filled with paper to prevent ingress of concrete, and all 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. Conduit shall be installed after the first grid of steel reinforcement work is securely fixed and all open ends of conduit 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.

Where straight runs of conduit are installed, draw-in boxes shall be provided at distances not exceeding 15 metres.

Immediately prior to installing the wiring all conduit and fittings shall be dried and cleaned out by drawing through a cloth swab.

Conduit shall be installed in such a manner as to prevent interference with other services and shall be kept at least 150 mm clear gas or water pipes, and heat in excess of 70°C.

Where conduit runs enter specified areas requiring flameproof equipment, barrier boxes shall be inserted immediately before the conduit enters the flameproof area. All conduits installed within this area shall be solid drawn 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 889, and Code of Practice C.P 1003.

Steel-Conduits shall be of heavy gauge Class B Welded to British Standard Specification B.S 31.

In no case will conduit smaller than 20 mm diameter be used on the works. Conduits installed within buildings shall be black enamelled finish except where specified otherwise.

Where installed externally or in damp conditions they shall be galvanised.

Conduit fittings, accessories or equipment used in conjunction with galvanised conduits shall also be galvanised or otherwise as approved by the Consulting Engineer.

Plastic-Conduit shall be best quality new super high impact grade heavy gauge Class "A" rigid PVC unplasticized conduit as or similar to manufacture Egatube Africa Ltd., suitable for plain connections or as specified.

The conduit shall be bent and formed strictly in accordance with the manufacturer`s instructions.

Small sizes i.e. 20 mm diameter and 25 mm diameter 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° to allow for "spring back".

Larger sizes of conduit shall be pre-heated before inserting rubber cord to prevent kinking. Conduits badly formed or bent, or damaged in any way, shall not be used.

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

All conduit fittings and accessories including couplers, ordinary clips, saddles, pipe hooks, reducers, stopping plugs, locknuts and male and female bushes shall be manufactured dimensionally, similar to B.S 31/1940 where applicable. Solid tees shall not be used.

Solid inspection elbows or bends or inspection tees shall be used only in exceptional circumstances and then only with the approval of the Consulting Engineers.

A means of expansion shall be provided in conduit runs in excess of 10 m without any bend or set, by use of expansion couplings, which shall be used at building expansion joint.

Where ceiling roses occur and the ceiling box is recessed below the finished level of the ceiling, suitable extension rings to accommodate the ceiling roses must be provided.

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

Metal trunking shall be fabricated from mild steel of not less than 18 swg.

All sections of trunking shall be rigidly fixed together and attached to the framework or fabric of the building at intervals of not less than 1.2 m.

Joints in trunking shall not overhang fixing points by more than 0.5 m.

All trunking shall be made electrically continuous by means of 25 x 3 mm copper links across each joint and where the trunking is galvanised, the links shall be made by galvanised flat iron strips.

All trunking fittings (i.e. bends, tees, etc.) shall leave the main trough completely clear of obstruction and continuously open except through walls and floors, at which points suitable fire resisting barriers shall be provided as may be necessary. The inner edge of bends and tees shall be chamfered where cables larger than 35 sq.mm are employed.

Where trunking passes through ceilings and walls the covers shall be solidly fixed to 150 mm either side of ceilings and floors and 50 mm either side of walls.

Screws and bolts securing covers to trunking or sections of covers together shall be arranged so that damage to cables cannot occur either when fixing covers or when installing cables in the trough.

When trunking is used to connect switchgear or fuse boards, such connections shall be made by

trunking fittings manufactured for this purpose and not by multiple conduit couplings.

When vertical sections of trunking are used which exceed 4.5 m in length, staggered tie off points shall be provided at 4.5 m intervals to support the weight of cables.

Unless otherwise stated, all trunking systems shall be painted as for conduit.

Cable tray shall be fabricated from perforated mild steel tray of minimum 14 swg. with return flanges and coupling pieces for rigidity and strength.

Unless otherwise stated in the Specification of Works the cable tray shall be painted grey enamel for indoor use and shall be hot dipped galvanised for outdoor locations.

Cable tray shall be appropriately fixed on robust and substantial brackets fixed into the walls or shall be suspended on rods securely fixed to the structure together with a bracket arrangement as required to facilitate the mild steel. Brackets of suspension supports shall be provided as necessary, the spacing of which shall not exceed 2.0 m.

Where the cable tray changes direction the minimum radius of bends shall not be less than 300 mm on the inside of the bend and in no case shall it be less than bending radius of the cable supported.

All brackets, suspension rods and attachments shall be finished as the cable tray supported.

The total length of bus-bar systems shall be determined from the Drawings for tender purposes, but the measurements must be checked on site prior to manufacture.

Fixing brackets for wall fixing shall be provided at not less than 1.8 m intervals. Phase colours shall be clearly marked.

Where the rising bus-bar systems are carried through floors, a barrier of fire resisting material shall be incorporated in the trunking at each floor level to prevent the possible spread of fire between floors.

A 25 x 3 mm copper tape shall be installed externally for the full length of the bus-bar trunking. The tape shall be bonded to each section at intervals not exceeding 1.2 m by means of 10 mm brass bolts, washers and locknuts.

## 6. **EARTHING**

Where protective multiple earthing (PME) is provided by the Electricity Supply Authority, the earthing lead shall be connected to the consumer's earthing terminal together with the neutral conductor of the installation, shall be so arranged that connection to the neutral conductor of the incoming supply can be carried out by the supply undertaking.

The earthing of the installation shall comply with the requirements laid down in Chapter 54 of the IEE Regulations. In addition, provision for earthing the neutral conductor shall be made for each distribution main.

An earth electrical system shall be installed at a point adjacent to the main supply intake and at every building served by the external distribution system.

Each earth electrode shall be a 12 mm diameter copper rod driven to depth of 1300mm. In rocky soil

conditions, where depth is difficult to obtain, the Contractor shall obtain written approval from the Consulting Engineer for an alternative earth electrode system. The electrode shall be connected via a green PVC insulated 2.5 sq.mm copper wire to an earth terminal adjacent to the incoming supply to which all cable armouring, conduit, trunking, switchgear etc., shall be bonded, together with all other metallic incoming services, e.g. water, gas etc.

Earthing arrangements and the resistance of the earth continuity conductor shall comply with the current 15th Edition of the IEE Regulations. In particular, attention is drawn to Regulations 542-1 to 547.

In situations such as bathrooms, kitchens, laundries or any situation where there is exposed metal and socket outlets or fixed appliances are installed all, metalwork including hot and cold water pipes, waste pipes, metal distribution boards, the casings of electrical appliances, etc., shall be effectively bonded to the earth continuity conductor of the electrical installation so as to ensure that no difference in electrical potential can arise between these items.

Attention is drawn to the IEE Regulations to the effect that the resistance of the earth continuity conductor shall not exceed 0.5 ohm.

7. **TESTING ON SITE**

The Contractor shall conduct during and at the completion of the installation and, if required, again at the expiration of the maintenance period, tests in accordance with the relevant section of the current edition of the Regulations of the Electrical Equipment of buildings issued by the IEE of Great Britain, the Government Electrical Specification and the Electric Supply Company's By-Laws.

Tests shall be carried out to prove that all single pole switches are installed in the "Live" conductor.

Tests shall be carried out to prove that all socket outlets and switches are connected to the "Live" conductor in the terminal marked as such, and that each pin is effectively bonded to the earth continuity system. Tests shall be carried out to verify the continuity of all conductors of each "ring" circuit.

Phase tests shall be carried out on completion of the installation to ensure that correct phase sequence is maintained throughout the installation. Triplicate copies of the results of the above tests shall be provided within 14 days of the witnessed tests and the Contractor will be required to issue to the Consulting Engineer the requisite certificates upon completion as required by the Regulations referred to above.

Any faults, defects, or omissions or faulty workmanship, incorrectly positioned or installed parts of the installation made apparent by such inspections or tests shall be rectified by the Contractor at his own expense.

The Contractor shall provide accurate instruments and apparatus and all labour required to carry out the above tests.

The Contractor shall test to the Consulting Engineer`s approval and as specified elsewhere in this Specification or in the Standard and Regulations already referred to, all equipment, plant and apparatus forming part of the works and before connecting to any power or other supply and setting to work.

Where such equipment, etc., forms part of or is connected to a system whether primarily of an electrical nature or otherwise (e.g. Air Conditioning System) the Contractor shall attend and assist in balancing, regulating, testing and commissioning, or if primarily an electrical or other system form of the Works, shall balance, regulate, test and commission the system to the Consulting Engineer`s approval.

**SECTION TWO**  
**PARTICULAR SPECIFICATION**

**1. EXTENT OF WORK**

The work to be carried out under this Sub-Contract includes the supply, on site, storage, delivery, installation, connection, testing, replacement of broken items, protecting, cleaning, energizing and leaving in serviceable condition to the satisfaction of the Architect and Engineer, guarantee and maintenance in defects, of the complete installation as herein specified on the drawings or as may be directed and shall include all such materials and equipment which, although not expressly specified, are required and are necessary to complete the installation to the satisfaction of the Architect and Engineer.

The installation comprises the following items which are more fully described in other parts of this specification.

The supply, installation and testing of: -

- a) All consumer units and splitter units.
- b) All main and Sub-Main cables.
- c) All power and lighting circuits.
- d) All final circuit switches.
- e) All 13 Amps socket outlets and fused spur unit.
- f) All earthing requirements.
- g) All underground cabling and tiling.
- h) All lighting fittings complete with lamps and tubes.
- i) The complete wiring of telephone system including conduit, and outlet
  - i. Boxes, wiring and RJ11/R45 outlet plates for the telephone installations.
- j) All earthing including earth electrodes, test clamps, earthing
  - i. Manholes, earthing and bonding leads.
- k) Excavation of earth mats.
- l) Excavation of cable trenches, sand bedding and cables.
- m) Cable ducts for underground cables.

**2. ELECTRICITY SUPPLY**

The supply of electricity to the project shall be provided by KP & Lighting Co Ltd at 415/240 volts, 3-phase 4-wire 50 Hz.

All trenching, sand bedding, tiling and backfilling for underground cabling shall be carried out by sub-contractor.

**3. TELEPHONE SERVICES**

In coming telephone services shall be carried underground by Telecom Kenya Limited.

All telephone wiring shall be carried out by a Contractor registered with Telkom (K) Ltd. The Sub-Contractor shall install a 25-diameter plastic conduit system with draw-wires from the switch box/disc case adaptable box at all blocks and loop from one telephone outlet to another. The Electrical sub-contractor shall forward the name of the contractor to undertake the telephone wiring to the engineer for approval.

All accessories shall be as MK OR EQUAL AND APPROVED or equal and approved.

**4. MANHOLES AND DUCTS**

All Manholes and ducts shall be supplied and installed by the Sub-Contractor.

Earthing Manhole

The standard earth electrode manholes shall be precast units with internal dimension 450 x 450 x 300 deep. They shall be supplied and installed by the Sub-Contractor.

**5. DISTRIBUTION BOARDS AND CONSUMER UNITS**

All distribution boards consumer units and splitter unit shall be as Schneider Electric or equal and approved.

All shall be internally labeled with circuit lists as per our drawings in type - written text.

**6. POWER INSTALLATION**

All power installations shall be carried out with Cu PVC/SC wires drawn into plastic conduits surface fixed with spacer bar saddles along roof purlins/members and concealed in walls and floors. The tender shall be based on the following heights for sockets, water heaters, other than Kitchen Equipment and plant room outlets: -

Socket outlets	300 mm a.f.f.l
Water Heaters outlets	1400 mm a.f.f.l
Switches	1400 mm a.f.f.l

Socket outlets above worktops shall be fixed at 150 mm on wall above worktop. Socket outlets in the plant room shall be fixed at 1400 mm a.f.f.l.

All accessories shall be as MK OR EQUAL AND APPROVED or equal and approved.

**7. INTERNAL LIGHTING**

All internal lighting installations shall be carried out with PVC/SC wires drawn into plastic conduits surface fixed along purlins with spacer bar saddles and concealed in walls.

Where fittings are mounted on cast-in boxes, box sizes shall be chosen such that they are completely covered by the fittings.

All lighting fittings and accessories shall be supplied by the contractor, complete with lamps, tubes and all necessary accessories.

Tubes shall be either warm white or daylight.

All accessories shall be as MK OR EQUAL AND APPROVED or equal and approved.

The rating of the switches shall be either 5A or 20A according to the load switched.

All lighting fittings shall be cleaned and the installation left in complete working order before handing over.

**8. INTERNAL TELEPHONE INSTALLATION**

The Sub-Contractor shall allow for a complete telephone conduit system as shown on the drawings.

All conduits shall be 25 mm diameter PVC concealed in floors and walls from adaptable boxes at entry to all telephone outlets.

All telephone outlet conduits shall provide easy passage for cables and shall have draw-wires left in position.

The telephone outlet shall comprise a standard flush steel box complete with moulded telephone outlet plate as MK OR EQUAL AND APPROVED mounted at 300 mm a.f.f.l.

All adaptable boxes shall be standard switch boxes complete with cover unless otherwise specified.

**9. INTERNAL TV CONDUIT INSTALLATIONS**

The Sub-Contractor shall allow for a complete TV conduit system as shown on the drawings.

All conduits shall be 25 mm diameter heavy gauge PVC concealed in floors and walls from outlet to TV outlet points.

All TV outlet conduits shall provide easy passage for cables and shall have draw in wires left in position.

The TV outlet shall comprise a standard flush through way plastic box mounted at 300 mm below ceiling level.

The adaptable box as entry shall be a standard switch box with cover.

**10. STREET LIGHTING**

All street, area and flood lighting installations shall be carried out in 2.5/4 core Cu PVC SWA PVC cable and laid underground to the lighting columns.

These shall be steel galvanised pipe columns having mounting height 5 metres and shall be as shown on the drawings. The columns shall be installed at a minimum depth of 1000 mm in the ground on 225 x 225 mm mild steel baseplate with a 20 mm diameter hole in the centre and the poles shall be surrounded by concrete upto 225 mm high.

These columns shall be painted to an approved color.

**11. LANTERNS**

These shall be of the completely enclosed type with antivandal bowl designed for side entry mounting on brackets with 38 mm diameter plain tubing. These shall be capable of accommodating one single

125 watt M.B.F./U lamp, 3-slot lamp holder connected with heat resistant cables. The lanterns shall be semi cut-off type with light output ratio of not less than 70% and shall be complete with control gear, reflector, and lamp. The lantern shall be as manufactured by "THORN" or equivalent and approved by the Engineer.

**12. EARTHING**

All the columns, lanterns and other metal parts shall be properly earthed. Electrical and mechanical continuity shall be preserved throughout the whole system from the consumer unit to the remotest columns and the earth resistance must not exceed 0.5 ohms. Every second pole must be efficiently earthed through earth electrodes by means of substantial copper clamps secured by non-rusting bolts. The lead must be visible and adequately protected. No earthing lead shall be less than 6 sq.mm in size except for the one used for earthing the lanterns where 2.5 sq.mm single core earth wire may be used.

## **GENERAL SPECIFICATION FOR FIRE DETECTION AND FIRE ALARM SYSTEM**

### **GENERAL SPECIFICATIONS OF MATERIALS AND WORKS**

#### **1.0 GENERAL**

- 1.1 This specification is to be read in conjunction with the electrical installation drawings issued by Electrical Engineer (BS). Bills of quantities and items listed in the Schedule of Units Rates shall be the basis of all additions and omissions during the progress of the works.
- 1.2 This specification states the general requirements for supplying, delivering, off-loading, assembling, co-ordination, fixing in position, connecting, inspecting, testing, commissioning and leaving in working order new, modified or additional fire detection and alarm system.
- 1.3 The work shall comprise the whole of the labour and, unless otherwise indicated, the entire supply of materials spare parts and any necessary auxiliary items necessary to form a complete installation and such tests, adjustments and commissioning as are prescribed in subsequent clauses and as may otherwise be required to give an effective working installation to the satisfaction of the CE&ME (BS) or his agent.
- 1.4 The words 'complete installation' shall mean not only the entire items of fire alarm equipment conveyed by this specification or accompanying drawings, but all the incidental sundry components necessary for the complete execution of the works and for the proper operation of the installation, whether or not these sundry components are mentioned in detail in the Bills of Quantities of this tender documents issued in connection with this contract/sub-contract.
- 1.5 Unless otherwise indicated, the following will also be carried out:
  - 1.5-1 Trenching, hole digging/drilling and backfilling.
  - 1.5-2 Duct laying and construction of cable entries and draw pits and all builders' works associated with fire alarm installation work.
  - 1.5-3 Provision of 2no. Sets of the following; as installed drawings, Installation manuals, maintenance manuals, and all test certifications documents upon successful completion of the works.
  - 1.5-4 The Engineer shall not be liable for the malfunction or complete destruction of the FACP during testing and commissioning. The Contractor shall replace such faulty or defective FACP at no extra cost to the client.

#### **2.0 WORKMANSHIP**

- 2.1 The workmanship and method of installation shall conform to the best standard practice. All work shall be performed by a skilled tradesman to the satisfaction of the Engineer.

Unskilled Helpers shall have at all time's qualified supervision.

- 2.2 Any work that in the opinion of the Engineer does not conform to the best standard practice and relevant government regulations, will be removed and reinstated at the installers' expense.
- 2.3 Permits, Certificates or Licenses must be held by all tradesmen for the type of work in which they are involved where such permits, certificates or licenses exist under Government legislation.

### **3.0 PROCUREMENT OF MATERIALS**

No assistance shall be given in the procurement or allotment of any material or products to be used in and necessary for the construction and overall completion of the works.

### **4.0 TYPE OF FIRE ALARM PANEL**

- 4.1 The type of the fire alarm control panel (FACP) shall be as specified in the particular specification of the tender document and where such specifications do not exist, the type of fire alarm supplied by the contractor shall be deemed to meet the requirements of the General Specification.
- 4.2 The requirements related to the level of protection, zoning of detectors and call points, circuiting and grouping of fire alarm devices, circuit arrangements (open or closed), circuit monitoring, two -stage alarms, repeater indicators panels shall be as specified in the Bills of Quantities.
- 4.3 Operation of ancillary services and connections to a central fire alarm station if specified shall be done in consultation with the relevant Fire brigade Authority/ Municipal Council or Police Department and Chief Fire officer Ministry of Public Works or any other method as provided for in the tender document.
- 4.4 All components in the fire alarm system must be compatible with each other and shall be installed in accordance with the manufacturer's recommendation. Components from different manufacturers shall only be used with the approval of the project Engineer and such usage must be as recommended by the FCAP manufacturer. Where such approval has been granted to the contractor, the contractor still remains liable for sound installation of the entire fire alarm system.
  - 4.5.1 Systems involving detectors shall be so designed that removal of one detector indicates a fault but does not render other detectors inoperative. Provision shall be included so that testing of individual detectors can be made without sounding an alarm, shutting down plant etc. nor necessitating the complete system to be disabled to prevent an alarm being raised.

## **5.0 REGULATIONS AND STANDARDS**

- 5.1 Mounting height shall be as indicated in the provided drawings or as directed by the Engineer.
- 5.2 A logbook shall be provided to enable records to be kept of inspections and tests of the system and of incidents, together with their cause and action taken.
- 5.3 The fire alarm system shall include requirements for the system components typical of, but not limited to, those below:
  - 5.3.1 Manual call points (Breakglass)
  - 5.3.2 Smoke detectors
  - 5.3.3 Duct smoke detectors
  - 5.3.4 Linear beam smoke detectors
  - 5.3.5 Fixed temperature heat detectors
  - 5.3.6 Rate of rise heat detectors
  - 5.3.7 Fire gas detectors
  - 5.3.8 Flame detectors
  - 5.3.9 Combination detectors
  - 5.3.10 Indicating devices
  - 5.3.11 Indicating appliances – i.e LED beacons
  - 5.3.12 Fire alarm control panel (F ACP)
  - 5.3.13 Output relays
  - 5.3.14 Sounders
  - 5.3.15 Remote indicators
  - 5.3.16 Door retainers
  - 5.3.17 Beam detectors
- 5.4 Installation of each of the above items shall comply with all relevant statutory instruments, Particular Specifications and regulations including the following:
  - 5.4.1 Regulations for Electrical Installations' latest edition, issued by the Institution of Electrical Engineers, including all the Appendices contained therein, and referred to herein as the 'IEE Wiring Regulations' and the associated guidance notes;
  - 5.4.2 Regulations and requirements of CCK.
  - 5.4.3 Current regulations by Kenya Bureau of Standards applicable to fire detection system
  - 5.4.4 NFP A 20, Standard for the Installation of Centrifugal Fire Pumps. NFPA 70, National Electrical Code.
  - 5.4.5 NFP A 90A, Standard for the Installation of Air Conditioning and Ventilating

Systems. UL 1971, Standard for Evacuation Notification Signals.

## 6.0 DEFINITION

- 6.1 **Alarm Signal:** Signifies a state of emergency requiring immediate action. Pertains to signals from operation of an alarm initiating device.
- 6.2 **Notification Appliance:** A bell, horn, chime, flashing strobe or combination thereof
- 6.3 **Supervisory Signal:** Indicates abnormal status or need for action regarding fire suppression or other protective system
- 6.4 **Alarm or trouble Signal:** Indicates that a fault, such as an open circuit or ground, has occurred in indicating appliance circuit, initiating device circuit, or internal to F ACP.
- 6.5 **Zone:** Initiating device or combination of devices connected to a single alarm-initiating device circuit.
- 6.7 **Main F ACP:** This is an analog addressable fire alarm system or Conventional fire alarm panel located at 24 hour/day guard/ main entrance area and is responsible for protecting primary building and monitoring all sub- FACP's, and communicating selected zone information with slave FACP.
- 6.8 **Slave FACP:** An independent conventional hard-wired fire alarm system that protects a designated area within primary building. Slave F ACP exchanges selected zone information with main FACP. Main F ACP maintains certain control aspects over the slave FACP such as, resetting slave indicating appliances after main F ACP alarm initiation.
- 6.9 **Sub- FACP.;** A stand-alone fire alarm system that may be conventional or analog addressable microprocessor fire alarm system. Microprocessor based systems generally have the ability to communicate to the Main fire alarm system via a communication network. Typically, a sub FACP protects an out-building. Such as a generator house or pump house.
- 6.10 **Communication Center:** An enclosure, room or series of rooms housing electrical electronic communications equipment and systems important to Government department Fire Safety and Hazard Control Division.ie City council/Local council/urban Council fire brigade, Police and Ministry of Roads and Public Works reporting desk represented by CE&ME.

## 7.0 FIRE ALARM SYSTEM

- 7.1 The fire alarm system provided shall be complete and of non-coded fire detection and alarm system with manual and automatic alarm initiation capable of being extended. The extension shall still be controlled by the main FACP. All other systems may be conventional or microprocessor-based system provided they can properly be monitored and/, or communicate with the Main F ACP.

- 7.2 Sub Fire Alarm Control Panel shall be either of a Conventional or Microprocessor based fire alarm system. If it is a microprocessor-based system, it shall be networked to the main FACP through a Style 7 wiring.
- 7.3 The main F ACP shall share control of the sub FACP, but shall not impact negatively on the normal operation of the sub FACP in case of main FACP faults.

## **8.0 FIRE ALARM FUNCTIONS AND OPERATING FEATURES**

The following shall be the basic required system functions and operating features:

- 8.1 Priority signals to accomplish automatic response functions initiated by first shall not be altered by subsequent alarms.
- 8.2 The highest priority alarm signal shall be Supervisory signals.
- 8.3 All other trouble signals shall have second- and third-level priority.
- 8.3 Signals of a higher-level priority will take precedence over signals of lower priority, even though lower-priority condition occurs first.
- 8.4 The fire alarm system must be able to annunciate/indicate alarm signals, regardless of priority or order received.
- 8.4 Signal on one zone should not prevent the receipt of signals from another zone.
- 8.5 Zones must be wired in such a way that they are manually re-settable from the F ACP after initiating devices are restored to normalcy.
- 8.6 For analogue addressable FACP, all analog loops shall be configured with loop isolators. and wired in a manner that prevents complete failure of the loop.
- 8.7 The fire alarm system; Manual or automatic operation, must be able to initiate the correct supervisory and alarm condition.

## **9.0 WIRING FIRE ALARM SYSTEM**

The fire alarm system wiring shall conform to one or a combination of the following;

- 9.1 Style B Wiring (Class B): Initiating device circuits electrically supervised such that a single break or a single ground fault condition is indicated by a trouble signal at the F ACP no matter where break or ground fault condition occurs. A single ground fault shall not interfere with alarm receipt capability.
- 9.2 Style Y Wiring (Class B) Notification appliance circuits shall be electrically supervised such that a single short, short to ground, and open fault are indicated with a trouble signal at the FACP. Alarm capability during abnormal conditions can be processed when a short to ground fault is present.
- 9.3 Style Z Wiring; (Class A) Notification appliance circuits electrically supervised such that a single short, short to ground, and open fault are indicated with a trouble signal at the F ACP. Alarm capability during abnormal conditions can be processed when a short to ground fault

and when a single open fault is present.

- 9.4 Style 4 Wiring: Signaling line circuits (SLC) are analog initiating device class 'B' circuits used in addressable systems. During abnormal conditions such as single open, single ground, wire to wire short, wire to wire short & open, wire to wire short & ground, open and ground and loss of carrier, these circuits shall indicate a trouble condition at the F ACP. Alarm capability when a single open or single ground occurs is a requirement of this style circuit.
- 9.5 Style 6 Wiring: Signaling line circuits (SLC) are analog initiating device class 'A' used in addressable systems. During abnormal conditions such as single open, single ground, wire to wire short, wire to wire short & open, wire to wire short & ground, open and ground and loss of carrier, these circuits shall indicate a trouble condition at the F ACP. Alarm capability when a single open or single ground occurs is a requirement of this style circuit.
- 9.6 Style 4 Communications: A 'one-way' communication network that provides integral or external network communications to other systems.
- 9.7 Style 7 Communications: A 'two-way' communication network that provides integral or external network communications to other systems.
- 9.8 Conventional Hard-Wired System: Alarm, supervisory, and initiating devices directly connected through individual dedicated conductors, to a central control panel without use of multiplexing circuits or devices.

## **10.0 POWER SUPPLY**

- 10.1 Power supply for Fire alarm system from KPLC shall be obtained from a dedicated emergency power circuits. Circuit breakers shall be fitted with a suitable MCB fitted with a lock requiring removal to operate. The circuit must be dedicated for used only for fire alarm. Each circuit used for fire alarm purposes shall be permanently labeled for function exclusively for the alarm function,
- 10.1 Secondary power supply shall be provided using sealed gelled electrolyte batteries (non-maintained type). For all fire alarm functions. The battery supply shall be calculated to operate loads in a supervisory mode for twenty-four hours with no primary power (KPLC) applied and, after that time, operate in alarm mode for five minutes conventional evacuation notification or two hours voice evacuation notification. Fifteen minutes of all call paging will be considered the equivalent of two hours normal paging use.
- 10.2 Batteries shall be sized at 125% of the calculated size to compensate for deterioration and aging during the battery life cycle. Battery calculations shall be submitted to CE&ME to justify the battery size.
- 10.3 Provide battery charging circuitry for each standby battery bank in the system. The charger shall be automatic in design, adjusting the charge rate to the condition of the batteries. All

system battery charge rates and terminal voltages shall be read using the fire alarm control panel LCD display in the service mode, indicating directly in volts and amperes. Meters reading in percentage are not acceptable.

10.2 Fire Alarm Power Supply switch must be painted red and label "FIRE ALARM."

## **11.0 HEAT/SMOKE/BEAM/COMBINATION DETECTORS**

11.1 Detection technologies using time delays to verify the existence of an alarm. Condition shall not be acceptable.

11.2 Detectors shall be rated at 57°C fixed, and 8.3 cm per minute rate of rise temperatures. Detectors shall be constructed to compensate for the thermal inertia inherent in conventional type detectors due to the thermal mass, and alarm at the set point of 57°C.

11.3 The detectors shall be spaced as per the manufacturer guidelines.

11.4 Detector bases shall be low profile twist lock type with screw clamp terminals and self wiping contacts.

11.5 Flame detectors shall be of ultraviolet light (UV) type or infra red (IR) or a combination of the two. The detectors must be positioned with unobstructed view of the protected area

11.6 The smoke detector shall be of the photoelectric type for detecting smoldering fires and ionization type for detection of flaming fires

## **12.0 MANUAL CALL POINT.**

12.1 Provide single action manual stations were shown on the drawings, The manual station installed shall be flush or surface mounted as required in the Bills of quantities.

12.2 The manual station shall be equipped with terminal strip and pressure style screw terminals for the connection of field wiring.

12.3 Surface mounted manual stations shall be mounted using a manufacturer's prescribed matching red enamel outlet box as indicated on the drawings/ or BQ.

## **13.0 REPLACING OLD/OBSOLETE FIRE SYSTEM**

13.1 Existing Fire Alarm Equipment must be Maintain fully operational until new equipment has been tested and accepted. As the new equipment is being installed, label it "NOT IN SERVICE" until new equipment is tested and commissioned. Remove tags from new equipment when put into service and tag existing/old/obsolete fire alarm equipment "NOT IN SERVICE" until removed from building.

13.2 After acceptance of new fire alarm system, remove existing disconnected fire alarm equipment, and restore damaged surfaces. Package operational fire alarm and detection equipment that has been removed and deliver to Client as directed by Chief electrical and Mechanical Engineer.

## **14.0 CLEANING AND ADJUSTING**

- 14.1 All paint splatters and other spots, dirt and debris must be removed once the installation is complete.
- 14.2 Clean internal surface of all units installed using methods and materials recommended by the manufacturer.
- 14.3 Provide the services of Manufacturer's factory authorized service representative to demonstrate and train Government maintenance personnel as specified below;
- 14.3.1 After completion of commissioning, the contractor must arrange for training of Ministry of roads technical personnel in procedure and schedules involved in operating, troubleshooting, servicing, and preventive maintenance of the system installed. The training offered shall run for not less than eight (8No.) Hours.
- 14.3.1 Schedule training with client personnel at least twenty-one days in advance. The training offered shall cover general usage/operation of the installed system
- 14.3.2 The contractor shall also be required to provide 6 copies of Manufacturers standardized and comprehensive system operation and user manuals covering all equipments installed.
- 14.3.3 The contractor shall also provide 6 copies of instructions listing routine maintenance procedures and noting possible breakdowns. Provide repair and troubleshooting guide, which lists common causes for breakdowns, malfunctions, and recommended repairs.

## **15.0 TESTING**

- 15.1 Pre-testing and Commissioning: Activities to be performed by manufacturer's-authorized service representative prior to final acceptance by Chief Electrical and Mechanical Engineer on behalf of the Government of the Republic Kenya.
- 15.2 CE&ME representative will be present during commissioning to witness and certify successful operation of: fire alarm systems.
- 15.3 Product data for system components including descriptive and technical literature, catalogues and installation instructions, Dimensioned plans and elevations showing minimum clearances and installed features and devices including list of materials and UL listed data must be provided by the contractor.
- 15.4 The contractor shall provide operation and maintenance data. Provide data for inclusion in Operating and Maintenance Manual. The data so provided must be for each product type, their features and operating sequences, both automatic and manual as well as recommendations for spare parts to be stocked at site. The names, addresses, and telephone numbers of service organizations that have stock of spare parts for system must be given.
- 15.5 The contractor shall also provide as installed drawing showing floor plans and the location of all fire alarm device. 3nos. copies of point-to-point wiring diagram reflecting all wiring to all

devices, including number, size, type of conductors and size and type of conduit must also be provided.

15.6.1 Battery calculations that meet manufacturers and NFPA requirements must be provided. The battery supplied must meet the demands of the entire fire alarm system installed.

15.7 Provide product certification signed by manufacturers of fire alarm system components or their local authorized distributor, certifying that the products comply with indicated requirements.

15.8 Identify and mark all wiring.

15.9 Provide operating instructions for FACP

## **16.0 COMMISSIONING**

16.1 Test each initiating and indicating device for alarm operation and proper response at control unit Test smoke detectors with actual products of combustion. Test sensitivity of each initiating device with analog sensitivity equipment in accordance with Ministry Public Works testing and commissioning guide. Use test equipment designed to allow anyone to test proper operation of detectors utilized. Retain equipment and special tools at site through the time period when pretesting and testing work is to be completed.

16.2 Test system for specified functions according to Manufacturer's operating and maintenance manual. The contractor shall systematically initiate specified functional performance items at each station including making every type of possible alarm and monitoring initiation and using every communication option. For each item, observe related performance at devices as per the requirement. Observe indicating lights displays, signal and enunciator indications.

16.3 Test both primary power and secondary power. Verify, by test that secondary power system is capable of operating system for the period and in manner specified.

16.4 Measure resistance Signal Line Circuits (SLC). Maximum line resistance for Style 4 circuit (both wires) is 100 ohms, when using Style 6, the total allowable resistance is 100 ohms (25 ohms per conductor).

16.5 Measure resistance of communication network circuit Maximum allowable line resistance is 80 ohms (both wires).

16.6 After pre-testing is complete, provide letter certifying installation is complete and fully operational; include names and titles of witnesses present during pretesting.

16.7 Correct deficiencies indicated by tests, and completely retest work affected by such deficiencies. Verify by system tests that total system meets requirements and complies with applicable standards.

16.8 Provide a written record of inspections, tests, and detailed test results, in the form of test log. All smoke detector sensitivity voltage measurements must be properly documented. Submit log upon satisfactory completion of tests.

16.9 Provide 21-day minimum notice in writing when system is ready for final acceptance testing (Commissioning).

**PROPOSED ULTRA MODERN TRAINING CENTRE FOR  
MINISTRY OF EDUCATION – AT CEMASTEVA  
STRUCTURED CABLING INSTALLATIONS**

# **GENERAL SPECIFICATION FOR STRUCTURED CABLING INSTALLATION**

## **INTRODUCTION**

Structured Cabling is a set of standards that determine how to wire a data center, office or building for data or voice communications, using Category 5 or Category 6A cable and RJ45 sockets. These standards define how to lay the cabling in a star formation, such that all outlets terminate at a central patch panel (which is normally 19-inch rack-mounted), from where it can be determined exactly how these connections will be used. Each outlet can be 'patched' into a data network switch (normally also rack mounted alongside), or patched into a 'telecoms patch panel' which forms a bridge into a private branch exchange (PABX) telephone system, thus making the connection a voice port.

Lines patched as data ports into a network switch require simple straight-through patch cables at the other end to connect a computer, whereas voice patches to PABXs require an adaptor at the remote end to translate the RJ45 pin config into a 6-pin BT socket. Depending on the type of PABX, these may need to be 'master' or 'secondary' adaptors.

It is normal to see different colour patch cables used in the patch panel to help identify which type of connection is being carried, though the structured cabling standards do not require this, except in the demarcation wall field

The standards demand that all eight connectors in the Cat6 cable are connected, resisting the temptation to 'double-up' or use one cable for both voice and data. This is generally a good thing as it means that they fully support features such as Power over Ethernet which require the so-far unused brown cables.

## **GENERAL SPECIFICATIONS**

### **1. AIM OF THE PROJECT**

- a. To implement structured cabling in compliance with TIA/EIA 568B and IEEE regulations for LANs in buildings
- b. To supply standard active components, configure and set them up to used on the LANs.

### **2. REGULATIONS GOVERNING STRUCTURED CABLING**

Materials, products and installations must comply with the mandatory provisions of all applicable industrial standards viz ISO/IEC, CCK, ATM CENELEC 11801, ANSI/EIA/TIA 56, latest IEEE regulations, KEBS, Electric Power Act and rules made there under:

### **3. CABLING**

- a) All cables must pass through conduits or trunking.
- b) All cables and connectors shall be labelled.
- c) No distortion due to kinks, sharp bends or excessive hauling tension shall be allowed.
- d) Cables shall be run in a manner eliminating any possibility of strain on the cable itself or

on the terminations.

- e) Cables shall have no joints or splices.
- f) Cables shall be kept at a minimum distance of 150mm from items liable to become hot or cold.
- g) Bending radii shall be not less than eight times the overall cable diameter.
- h) The manufacturers hauling tension shall not be exceeded.
- i) All cable ties and fixings shall be tightened to support the cable loom without distortion of the cable sheath.
- j) The fibre optic cable shall be multi-mode optimal speed and with graded index, and of nominal size 62.5/125 micron.
- k) Fibre optic cable shall have a core/cladding diameter on nominal 850nm and 1300nm optical wavelength.
- l) The optic cable shall be of appropriate core with each core terminated on both ends.
- m) The enhanced UTP 4 pair shall be of cat 6 grade and exceed ANSI/TIA/EIA-568-Aj and ISO/IEC 11001 standards. Cat 6 structured cabling shall be used throughout the entire installation.

#### **4 Metal Trunking**

All metal trunking used shall be spray painted to approval and shall be fabricated from mild steel not less than 18swg (gauge) and have three compartments.

#### **Network Servers**

#### **5. PATCH PANELS**

- a) Shall conform to ANSI/TIA/EIA-568A and rack mounted.
- b) Shall be equipped with RJ45 contacts of UTP with maximum ohms sockets with capacity of 12, 24 or 48 ports.
- c) Shall be earthed.
- d) Fibre optic patch panels shall be configured to the number of strands terminated at each location.
- e) Fibre Optic patching shall be done from the cabinet housing optic boxes/ panels as well as the optic electronic equipment.
- f) Fibre Optic patch panel shall have a sliding tray.
- g) Except for patch cords used to connect NICs to the RJ45 sockets, all patch cords shall be labelled at each extremity with PVC support and intelligible marking. For other components the label shall be of stiff plastic PVC type.

## **6. NETWORK CONTROL EQUIPMENT**

- a) Active devices used at the LAN edge shall have 12, 24 or 48 ports for connection to the horizontal cabling.
- b) Active devices shall be rack mounted.
- c) Active devices for horizontal cabling shall support autosensing 10/100mbps and backbase cabling at 1000mbps.
- d) Active devices used at aggregation layer of LAN shall support IP routing.
- e) Active devices used at the LAN edge must be stackable and shall attach to the backbone cabling at 1000mbps.
- f) Where more than one active device is required to satisfactorily serve the floor data outlet distribution requirements they shall be stacked using interface operating at the backbone speed.

## **7. EQUIPMENT CABINETS**

- a) The main cabinet shall be of appropriate size.
- b) All cabinets for active devices shall conform to ANSI/TIA/EIA-568A specifications with forced cooling.
- c) Cabinets shall have adequate room for additional components typically 3U free space.

## **8. NETWORK CABINETS**

- a) Floor/ Block cabinets shall be metallic with front clear glass at least 22U and of good finish and conveniently accessible by technical personnel for maintenance.
- b) Main cabinet in the network centre to be at least 42U or equivalent and easily accessible during maintenance.
- c) Power to the cabinets shall be switched off from within the cabinets. Proper power socket cables to be supplied with the cabinets.
- d) All cabinets to conform to ANSI/TIA/EIA-568B with forced cooling and their location shall be determined on site.
- e) Support small factor pluggable (SFP) and industry leading density up to 240 of IEEE 8033 for 1000 Base-SX ports per system.

## **9. ETHERNET EDGE SWITCHES**

- a) Each floor edge switch connecting to the backbone must include at least two ports of 1000 Base X Gigabit Ethernet with GBIC support, QOS, Multiple queues with weighted round robin (WRR) scheduling and layer 3 switching and routing of IP, IPX and IP multicast traffic.
- b) Each switch in the set up should give 10/100/MBPS to the desktop.
- c) There should be adequate switches to cater for the total number of data points.

- d) The switches connecting as a backbone shall have additional 1000Base X port that shall be connected as a backup and shall be configured for automatic load balancing.

#### **10. ETHERNET CORE SWITCH**

The following are the minimum requirements for the core switch:

- a) The Backbone switch should provide minimum (10/100/1000 ports) of 24 ports of IEEE802.32 1000 Base X.
- b) The minimum switching capacity of 150 GBPS (fabric) and 45 million packets per second.
- c) Be able to run industrial standard IP multi cast at wire speed.
- d) Non-blocking integrated layer 2/3/4 switching performance.
- e) Multi-layer IOS software services with IP routing, advanced QOS, traffic management and comprehensive security.
- f) Shall be rack mounted in standard rack/cabinets.
- g) Shall have a redundant power supply for each edge switch connecting to the backbone.
- h) Shall support BGP switching.
- i) Shall support both data and voice.
- j) Shall support security features.

#### **11. ETHERNET GATEWAY ROUTER**

The following are the minimum requirements for the router;

- a) Ability to route both voice and data
- b) Should provide minimum three (3 No.) 1000Base T ports
- c) Should provide minimum of two (2 No.) ISDN ports.
- d) Should be mounted on standard rack /cabinet
- e) Should have dual processor ( voice/data)

#### **13. LABLING**

- a) Horizontal and backbone cables shall be labelled at each end. The cable or its label shall be marked with its identifier.
- b) A unique identifier shall be marked on each faceplate to identify it as connecting hardware.
- c) Each port on the face plate shall be labelled with its identifier.
- d) A unique identifier shall be marked on each piece of connecting hardware to identify it as a connecting hardware.
- e) Each port on the connecting hardware shall be labelled with its identifier.
- f) A unique identifier shall be marked on each **port** on the connecting faceplate to identify it as a connecting hardware.

**14. DRAWING**

Working drawings shall be supplied to the PM for approval showing the location of identifiers for all Horizontal cabling routes and Terminations, Backbone Routing and Terminations, Data Outlets/ Connectors and Active components etc.

**15. RECORDS**

All records shall be created and turned over to the PM at the completion of work. The format shall be computer based and both soft and hard copies shall be part of the As-built package with minimum requirements including:

- a) Cable records complete with identifiers, cable type, length, termination position at both ends, manufacturer and part number.
- b) Connecting hardware records complete with identifier, type of hardware and position.
- c) Connecting hardware positions complete with identifiers, type of position and cable identifier attached to it.
- d) Any other items that are necessary for maintenance

**16. REPORTS**

All reports shall be generated from the computer-based programme used to create the records above. These reports shall include but not limited to:

- a) Cable reports
- b) Cross connect reports
- c) Connecting hardware reports

**17. TESTING**

**General**

Testing of entire cabling system as per ANSI/TIA/EIA-568B for UTP Ethernet cables shall be performed prior to system handover.

**Fibre Optic Testing**

Testing of fibre optic shall be as per IEEE 802.32 and ANSI/TIA/EIA-568B for 1000 Base-LX/ 1000 Base-SX

**18. WARRANTY**

The cabling installation shall carry a warranty of at least 15 years and the contractor shall issue the PM with certificate from the cable manufacturer upon completion. The cost of the certification if any shall have been included in the prices. You have to specify in both technical and financial proposals the duration the issuance of the certificate will take after completion and commissioning of the installation.

**19. TRAINING**

Training of system administrators

**20. TECHNICAL PROPOSAL**

The tenderer shall provide a workable, cost effective and elaborate technical solution (proposal) to realize the installation. The proposal shall include but not limited to the following:

- a) Detailed schematic design for each floor, showing the components and their description/ identification and connectivity.
- b) Detailed network layout diagrams of the proposed solution showing interconnectivity of the building / floor layout showing switches, Routers, DTO equipment etc.
- c) Proposal for network management.
- d) Detailed work plans for the project, listing tasks, activities, datelines, persons/ teams assigned lead responsibilities for the project activities and tasks.
- e) Detailed experience and past performance of the bidder on works of similar magnitude within the last 5 years and details of current work on hand and any other contractual commitments.
- f) Qualifications and experience of key personnel proposed for administration and execution of contract, both on and off site.
- g) Detailed coloured manufacturer's Brochures detailing Technical Literature and specifications on all the active equipment they intend to supply.
- h) Technical schedule of items – Form F/2.

**21. FINANCIAL PROPOSAL**

Bidders are required to provide a separate Financial Proposal which must include the following:

- a) Valid Tax compliance certificate
- b) Price schedule for all floors
- c) Price schedule for the backbone link between buildings / floors.
- d) Price summary as indicated in the tender document

**22. IN ADDITION THEY WILL BE REQUIRED TO GIVE:**

- a) Form of Tender dully completed signed and witnesses
- b) Tender security form
- c) Confidential Business Questionnaire form
- d) Evidence of financial resources
- e) Financial reports for the past 5 years

**21. LEGEND**

ANSI	-American National Standards Institute
TIA	-Telecommunications Industry Association
EIA	-Electronic Industries Association

ISO            -International Standards Organization  
IEC            -International Electro-technical Committee

**PROPOSED ULTRA MODERN TRAINING CENTRE FOR  
MINISTRY OF EDUCATION – AT CEMASTEVA  
STANDBY GENERATOR INSTALLATIONS**



1.5 Work by Others

Construction of the Generator Room and the foundation for mounting the engines shall be carried out by others to the requirements of the Sub-contractor. The Sub-Contractor shall however be responsible for the accuracy of information regarding his requirements as declared at the time of tendering. Any subsequent changes in requirements asked for by the Sub-Contractor shall be at the expense of the Sub-Contractor.

1.6 Compliance

The Tenderer shall give a statement of compliance with this specification as part of his tender and shall be bound to that statement of compliance in all respects at all times during the execution of the works as detailed in this specification.

1.7 Employer's Staff

The Sub-Contractor shall, if requested, arrange for the training of staff nominated by the Employer at the sub-Contract's office at site or at the works of the manufacturers supplying the plant for the installation. The cost of providing adequate training within six months shall be quoted.

1.8 Patent Rights

The Sub-Contractor shall fully indemnify the purchaser and all others concerned against any action, claim or proceedings relating to the infringement of any patent or design or any alleged patent or design rights and shall pay any royalties which may be payable in respect of any design thereof shall have been supplied by the Contractor to the Purchaser.

1.9 Liaison

The Sub-Contractor shall liaise fully with the Main Contractor as mentioned in Clause 1.5.

**PART B**

**PARTICULAR SPECIFICATION AND CONDITIONS**

**INDEX**

<u>Section</u>	<u>Description</u>	<u>Page No.</u>
1	Particular Conditions	B/1 - B/2
2	Diesel Engine	B/3 - B/6
3	Generator Set	B/7 - B/11
4	Control Cubicle	B/12- B/16

**PART B**

**SECTION ONE**

**PARTICULAR SPECIFICATION AND CONDITIONS**

1.00 PARTICULAR CONDITIONS

1.01 Location of Site

The site of the proposed works on **Karen, Nairobi County**.

The following climatic conditions apply at the site of the works and all plant, equipment, apparatus, materials and installations shall be suitable for these conditions: -

Maximum temperature	30.1 <sup>o</sup> C	}	
Minimum Temperature	11.3 <sup>o</sup> C	}	
Relative humidity range	48% - 93%	}	Conditions
Altitude	<b>1700m</b> above sea level	}	for Nairobi

1.02 Description of Project

The project comprises development of **Ultra-Modern Training Centre for Data Centre**.

1.03 Scope of Sub-Contract Works

The work covered by this specification includes the supply, delivery, installation, setting to work, commissioning to the satisfaction of the Engineer, and maintenance for a period of **twelve months**, of a **1 No. 150 KVA** for the entire building **Prime Rated** Super Silent Diesel Engine Generating Set for standby operation at 3 x 415/240 volts 50 Hz, complete with **acoustic canopy and all necessary auxiliary equipment as indicated**.

1.04 Commencement of Works

The Sub-Contractor in submitting his tender shall be deemed to have included for commencing any necessary work on site at such a time as will comply with the Main Contractor's programme.

1.05 Duration of Contract

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

1.06 Contract Drawings

The Sub-Contractor shall be deemed to have studied all the relevant Contract Drawings listed or referred to in and forming part of the specification.

## SECTION 2

### DIESEL ENGINE

2.0 Cylinder Block

The cylinder block shall be made of one-piece cast iron. It shall have full length water jacket with circulation around each cylinder. The cylinder block shall have wet liners with rubber seal at the bottom end.

2.1 Cylinder Head

The cylinder head for each bank of cylinders shall be of one piece and manufactured from cast iron. It shall be secured by studs of high tensile steel and be easily detachable. Valve seats shall be replaceable.

2.2 Pistons

The pistons shall be made of die cast aluminium alloy and tapered with a ground skirt. The pistons shall have at least three compression and two oil control rings. The combustion chamber and the valve recess shall be smooth contoured. The pistons shall have fully floating pins.

2.3 Valves

The valves shall have separate guides presses into the cylinder head. Operating shall be of the normal pushrod/rocket type with tappet adjustment at the rocker arm.

2.4 Fly-Wheel

The Fly-Wheel shall be of heavy cast iron with close coupling type cast iron flywheel housing and shall have a gear ring bolted onto it. the gear ring shall have heat treated teeth.

2.5 Crank sheet

The crank sheet shall be forged steel with induction hardened main and journals. It shall statically and dynamically balance and shall have replaceable, line steel shell bearings.

2.6 Connecting Rods

The connecting rods shall be of `1' Section forged steel.

2.7 Fuel and Air System

The engine shall have a mono-block injection pump which is gear driven through flexible coupling. The fuel pump shall be integral and shall incorporate a hand primer. The engine shall have a multi-core injector nozzle. A fuel filter shall be provided complete with a replaceable element and the engine shall have a heavy duty oil bath air cleaner.

2.8 Governor

The Governor shall be of the centrifugal type operating direct on the fuel line and shall be capable of maintaining the speed constant within 33/34 of nominal output in accordance with B.S.489:1958 Class A2.

2.9 Protection

The engine shall be provided with the following protective devices capable of providing audible and visible alarm signals at one or more remote locations.

- a) Low lubricating oil pressure
- b) High lubricating oil temperature
- c) High cooling water temperature
- d) High engine speed

2.10 Instrumentation

The engine shall be provided with the following instruments to indicate various speeds and temperatures: -

- i) Tachometer indicating the engine speed.
- ii) Instrumentation to indicate the temperature of the exhaust gases.
- iii) Instrumentation to indicate the temperature of the lubrication oil.
- iv) Instrumentation to indicate the pressure of the lubrication oil.
- v) Instrumentation to indicate the pressure of the cooling water.

2.11 Auxiliary Equipment

The Sub-Contractor shall be responsible for providing the following ancillary equipment required for the installation:

- a) Exhaust piping and heavy-duty silencer including flexible piping off the engine exhaust manifold. The exhaust piping provided shall be sufficiently long to cover the route shown on the Contract Drawings. The Sub-Contractor shall liaise with the Main Contractor for the final positioning of the exhaust pipe. A masonry duct has been provided to discharge exhaust fumes at roof level.
- b) Fuel header tank **1 No. (2500 litres)** for the **1 No. 150 KVA Generator prime rated** with contents gauge, drainpipe with cock, vent, gill connection and engine supply pipe with isolating valve.
- c) Basic set of tools and special tools or gauges required for maintenance, all contained in a steel, lockable box. The tools may include but not limited to the following: -
  - set of open-ended spanners
  - set of ring spanners
  - Circlip pliers (internal and external)
  - Normal pliers
  - insulated crocodile pliers
  - set of insulated screwdrivers and hammer
  - Valve spring compression tool
  - Piston band assembling set
  - set of feeler gauges
  - valve grinding tool
  - cleaning outfit for injector nozzle
- d) Semi-rotary hand pump to be mounted adjacent to the header tank with necessary piping from pump to header tank.

2.12 Cooling System

Unless otherwise specified elsewhere, a suitable radiator shall be provided for the cooling water and lubricating oil requirements of the engine when operating under the site conditions stated. This shall be complete with engine driven fan and drive, guard for fan and drive, belt tensioner and all integral oil and water piping connections.

A suitable duct from the radiator face flange, extending to the engine room wall, total distance one metre, shall be supplied incorporating a flexible section if required.

Circulation of both lubricating oil and primary water shall be catered for by means of geared or belt driven pumps, integral with engine.

A thermostatic by-pass shall be fitted in the water outlet from the engine to give a quick warm up and even temperature control over the load range.

## Electrical Services Specifications and Bills

### 2.13 Lubrication

The engine components shall be lubricated via a pressure oil system from an integral oil pump driven by the engine. The system shall incorporate oil filter, the secondary oil filter being of the changeable type. A suitable relief valve shall be provided to maintain the pump discharge pressure within safe limits.

### 2.14 Starting

The engine shall start put by means of a D.C. motor which shall be supplied from a set of rechargeable batteries of an appropriate voltage and of such a capacity as to enable up to ten start-ups in one hour when fully charged.

### 2.15 Compliance

The equipment and installation shall comply with B.S. 649 and also with C.P. 323.

The Sub-Contractor shall in his statement of compliance confirm that the engine would be capable of running on class 'A' fuel to B.S. 2869:1957.

### 2.16 Noise Level

The Sub-Contractor shall state in his statement of compliance the level of noise in decibel expected in the engine room.

### 2.17 Ancillary Power Requirements

In selecting the size of the diesel engine, the Sub-Contractor shall make suitable allowances for power requirements for the cooling system, the lubricating system and any other requirements that may be necessary for that set.

### 2.18 Ventilation

The Sub-Contractor must ensure that adequate ventilation in the generator room is provided.

## SECTION 3

### GENERATOR SET

#### 3.0 Alternator

The alternator shall be of 12 wire reconnectable brushless type rated at 0.8. p.f. lagging in accordance with B.S. 2612:1975 and having a revolving field, a single self-aligning roller bearing and solid half coupling to connect to the engine.

The alternator shall be screen protected, drip-proof and shall be wound with high temperature, tropicalised class B insulation of the stator and class F insulation on the rotor. The stator frame shall be barrel design with conventional two-layer winding in semi-enclosed skewed slot, pitched to give a good wave-dorm with low harmonic content.

The rotor core shall be specially constructed with strip winding to obtain maximum cooling the rotor and stator.

#### 3.1 A.C. EXCITER

An A.C. exciter of direct-coupled flange mounted type shall be supplied. The exciter frame shall be of modular iron and shall serve additionally as the bearing housing. The exciter armature shall be mounted on a tub on the alternator shaft. Connections shall be taken to the rotating rectifiers, which shall be carried on aluminium castings, from the main room.

#### 3.2 Automatic Voltage Regulator

A Thyristor type static automatic voltage regulator shall be built into the machine. This regulator shall incorporate a zener diode bridge reference voltage circuit, thyristor drive reactor with series silicon diode and a further commutating diode. Under steady conditions, the automatic voltage regulator shall maintain the voltage within plus or minus 2 1/2% for all balanced loads between unity and zero lagging. The automatic voltage regulator shall be complete with hand-operated manual control potentiometer which shall be fitted in control pane.

The voltage level controls shall enable the terminal voltage to be adjustable within the range - 5% to +10%.

The Voltage drop controls shall be adjustable for proper division in reactive KVA when operating in parallel with other alternators.

The voltage gain controls shall be adjustable to compensate for engine speed variations when operating with a speed-droop governor. After any change of load, the voltage shall not vary by more than plus or minus 15% the rated voltage, and shall return to within plus or minus 3% within 3 seconds, and to within plus or minus 2.5 of rated voltage within 15 seconds. On starting, the voltage overshoot shall not exceed 15% and shall return to within plus or minus 3% within 3 seconds.

#### 3.3 Terminal Box

Any suitable dimensioned terminal box suitable for conduit or cable entry shall be supplied with undrilled gland plate.

#### 3.4 Rating

The machine shall be continuously maximum rated in accordance with B.S 2613 and shall be so derated owing to site conditions - at the specified electrical output is obtained for the alternator. The Sub-Contractor shall provide additional labelling on the generator to distinguish clearly between the nameplate ratings and the actual ratings on site. The tenderer's manufacturer's catalogue should indicate the percentage reductions from the nameplate rating resulting from altitude and inlet temperature for any of the following engine variations: -

- a) Naturally aspirated
- b) Turbo-charged without a charge air cooler
- c) Turbo-charged with a charge air cooler.

3.5 Radio Interference Suppression

The generator sets shall be suppressed for radio interference in accordance with B.S. 833 and C.P 1006.

3.6 Duty Performance

The generator will be used as a standby generator.

3.7 Generator Set Specification

The generator shall be rated for the following parameters after suitable derating for the site service conditions and allowing for power requirements for integral cooling system, lubricating system and any other integral parts of the set.

Generators output       **1 No. 150 KVA**

Power factor               0.8 lagging

No load voltage 415 volts

Phases                      3

Frequency                 50 Hz

Speed                      1500 r.p.m

Ambient Temp. Up to 45° C.

3.8 Testing and Commissioning

The Sub-Contractor shall include for fully commissioning the set and its control equipment, and for the purpose of the required tests, shall provide all necessary instruments, tools, fuel and lubricating oil.

The tests and checks shall be carried out by the Sub-Contractor in the presence of the Engineer or his representative, as applicable.

- i) Check that the main frame is level in all directions, engine and generator shafts are in proper alignment and the vibration absorbing devices are properly installed and located.
- ii) Check water and sump oil levels and that the water jacket is in working order.
- iii) Check the battery electrolyte levels and the specified gravity.
- iv) Ensure that sufficient oil is in the fuel tank for a two-hour test run.
- v) Examine the containers in which the fuel and lubricating oils were delivered and check that the type of oils is recommended for the unit.
- vi) Check that the engine block water drain points are free from sludge and other blockages.
- vii) Check engine bolts, main drive coupling, valve clearance, fuel pumps section, governor settings, pipe line connections, water hose, exhaust couplings, flexible pipe-work etc. and the ball valve and overflow work.
- viii) Check all out-going connections on the generator and at the control panel. All lugs for principal connections shall have clean and bright contact surfaces. A suitable abrasive material shall be used where necessary.
- ix) Check access panels and doors for proper opening and closing and for the functioning of any interlocks fitted.
- x) With the set isolated from the main supply and the selector switch in the 'Manual' position, start the engine by means of the 'start' push button and allow it to run up to normal speed.  
Check that during the time the engine starter motor is in operation, the main battery charger is automatically switched off to avoid its being overloaded by the reduction in voltage across the battery.

## Electrical Services Specifications and Bills

- xi) Check instruments and gauges for normal operation and response and that the generator voltage is being maintained within the prescribed limits, making due allowance for no-load conditions. Compare the reading of the frequency meter with that of the engine tachometer.
- xii) Stop engine by turning selector switch to "off" position and verify that generator contactor opens as between 95% and 85% normal voltage. Re-check water and oil levels.
- xiii) Turn selector switch to 'Auto' position. Disconnect the sensing circuit supply and check that the set starts, the mains contactor opens, and the generator contactor closes in correct order. Reconnect the sensing circuit to verify that the engine stops on restoration of the mains supply and the contactors operate correctly. Check voltage sensing time delays on each phase in turn and also that the push buttons for mains failure simulation and engine stopping operate correctly.
- NB** Running of the engine for any length of time under-no-load conditions is undesirable and tests calling for such operation should be carried out in as short a time as is consistent with thoroughness.
- xiv) Operate the necessary isolators and switches to put the set on stand-by for essential services network with the selector switch in the 'Auto' position, and using the mains failure simulation push, verify that the set operates correctly with the appropriate time delay for taking up load and that the carrying of the load and its distribution over the three phases are satisfactory.
- xv) Run the set at various loads for periods totalling at least 30 minutes. Check the voltage and current in each phase in turn and that the voltage and frequency are being maintained within the required limits with large alterations of load.
- xvi) Check the operation of the turbo-charger units and the colour of the exhaust gas at various loads.
- xvii) Check that the various engine safeguards operate satisfactorily.
- (xviii) Check the vibration absorbing devices for proper operation and that the performance of all flexible connections, both mechanical and electrical, is satisfactory.
- xix) Re-check the lubricating oil and water level, replenish the fuel oil tank and leave the set in normal operating order.
- xx) An initial supply of all lubricating oils and greases shall be provided by the Sub-Contractor.

## SECTION 4

### CONTROL CUBICLE

#### 4.0 General

The control panels shall be totally enclosed type plant mounted on anti-vibration mountings on the alternators, fitted with removable covers giving access to the control gear, terminal and connection blocks and undrilled gland plates for cables entry and shall be finished in stove enamelled grey hammer paint. The control panel shall be appropriately rated.

#### 4.1 Function

The control cubicle shall house the start/stop buttons and protection systems and shall be complete with all the necessary relays and circuitry.

#### 4.2 Control and Logic Section

Facilities shall be available with suitable circuit breakers protection for the following functions: -

- a) Manual start
- b) Manual stop
- c) Stall lock-out, i.e. a lock-out to prevent recracking of an engine upon fuel failure, or stall conditions.

#### 4.3 Protection Circuits

Suitably fused protection circuits, for oil, water, speed and one spare, shall be allowed for. The first stage protection shall be by means of fail-safe circuits while the second stage shall be energised on halt circuits. All circuits except overspend shall be commissioned after a delay following engine start-up.

The circuits for: -

- a) Lubricating oil pressure
- b) Water temperature
- c) Spare

shall be either alarm, or alarm and shut-down. The latter shall be achieved by means of a link within the control panel. The circuit for engine overspends shall give simultaneous alarm and shut down. When the engine has a faulty condition, the protection circuits shall still accept further faults. Once a shut-down signal has been given, the protection circuits shall be locked on as:

- i) Not to give further fault indication as engine stops.
- ii) To give indication of fault condition even when the engine has stopped.

The fault circuit shall be re-set by pushing the "Re-Set" button.

One audible alarm mute shall be provided for each fault channel. This shall mute the alarm for the fault causing the alarm, but shall leave the Klaxon prepared for further faults.

#### 4.4 Switching Section

A suitably fused switching section for engine functions as per list below shall be provided:

- a) Fuel rack solenoid (start or stop)
- b) Starter motor solenoid via a repeater.

4.5 Indication

Indicator lamps as per list below shall be provided:

- a) Engine running and protection circuits commissioned - green.
- b) Fault parameters - all red.

The indication circuits shall have a lamp test push button by means of which the lamp filaments can be tested.

4.6 Control Switching

A rotary switch with off/on positions, to switch the control circuit supplies. In the 'ON' position the engine shall be started by depressing a push button and stopped by depressing a 'stop' push button.

The indicators, switches and push buttons shall be mounted on the front face of the chassis unit.

4.7 Alarm

The Sub-contractor shall supply and install a Klaxon which is loud enough to be heard even when the engine is running. The supply for this Klaxon shall be obtained from the control cubicle through rated fuses.

4.8 Mains Detection

A mains detection unit which can register a mains voltage failure under the following conditions shall be provided: -

- a) Failure of any one or more phases
- b) Incorrect phase sequence
- c) Low volts on any individual or all phases - i.e below 85% of normal voltage.
- d) Excessive frequency change i.e minus or plus 3 Hz.

The failure condition shall be used to produce a start signal for the standby engine after a delay. The delay shall be adjustable and shall ensure the failure is not a transient condition.

Mains detection condition shall be used to produce a start signal for the standby engine after a delay. The delay shall be adjustable and shall ensure the failure is not a transient condition.

Mains detection units shall receive their sensing supplied from the busbars feeding the load.

4.9 The following equipment shall be provided by the Generator supplier:-

- a) Moulded case air circuit breaker, triple pole and neutral, with magnetic release to provide alternator short circuit protection, trip free handle and shunt trip.
- b) One bolted neutral link.
- c) Alternator voltage trimmer regulator
- d) 3 No. one per phase, flush mounting ammeters.
- e) 1 No. one flush mounting ammeters.
- f) 1 No. one voltmeter rotary selector switch
- g) One set of control circuit instruments and the accompanying fuses.
- h) All internal wiring, terminals, cable lugs, legends and one main earthing bar.
- i) One No. frequency meter, vibrating leaf type
- j) One No., governor motor raise and lower switch.
- k) Cable boxes and glands to suit.
- l) One No. Kilowatt-hour meter

4.10 Terminations

All internal wiring terminations shall be numbered and marked with ferrules.

4.11 Earthing

The Sub-Contractor shall be responsible for ensuring that the earthing of the generator neutral is carried out efficiently and that the resistance of the generator neutral from the earth does not exceed one ohm.

The Sub-Contractor shall be responsible for the installation of a set of earth electrodes, the electrodes shall comprise four earth rods, installed in pairs, each pair connected together and to the earth bus-bar by an insulated stranded conductor. The earth rods shall be 2m long by 15mm diameter, extensible type as "copperweld" or other equal and approved, each pair of electrodes shall be located not less than 3m apart, the first pair being not less than 3m from the building.

The head of the earth rods shall be driven to 300mm below the surface of the ground and enclosed in a concrete box with a concrete inspection cover.

The Sub-Contractor shall ensure that the earthing system of the generator is adequately bonded to the permanent earth system of the 'normal' supply.

All earthing shall be carried out in accordance with the appropriate section of the I.E.E Regulations.

4.12 Trickle Charger

The trickle charger shall have rating and service parameters such as to keep the engine start batteries fully charged and ready for service whenever required. When the engine is running the batteries shall be charged from an integral dynamo.

4.13 Hours Counter

The Sub-Contractor shall allow for the installation of an hours counter on the control panel of the generator.

4.14 Automatic Changeover Contact Unit

- a) A contactor unit shall be provided which on failure of the normal electricity supply will automatically initiate the starting of and effect the transfer of load to the stand-by generator. The unit shall contain power contactors and ancillary apparatus as specified.
- b) Failure of the normal supply shall mean complete loss of voltage or the falling below 85% of the normal voltage between any two phases or phase and neutral.
- c) The power circuit shall consist of two contactors feeding a common busbar to which the load will be directly connected. One contactor shall control the electrically and mechanically interlocked so that they cannot both be closed at the same time.
- d) On failure of the normal supply, the unit shall operate in the following manner:-
  - i) After a delay, adjustable from 0 to 5 seconds (to avoid operation by a transient dip in voltage) a signal shall be given to start the stand-by generating set.
  - ii) On receipt of a signal from the stand-by generating set that it is ready to take the load and providing that the failure of the normal supply still persists, the normal supply contactor shall close. If the normal supply has been restored before the change-over has taken place, the contactors shall not operate and the starting delay contacts shall open to initiate the shutting down of the stand-by generating set.

- e) When the stand-by supply is in operation and the normal supply is restored and remains within 10% of the rated voltage on all phases for a pre-set time (adjustable to 30 seconds) the stand-by contactor shall open and the normal supply contactors shall close; the starting relay contacts shall then open to shut down the stand-by generating set.
- f) Provision should be so made that automatic return to normal supply can be prevented if required.
- g) Once a start signal has been sent to the stand-by generating set, the engine starting sequence shall be allowed to continue until the set is ready to take the load before a stopping signal is sent.
- h) By addition of external connections the following facilities shall be available:-
  - i) Remote starting of the stand-by generating set and transfer of the load to it.
  - ii) Restoration of the normal supply on failure of the stand-by generating set.
- i) Each switch shall be labelled with its duty and each position shall be marked.

The following shall be fitted:-

- i) Contactor Hand Control switch, with make before break contacts and 'Hand' position the unit shall be controlled by the "Contactor Hand Control Switch". In the 'auto' position the unit shall operate automatically irrespective of the position of the "Contactor Hand Control Switch". In the 'auto' position the unit shall operate automatically irrespective of the position of the "Contactor Hand Control Switch".
  - ii) A contactor Hand Control Switch; with 'Stand-by' and 'Normal' position.
  - iii) An Auto Return Switch, having 'on' and 'off' positions. In the 'on' position the return to normal supply shall be automatic when the normal supply is restored.
  - iv) Contactor By-pass switches; shall be provided to enable the essential load circuits to be served direct from the normal supply to enable the generator and/or the control equipment to be serviced. The by-pass switches shall be provided with a suitable and conspicuous label warning against leaving the generator in the disconnected position.
- j) Indicating lamps shall be provided. They shall be appropriately labelled easily visible and shall give the following information.
- i) Normal supply available
  - ii) Stand-by supply available
  - iii) Normal supply in use
  - iv) Stand-by supply in use
- k) A push button labelled 'Test' shall be provided to enable a failure of normal supply to be simulated. If the button is pressed and released the equipment shall complete the starting sequence and when the set is ready to take the load it shall be shut down. If the button is held depressed the equipment shall change-over to the stand-by supply when the set is ready to take load.
- l) The control circuit supply shall be either 12 volts or 24 volts d.c depending upon the starting battery and charger. No current shall be drawn from the control supply when the unit is accepting the normal power supply.

**SCHEDULE NO. 1****SUMMARY OF INFORMATION FOR TENDERS**

The Tenderer is advised to read the relevant section of the Specification for full details of the items summarised below:

Item	Requirements	Ref. Clause
<b>1. <u>Operating conditions</u></b>		1.1
Site	Karen, Nairobi County	
Altitude	1700m above sea level	
Relative humidity range	36 - 95%	
To operate in	Unheated building	
Dust conditions	Dust laden atmosphere	
<b>2. <u>Duty</u></b>	Mains failure unit and duty power	3.7
	10 starts per hour	2.14
<b>3. <u>Performance</u></b>	<b>1 No. 150 KVA, 415 volts</b>	
	3 phase, 50 Hz	3.7
<b>4. <u>Set Arrangements</u></b>		
Weather proof roof and side panels	required	
5. Remote governor control	required	
6. Aspiration	natural	
7. Manual start	required	
8. Sump heater	not required	
9. Silencer: - details of additional pipework and fittings is required		2.11a
10. Daily service tank: capacity if other than 24 hours	...litres/.....hours	2.11b
Transfer pump	hand pump	2.11d
Auxiliary fuel tank: sitting capacity	required	
11. Fuel jettison cock for		
a) Daily service tank		
b) Auxiliary fuel tank	required	
12. Engine instruments:		
Details if not as standard		2.10
13. Cooling system required		2.12

## Electrical Services Specifications and Bills

- |                                |                             |     |
|--------------------------------|-----------------------------|-----|
| 14. Electrical control panel:  |                             |     |
| Main Switch                    | Circuit breaker             | 4.9 |
| Provision for parallel running | not required                |     |
| 15. Lock-out remote            | indication circuit required | 4.2 |
| 16. Fire service terminals     | required                    |     |
| 17. Earth fields               | required                    |     |
| 18. Building drawing           | required                    |     |
| 19. Maintenance period         | 12 months                   |     |
| 20. Sound Proof Canopy         | required                    |     |

**SCHEDULE NO. 2**  
**A. TECHNICAL DETAILS OF THE 1 No 150KVA**  
**SET OFFERED BY TENDERER**

1. Diesel Engine

Item	Details
Make	
Type	
Bore	
Stroke	
Net continuous rating (B.S. 649)	
a) At sea level	kVA
(b) At site	kVA
speed	rev/min
Year this type put into service	
Total number sold	
Total number sold	
a) Worldwide	
b) In East Africa	
c) In Kenya	
Aspiration:	
Make	
Type	
Number in use	
Thermometers:	
Make	
Type	
Air Cooling	
Quality of air required	
Details of ducting	
Water cooling	

Electrical Services Specifications and Bills

Item	Details
Details of water cooling circuits	
Radiator	
Make	
Type	Mm
Length	Mm
Breadth	Mm
Height	Mm
Aspiration	Mm
Method	
Quantity of air required	m <sup>3</sup> /s

2. **Auxiliaries**

Item	Details		
	Make	Type	Other Relevant
Lubricants Oil Circuits			
Filter			
Coolers			
Primary pumps			
Tachometer and drive Governor			
Cold start devices			
Running hours meter			
Safety devices:			
High temperature			
Low pressure (Lubricating Oil)			
Cooling water flow trip			
Overspeed trip			
Speed sensing devices			
Lubricating oil			
Thermometers:			
Number position(s)			
Water thermometer: -			
Starting Battery			
Sound Proof Canopy			
Immersion heater			

3. Lubrication

Recommended oil (s)

Sump

Elsewhere (state where)

4. Alternator and exciter

Make and type

Bearings \* ball/roller/plain

Insulation class (BS. 27 7

---

\* delete as necessary

**4. Electrical Control Panel**

Item	Details		
	Make	Type	Rating
Location of Control panel:			
Confirm the following minimum Instrumentation fitted:			
Alternator output ammeter:			
Alternator output voltmeter:			
Alternator output frequency meter			
Alternator output Kilowatt meter			
Generator service hours records			
Confirm the following minimum controls fitted:			
Ammeter selector switch:			
Voltmeter Selector switch:			
Engine control manual/ auto selector:			
Generator test facility:			
Confirm the following sequence relays/timers are fitted:			
Phase failure detection circuit and one or all three phase adjustable:			
Multi-attempt start:			
Mains return stop delay adjustable:			
Engine cool-down off-load delay:			
Confirm the following minimum protection circuits with automatic shut down and alarm indication are provided:			
Engine failure to start:			
Engine low oil pressure:			
Engine overspeed:			
Type of indication provided (CCD or filament lamp):			
Lamp test push button:			
Details of Engine Starter			
Battery static charger:			

Electrical Services Specifications and Bills

Item	Details		
	Make	Type	Rating
Alternator output circuit breaker:			
Make:			
Rating in amperes:			
Number of poles:			
Mains/Alternator change over:			
Contactors:			
Rating in amperes:			
Number of poles:			
Electrical Interlock:			
Mechanical Interlock:			
By-pass switch			
Rating in amperes:			
Number of poles:			
Indicator lamps - No			
Ammeter switch			
Voltmeter switch			
kWh meter			
Frequency meter			
Ammeter - No			
Voltmeters No.			
Power factor meter:			
Other equipment - give details			

# Electrical Services Specifications and Bills

## 6. Performance data

Fuel Consumption	Rounded Output	Output
	%	Kg.Wh
	110	
	100	
	75	60 l/hr
	50	
Maximum output at site	Ambient	output
	Temp <sup>0</sup> C	kVA
	40	
	30	
	20	
	10	

Items	Details 1 No. 150 KVA
Critical Speeds - rev/min	
Cyclic irregularity	
Voltage regulation	
Frequency regulation	
Time to accept 75% full load from 5 degrees C.	
7. Physical Details	
Daily service tank for 24 hour operation capacity	
Size	
Total weight of set	
Overall dimensions of set	
Weight of heaviest component	
Weather proofing	
8. Operational Details	
Description of operation sequence of the automatic control (where fitted) Details of drawings, literature, e.t.c., included with tender	
9. Delivery Details	
Time in weeks from acceptance of tender to delivery of all equipment to site	
Time in weeks from acceptance of tender to commissioning tests	

**SCHEDULE NO. 3**

**DEVIATIONS FROM THE SPECIFICATION**

The tenderer shall give below details of any equipment, which does not meet the specification, or any other deviations, omissions, additions or alternatives in respect of the set which he is offering.

If none, write none.

**SCHEDULE NO. 4**

**LIST OF TOOLS TO BE SUPPLIED WITH THE SET**

The following tools shall be handed over to the Engineer before completion of this contract.

Item	Details	Price (Kshs)
1	Metal tool box with lock and 2 keys	
2	Set of 8 No. Chrome Vanadium ring spanners in sizes to suit the set.	
3	Ditto open-ended spanners	
4	Set of 3 screwdrivers, 75mm, 200mm and 300mm plus one 200mm Phillips type	
5	One set of feeler gauges	
6	One grease gun to suit greasing points	
7	One oil can, trigger type	
8	One hydrometer and plastic filler bottle with pouring sprout	
	<b>Total carried forward to price summary schedule</b>	_____

The tenderer shall give below details of any special tools, which he recommends should be purchased as an optional extra.

Details \_\_\_\_\_ Price \_\_\_\_\_  
 Signed (as in tender): .....  
 Date: .....

**SCHEDULE NO. 5**

**LIST OF SPARE PARTS AND LUBRICANTS TO BE SUPPLIED WITH THE SET**

The following items shall be handed over to the Engineer before completion of this contract. They shall not be used by the contractor contrary to carry out his normal maintenance.

Item	Details	Price (Kshs)
1	Oil filters - 3 No.	
2	Air filters - 3 No.	
3	One injector to suit the set	
4	One set of fan belts comprising..... belts	
5	One set of indicator bulbs comprising ..... bulbs	
6	One overhaul kit	
7	One set of fuses comprising..... fuses	
8	One 60 litre plastic container of sump of oil grade.....	
9	One 2-kilogram tin of grease grade.....	
10	One 10 litre plastic container of distilled water.....	
	<b>Total carried forward to price summary schedule</b>	_____

The tenderer shall give below details of any other spares which he recommends to be purchased as an optional extra.

Details

Price

Signed (as in tender) .....

Date: .....

**SCHEDULE NO. 6**

**EARTHING**

The tenderer shall insert his prices for the following items. The configuration of the earth fields shall be as directed by the Engineer on site.

Item	Details	Price (Kshs)
1	Supply and install 2 No. steel cored copper earth rods, 1200mm x 12mm threaded for extension, connected by brass clamps to 10 metres of 25mm x 3mm copper earth tape laid in trenches of minimum depth 300mm and fixed to the wall of the generator room with brass spacer bar saddles at 1 metre intervals, connected to the station earth bar via a brass test clamp	

Price per additional earth.....

Price per additional meter of earth

Tape.....

Signed (as in tender) .....

Date: .....

**SCHEDULE NO. 7****PRICE SUMMARY PAGE 1**

<b>Item</b>	<b>Details</b>	<b>UNIT</b>	<b>QTY</b>	<b>RATE</b>	<b>AMOUNT</b>
				<b>Kshs</b>	<b>Kshs</b>
1	Sub-Contract Preliminaries	Lot			
2	i) Supply, Installation, Testing and commissioning of <b>1 No. 150 kVA (Prime Rated)</b> . Standby generator sets each complete with super silent acoustic and weatherproof canopy with a maximum noise level of 67dB at 7 metres on full load, automatic mains failure panel, <b>Automatic change over switch</b> , power supply and control cables.  <b>Purchased through local (Kenyan) authorized distribution channels</b>	Item	1		
	i) <b>1 No. 2500 Litres</b> fuel tank with associated plumbing works, electric pump.	Item	1		
	ii) 100mm diameter, 3mm thick steel tube exhaust system for generator complete with. Flexible connections, lagging brackets and black industrial (gloss paint), (Provisional length).	LM	1		
	iii) 2 Run of 120mm sq 4 core PVC/SWA/XPLE/PVC c/w cable glands and lugs insulated copper cable laid in trenches and suspended on cable ladder for interconnection of generator set control panel, the automatic change over panel and manual by-pass switch (Provisional length).	LM	150		
	<b>TOTAL CARRIED TO THE NEXT PAGE</b>				

Item	Details	UNIT	QTY	RATE	AMOUNT
				Kshs	Kshs
	<b>Total Brought Down from the Previous Page</b>				
	iv) 4-core 2.5mm <sup>2</sup> PVC/SWA/PVC c/w cable glands and lugs signal/control cable for the generator set.	LM	40		
	v) Allow for off-site and on-site full load testing, 24hrs. records and commissioning of the set.	Item	1		
	vi) Hot-air ducting fabricated to approval.	LM	10		
	vii) Initial fuelling the generator and the reserve tank	Litres	2500		
3	Allow for production of 12 calendar months warranty and presentation of 3No. Sets of relevant operational/maintenance manuals/ documentation and warranty cards, "As-built" drawings/ cabling/ schematic line diagram test results to be submitted as a bound report. <b>(Provide Manufacturer's warranty)</b>	Item	3		
4	Schedule 4 - Supply of tools	Item	1		
5	Schedule 5 - Supply of spares and lubricants	Item	1		
6	Schedule 6 – Earthing	LM	1		
7	Comprehensive maintenance for a period of twelve months during the Defects Liability Period as per the manufacture's maintenance requirements and schedules.	Item	1		
8	ALLOW PC SUM FOR GENSET HOUSE		1	2,000,000.00	2,000,000.00
9	Allow contingency sum to be used at the discretion of the Architect/Engineer	Item	1	200,000	200,000.00
	<b>TOTAL CARRIED FORWARD TO ELECTRICAL SERVICES GRAND SUMMARY PAGE</b>				

**PROPOSED ULTRA MODERN TRAINING CENTRE FOR MINISTRY OF EDUCATION - CEMASTEVA**  
**ELECTRICAL INSTALLATIONS - DATA CENTRE**

ITEM	DESCRIPTION	UNIT	QTY.	RATE	AMOUNT
				KSHS.	KSHS.
<b>1.1.00</b>	<b><u>LIGHTING POINTS AND FITTINGS</u></b>				
	<b>Supply, install, test, commission and maintain: -</b>				
1.1.01	Lighting points wired in 3 x 1.5sqmm PVC insulated single core (SC) copper wires drawn in 20 mm HG PVC conduits concealed in walls and floors, one way switched with all accessories but excluding switch and fitting	No.	30		
1.1.02	Ditto, for two-way lighting points	No.			
1.1.03	10A plate switch 1 gang two-way SP as MK OR EQUAL AND APPROVEDK4871 WHI	No.	2		
1.1.04	10A plate switch 2 gang two-way SP as MK OR EQUAL AND APPROVEDK4872 WHI	No.	2		
1.1.05	10A plate switch 3 gang two-way SP as MK OR EQUAL AND APPROVEDK 4873 WHI	No.	3		
1.1.06	36W, 0.9 P.F. 600x600mm 105Lm/W LED panel light fitting as Philips or equal and approved, for recessed acoustic ceiling. Type F5, Daylight	No.	20		
1.1.07	Single wall bracket as Massive Houston 4  71528/01/47 complete with 1x E27 max. 60W 240V lamps as, Type "S1"	No.	4		
1.1.08	150mm Dia Circular LED Panel as Philips or equal and approved 12W LED ECO, Surface As Type A5	No.	4		
1.1.09	Maintained emergency exit luminaire illuminated by I.E.D.s with 3hr NiCd battery backup with extruded aluminum support rail enclosing L.E.D's on linear PCB, supported by chains, suspended from ABS injection molded housing, enclosing battery and electronic control circuits, Type "ET"	No.	2		
			30		
	<b>TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 8</b>				

**PROPOSED ULTRA MODERN TRAINING CENTRE FOR MINISTRY OF EDUCATION - CEMASTE A**  
**ELECTRICAL INSTALLATIONS - DATA CENTRE**

ITEM	DESCRIPTION	UNIT	QTY.	RATE	AMOUNT
				KSHS.	KSHS.
<b>1.2.00</b>	<b><u>POWER POINTS AND OUTLETS</u></b>				
	<b>Supply, install, test, commission and maintain:-</b>				
1.2.01	13A ring twin socket outlet points wired in 3 x 2.5sq mm PVC SC copper cables drawn in trunking /20mm HG PVC conduits concealed in the wall and floors complete with all accessories but excluding the socket outlet plate.	No.	30		
1.2.02	Ditto, but for fused spur outlet	No.	2		
1.2.03	Power Supply to Cabinet circuit wired in 3 core multicore 6sq mm PVC Copper cables drawn in 25mm HG PVC conduits concealed in the wall and floors complete with all accessories but excluding the Isolator	LM	360		
1.2.04	Air conditioning circuit wired in 5 core multicore 10sq mm PVC Copper cables drawn in 25mm HG PVC conduits concealed in the wall and floors complete with all accessories but excluding the Isolator	LM	180		
1.2.05	200 x 50mm two compartment trunking surface mounted prepainted and baked steel trunking made out of 16 swg sheets and frame complete with cover, switch boxes, cross over bridges and fixing accessories	LM	50		
1.2.06	Trunking face plates for twin socket outlet plates	No.	30		
1.2.07	Trunking face plates for twin RJ 45socket outlet plates	No.	20		
1.2.08	Trunking face plates for twin RJ 45socket outlet plates	No.	20		
1.2.09	13A flush 2 gang switch socket-outlet as MK or equal and approved K 2747 WHI	No.	20		
1.2.10	13A flush 2 gang switch socket-outlet as MK or equal and approved K 2747 RED	No.	10		
1.2.11	20A flush DP switch with pilot lamp as MK or equal and approved K 5423 WHI	No.	2		
1.2.12	32A TP Isolator Switch as Katko or equal and approved	No.	6		
1.2.13	63A SP Isolator Switch as Katko or equal and approved	No.	8		
1.2.14	32A 3P+N+E angled industrial surface mounting socket as Legrand or equal and approved complete with plug	No.	6		
1.2.15	40A 2P+E angled industrial surface mounting socket as Legrand or equal and approved complete with plug	No.	12		
	<b>TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 8</b>				

**PROPOSED ULTRA MODERN TRAINING CENTRE FOR MINISTRY OF EDUCATION - CEMASTEVA**  
**ELECTRICAL INSTALLATIONS - DATA CENTRE**

ITEM	DESCRIPTION	UNIT	QTY.	RATE	AMOUNT
				KSHS.	KSHS.
<b>1.3.00</b>	<b><u>TELEPHONE AND PUBLIC ADDRESS SYSTEM</u></b>				
	<b>Supply, install, test, commission and maintain:-</b>				
1.3.01	Telephone/ Data outlet points comprising of 25 mm diameter HG PVC conduits and the draw wire concealed in walls and floor with all accessories excluding outlet plate	No.	10		
1.3.02	TV outlet points comprising of 25 mm diameter HG PVC conduits and the draw wire concealed in walls and floor with all accessories excluding outlet plate	No.			
1.3.03	CCTV outlet points comprising of 25 mm diameter HG PVC conduits and the draw wire concealed in walls and floor with all accessories excluding outlet plate	No.	8		
1.3.04	Access Control outlet points comprising of 25 mm diameter HG PVC conduits and the draw wire concealed in walls and floor with all accessories excluding outlet plate	No.	4		
1.3.05	Microphone/ Speaker outlet points comprising of 25 mm diameter HG PVC conduits and the draw wire concealed in walls and floor with all accessories excluding outlet plate	No.	2		
1.3.06	300 x 300 x 75mm prepainted steel adaptable box	No.	2		
1.3.07	Twin coaxial outlet plates as MK or equal and approved 3520 WHI	No.			
1.3.08	50 mm diameter H.G PVC conduits for linking the trunking and adaptable boxes concealed in the walls and ceiling with all accessories	LM.	50		
1.3.09	32 mm diameter H.G PVC conduits for linking the trunking and adaptable boxes concealed in the walls and ceiling with all accessories	LM.	50		
	<b>TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 8</b>				

**PROPOSED ULTRA MODERN TRAINING CENTRE FOR MINISTRY OF EDUCATION - CEMASTEVA**  
**ELECTRICAL INSTALLATIONS - DATA CENTRE**

ITEM	DESCRIPTION	UNIT	QTY.	RATE	AMOUNT
				KSHS.	KSHS.
<b>1.4.00</b>	<b>FIRE ALARM SYSTEM</b>				
	Supply, install, test, commission and maintain the following items: -				
1.4.01	Single loop Wiring for addressable call/detector points comprising 1.5 sq mm 3 core copper fire defence cable with CPC drawn in 25mm diameter HG PVC conduits concealed in floors and walls from the Addressable Control Panel to alarm points	NO	12		
1.4.02	Ditto, from Control Panel to alarm bell	NO	1		
1.4.03	24 V DC fire alarm Electronic sounder as Menvier Cat. MAS 850LPS complete with mounting base	NO	1		
1.4.04	Addressable break glass call point as Menvier MBG814	NO	4		
1.4.05	Addressable photo Sensor as Menvier Cat. MAP820 or equal and approved complete with mounting MAB800 base	NO	2		
1.4.06	Addressable thermal Sensor as Menvier Cat. MAH830 or equal and approved complete with mounting MAB800 base	NO	6		
1.4.07	CF3000PRG - Intelligent addressable passive Repeater Panel	NO	1		
	<b>Aspirator System</b>				
1.4.08	Elotec Grizzle Aspirating Smoke Detector Model No. AE2010G	NO	1		
1.4.09	Thub Mounting console	NO	1		
1.4.10	HUB for Aspect, 2-1 Model No. PLP 210 007	NO	1		
1.4.11	Plastic Pipe Model No. PL 252	NO	9		
1.4.12	Straight Connector Model No. SK 252	NO	5		
1.4.13	90 Degree Connector Model No. BE 252	NO	6		
1.4.14	End Cap Model No. EP250	NO	2		
1.4.15	Pipe clip Model No. CL 250	NO	20		
1.4.16	Any other item required to complete the works	LOT	1		
	<b>TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 8</b>				

**PROPOSED ULTRA MODERN TRAINING CENTRE FOR MINISTRY OF EDUCATION - CEMASTEIA**  
**ELECTRICAL INSTALLATIONS - DATA CENTRE**

ITEM	DESCRIPTION	UNIT	QTY.	RATE	AMOUNT
				KSHS.	KSHS.
<b>1.5.00</b>	<b>SUB-MAINS AND DISTRIBUTION</b> <b>Supply, install, test, commission and maintain :-</b>				
1.5.01	Sub Board with Adjustable 400A TPN integral adjustable Isolator as ABB complete with the following:- Form 3B Construction - 1 No. 400A TPN COPPER BUS BARS - 5 No. 63A TPN MCCB as ABB or equal and Approved - 4 No. 80A TPN MCCB as ABB or equal and Approved - 4 No. 63A SPN MCCB as ABB or equal and Approved - 4 No. TPN SPARES - all necessary wiring and auxiliaries The sub board to be finished in auto lacquer, IP20 Degree of Protection and as manufactured by Switchgear Ltd	Item	1		
1.5.02	Complete earthing of the sub board to IEE requirements comprising of 15mm diameter 5ft long copper earth electrodes, 16sq mm ECC, all accessories complete with connection manhole with removable cover	No.	1		
1.5.03	95mm sq 4 core PVC SWA PVC armoured copper cables drawn in 150mm HG PVC ducts and trenches complete with cable lugs and cable glands from the Data Centre LV board to the Sub board above	LM	200		
1.5.04	300mm Steel cable ladder/ tray made out of 14 swg complete with mounting brackets and rods	LM	60		
1.5.05	12 - way TPN distribution board DB RAW as Schneider Electric complete with 125A TPN intergral isolator complete with the following:- 2 No. 10A SP MCB Acti 9 2 No. 20A SP MCB Acti 9 2 No 30A SP MCB Acti 9 7 No. 40A SP MCB Acti 9 1 No. 15A SP MCB Acti 9 8 No. blanking plates	ITEM	1		
1.5.05	Sub-mains comprising of 4 core 16sq mm SWAC copper cables complete with cable glands and lugs drawn in 50 mm HG PVC conduit from the Sub Board to the Distribution Board above.	LM	50		
	<b>TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 8</b>				

**PROPOSED ULTRA MODERN TRAINING CENTRE FOR MINISTRY OF EDUCATION - CEMASTEIA**  
**ELECTRICAL INSTALLATIONS - DATA CENTRE**

ITEM	DESCRIPTION	UNIT	QTY.	RATE	AMOUNT
				KSHS.	KSHS.
1.5.01	12 - way TPN distribution board DB RAW POWER as Schneider Electric complete with 125A TPN integral isolator complete with the following: - AIR CONDITIONING UNITS 2 No. 20A SP MCB Acti 9 5 No 32A SP MCB Acti 9 2 No. 40A SP MCB Acti 9 1 No. 15A SP MCB Acti 9 8 No. blanking plates	ITEM	1		
1.4.02	Sub-mains comprising of 4 core 25sq mm SWAC copper cables complete with cable glands and lugs drawn in 50 mm HG PVC conduit from the Sub Board to the Distribution Board above.	LM	50		
1.5.03	16 - way TPN distribution board DB CLEAN POWER as Schneider Electric complete with 125A TPN integral isolator complete with the following: - 2 No 32A SP MCB Acti 9 12 No. 40A SP MCB Acti 9 1 No. 15A SP MCB Acti 9 8 No. blanking plates	ITEM	1		
1.5.04	Sub-mains comprising of 4 core 35sq mm SWAC copper cables complete with cable glands and lugs drawn in 50 mm HG PVC conduit from the UPS to the Distribution Board above.	LM	50		
1.5.04	Sub-mains comprising of 4 core 35sq mm SWAC copper cables complete with cable glands and lugs drawn in 50 mm HG PVC conduit from the UPS to the Distribution Board above.	LM	50		
	<b>TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 8</b>				

**PROPOSED ULTRA MODERN TRAINING CENTRE FOR MINISTRY OF EDUCATION - CEMASTEIA**  
**ELECTRICAL INSTALLATIONS - DATA CENTRE**

ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
				KSHS.	KSHS.
<b>4.1.00</b>	<b>SUB -MAINS AND DISTRIBUTION</b> <b>Supply, Install, test, commission, and maintain the following items</b>				
4.1.01	LV Board to house 1 No. 3 Phase Sub meter, fabricated from 16 SWG steel sheets and frames complete with the following: - 1 No. 600A TP Copper Busbars 2 No. 400A TP MCCB as ABB Type D Adjustable 1 No. 3 Phase Digital Sub Meter ABB 3 No. 63A TP MCCB as ABB Type D 2 No 80A TP MCB as ABB Type D 1 No 50A SPN MCCB as ABB Type D 2 No 320 A TPN By-pass switch 1 No 320A TPN Automatic Motorized Changeover Switch space for KP&LC cut-outs, current transformers and meters and Surge Protection Device, Phase Failure Relays, Digital Display all necessary wiring and auxiliaries. The Form 3B construction switchboard to be finished in auto lacquer' IP54 Degree of protection and as manufactured by Switchgear Ltd	ITEM	1		
4.1.02	Earth mesh comprising of 25 x 3mm copper tape complete with red soil, merconite and clamps, installed into the ground around the building and connected to the test clamps and switch board complete with all accessories.	ITEM	1		
4.1.10	95mm sq 4 core PVC SWA PVC armoured copper cables drawn in 150mm HG PVC ducts and trenches complete with cable lugs and cable glands from the Main LV board to the Data Centre LV board above	LM	100		
4.1.11	Allow for 3 No. hard copies of working drawings, 3 No. CD and working drawings to Engineers approval. For Electrical Installation	Item	1		
4.1.12	Allow for 3 No. hard copies of as built drawings, 3 No. CD and As-built drawings to Engineers approval. For Electrical Installation	Item	1		
4.1.13	Allow for attendance to the standby generator installation sub contractor	Item	1		
4.1.14	Allow for attendance to the Security Services installation sub contractor	Item	1		
	<b>TOTAL CARRIED FORWARD TO</b> <b>COLLECTION PAGE No. 8</b>				

**PROPOSED ULTRA MODERN TRAINING CENTRE FOR MINISTRY OF EDUCATION - CEMASTE A**  
**ELECTRICAL INSTALLATIONS - DATA CENTRE - PHASE II**

	DESCRIPTION				AMOUNT
					KSHS.
	<b>SUMMARY PAGE 2</b>				
	BROUGHT FORWARD FROM PAGE No. 1				
	BROUGHT FORWARD FROM PAGE No. 2				
	BROUGHT FORWARD FROM PAGE No. 3				
	BROUGHT FORWARD FROM PAGE No. 4				
	BROUGHT FORWARD FROM PAGE No. 5				
	BROUGHT FORWARD FROM PAGE No. 6				
	BROUGHT FORWARD FROM PAGE No. 7				
	ALLOW FOR A PROVISIONAL CONTIGENCY				500,000.00
	<b>TOTAL CARRIED FORWARD TO</b>				
	<b>ELECTRICAL SERVICES SUMMARY PAGE</b>				

**PROPOSED ULTRA MODERN TRAINING CENTRE FOR MINISTRY OF EDUCATION - CEMASTEIA**  
**ELECTRICAL INSTALLATIONS - SOLAR PV HYBRID SOLUTION**

ITEM	DESCRIPTION	UNIT	QTY.	RATE	AMOUNT
				KSHS.	KSHS.
9.1.00	<b>Solar Hybrid solution integrated with power Supply from KPLC and Generator</b>  <b>Supply, Install, test, commission and maintain:-</b>				
9.1.01	580W Monocrystalline Solar Panels complete with accessories	No.	165		
9.1.02	25kW Smart Hybrid Inverter install c/w programming	No.	3		
9.1.03	Communication Device for Monitoring Module	No.	1		
9.1.04	20A, 1000V DC Isolator	No.	10		
9.1.05	6.0mm 1000V DC Cable (Red + Black) DC Cable	LM	750		
9.1.06	6.0mm 1000V DC Cable (Red + Black) AC Cable	LM	750		
9.1.07	Solar Panel Support Structures and roof brackets, Mounting rails (40x30) with other materials including end clamps, Mid Clamps PV mounting L- brackets, H.T Hex Bolt X20, Cap Screw HEX MBX20, Square nuts, cable glands, self-tapping screws, nut stoppers etc.	No.	165		
9.1.08	120mm sq 4 core PVC SWA PVC armored copper cables drawn in 150mm HG PVC ducts and trenches complete with cable lugs and cable glands from the Solar LV Board to the Data Centre LV board above	LM	100		
9.1.09	200 x 50mm one compartment trunking surface mounted prepainted and baked steel trunking made out of 16 swg sheets and frame complete with cover, switch boxes, cross over bridges and fixing accessories	LM.	80		
9.1.10	50mm sq 4 core PVC SWA PVC armored copper cables drawn conduits and trunking	LM	100		
9.1.11	AC Combiner board + Changeover Switch	No.	2		
9.1.12	DC combiner and Isolator board	Lot.	2		
9.1.13	Green/yellow 35mm earth cable	LM	70		
9.1.14	400 Amps Automatic Change Over Panel c/w enclosure and all the required necessary accessories	Item	1		
	<b>TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 11</b>				

**PROPOSED ULTRA MODERN TRAINING CENTRE FOR MINISTRY OF EDUCATION - CEMASTEIA**  
**ELECTRICAL INSTALLATIONS - SOLAR PV HYBRID SOLUTION**

ITEM	DESCRIPTION	UNIT	QTY.	RATE	AMOUNT
				KSHS.	KSHS.
9.1.15	Synchronization of Main grid, Genset and PV system complete with anti-reflux controller	Lot	1		
9.1.16	LFP (Lithium Iron Phosphate – LiFePO4) Battery Cell technology: LFP (Lithium Iron Phosphate – LiFePO4) Module Capacity: 9.6 kWh Nominal Voltage: 48 Vdc Work Voltage Range: 40.5 – 54 Vdc Charge / Discharge Current (Recommended): 115 A Charge / Discharge Current (Max): 220 A Depth of Discharge: 90% PERFORMANCES WARRANTY: 10 years	No.	12		
9.1.17	Batter rack for 6 No. Battery's above	No.	2		
9.1.17	400A 4P Bypass Panel complete with enclosure and all accessories	No.	1		
9.1.18	Any other item required to complete the solar PV installation and integration with mains and generator	Item	1		
9.1.19	Allow for 3 No. hard copies of working drawings, 3 No. CD and working drawings to Engineers approval. For Electrical Installation	Item	1		
9.1.20	Allow for 3 No. hard copies of as built drawings, 3 No. CD and As-built drawings to Engineers approval. For Electrical Installation	Item	1		
	<b>TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 11</b>				

**PROPOSED ULTRA MODERN TRAINING CENTRE FOR MINISTRY OF EDUCATION - CEMASTE A**  
**ELECTRICAL INSTALLATIONS - SOLAR PV HYBRID SOLUTION**

	DESCRIPTION				AMOUNT
					KSHS.
	<b>SUMMARY PAGE 3</b>				
	BROUGHT FORWARD FROM PAGE No. 9				
	BROUGHT FORWARD FROM PAGE No. 10				
	ALLOW FOR A PROVISIONAL CONTIGENCY				500,000.00
	<b>TOTAL CARRIED FORWARD TO ELECTRICAL SERVICES SUMMARY PAGE</b>				

**PROPOSED ULTRA MODERN TRAINING CENTRE FOR MINISTRY OF EDUCATION - CEMASTEVA**  
**ELECTRICAL INSTALLATIONS - UPS**

ITEM	DESCRIPTION	UNIT	QTY.	RATE	AMOUNT
				KSHS.	KSHS.
10.1.01	<b>Supply, Install, test, commission and maintain:-</b> UNINTERRUPTED POWER SUPPLY  <b>A. OUTPUT</b> Output Power Capacity: 50 kW / 50 kVA Nominal Output Voltage: 400V 3PH, Output Voltage Note: Configurable for 415 V 3 Phase nominal output Efficiency at Full Load: 92.9% Output Voltage Distortion: Less than 2% Output Frequency (sync to mains): 50 Hz - programmable +/- 0.5 Other Output Voltages: 415V Crest Factor: 3: 1 Waveform Type: Sine wave Output Connections: (1) Hard Wire 4-wire (3PH + G) (1) Hard Wire 5-wire (3PH + N + E) Output Voltage Tolerance: +/- 1% static and +/- 2 % at 100% load Output Voltage THD: < 1% linear load and < 2.5% nonlinear load Overload Operation: 10 minutes @ 125% and 60 seconds @ 150% Efficiency at Half Load: 90% Required Output Current Protection: 91A <b>Bypass: Built-in Maintenance Bypass, Built-in Static Bypass,</b> <b>Optional External Bypass</b> <b>B. INPUT</b> Nominal Input Voltage: 400V 3PH, 480V 3PH, 600V 3PH Input Frequency: 45 - 65 Hz Input Connections: Hard Wire 5-wire (3PH +N +E) Input voltage range for main operations: 340 - 460 (400V), 408 – 538V Other Input Voltages: 380, 400, 415 Maximum Input Current: 91A Input Breaker Capacity: 125.0 A Maximum Short Circuit Withstand (Icw): 65.0 kA Input Total Harmonic Distortion: Less than 3% for full load Type of Input Protection Required: 3-pole breaker <b>C. BATTERIES AND RUNTIME</b> <b>30 MIN RUNTIME or 25 kWh battery storage</b> <b>Battery Type: No internal battery – uses external batteries</b> <b>system c/w rack. Nominal Battery Voltage: 415V</b> <b>NOTE:</b> <b>The bidder shall Also provided a control panel that will</b> <b>supply from the two UPS to operate alternation</b> The price should be inclusive of all necessary accessories and cables. The UPS will be installed in the server room and the maximum length cable to be used is 10 metres. As Eaton or APC - Schneider Electric	No.	2		
10.1.02	ALLOW FOR PROVISIONAL CONTINGENCY				400,000.00
	TOTAL CARRIED FORWARD TO SUMMARY PAGE				



**PROPOSED ULTRA MODERN TRAINING CENTRE FOR MINISTRY OF EDUCATION - CEMASTE A**  
**CCTV INSTALLATIONS - DATA CENTRE**

ITEM	DESCRIPTION	UNIT	QTY.	RATE	AMOUNT
				KSHS	KSHS.
	<b>Supply, install, test and commission the following:-</b>				
1.1.01	Camera outlet point comprising wiring with 4-pair UTP- 0.5mm plain copper wire PVC insulated and PVC sheathed drawn into installed ducts and conduits to meet category 6A of TIA PN - 3727 and class E of ISO/ IEC 11801 requirements but excluding outlet plates, all accessories included, as Siemon	No.	10		
1.1.02	HikVision DS-2CD2145FWD-I 4 MP IR Fixed Dome Network Camera complete with mounting accessories	No.	6		
1.1.03	HIKVISION DS-2CD2T45FWD-I5/I8 4 MP IR Fixed Bullet Network Camera complete with mounting accessories	No.	4		
1.1.04	Cisco Catalyst C9200L - 24P - 4X - E, 370W (24 - Port PoE with 4 x 10 G SFP+ uplink ports) with advanced IP service licenses, and populated with appropriate SFP transceiver modules for uplinks to the Fiber aggregation switch complete with 3 Years DNA, 8x5xNBD SMARTnet and all accessories - Access Switch	No.	1		
1.1.05	CAT 6A shielded loaded Patch Panel - 24 ports as Siemon flat 1 U black (Z6AS-PNL-U24K)	No.	1		
1.1.06	Complete CCTV control centre comprising of: Network Video Recorder Hardware, as HIKVISION 16CH 16 Channels PoE NVR Network Video Recorder modulator. Complete with 2 No. 8 TB HDD The NVRs should also allow for mobile viewing and remote access	Item	1		
1.1.07	43" Smart TV 4K resolution as either LG or Samsung complete with all mounting brackets and accessories	Item	1		
1.1.08	Complete CCTV control centre comprising of: Network Video Recorder Hardware, as HIKVISION 16CH 16 Channels PoE NVR Network Video Recorder modulator. Complete with 2 No. 8 TB HDD The NVRs should also allow for mobile viewing and remote access	Item	1		
1.1.09	HP Pavilion 27-d1008ne All in one core i7 16 gb ram 2tb hdd GEF MX 350 4GB complete with keyboard, mouse and Licenced Windows 11 Pro. Operating System and Microsoft Professional, appropriate Video management softwares	Item	1		
1.1.10	Networking Accessories comprising of masking tapes, labels, cable ties etc	LOT	1		
	<b>TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 3</b>				

**PROPOSED ULTRA MODERN TRAINING CENTRE FOR MINISTRY OF EDUCATION - CEMASTEVA**  
**CCTV INSTALLATIONS - DATA CENTRE**

ITEM	DESCRIPTION	UNIT	QTY.	RATE	AMOUNT
				KSHS	KSHS.
1.1.11	1U patch cord organisers as Siemon or equal and approved	No.	1		
1.1.12	Fibre patch panel, SC Holmet connectors, SC duplex adapters and SC-SC patch cords necessary to terminate the fibre cable	Item	1		
1.1.13	Complete earthing of cabinets to IEE requirements comprising of 16sq mm ECC, connected to the electrical installations earthing complete with all accessories	Item	1		
1.1.14	12U metal cabinet ( 800mm high x 600mm wide x 900mm deep complete with perforated doors, trays, fans and 4 No.power sockets, V - organisers, Intelligent Power Distribution Units (PDU) complete with all accessories	No.	1		
1.1.15	Allow for Fluke Testing and giving client report in a CD	Item	1		
1.1.13	Any other item required to complete the works	LOT	1		
1.1.14	Allow for testing and commissioning to Engineers' and Client satisfaction	LOT	1		
1.1.15	Allow for Training of key personnel on usage and operation of systems installed	LOT	1		
1.1.16	Allow for 3 No. hard copies of working drawings, 3 No. CD and working drawings to Engineers approval. For Security Installation	LOT			
1.1.17	Allow for 3 No. hard copies of as built drawings, 3 No. CD and As-built drawings to Engineers approval. For Security Installation	LOT	1		
	<b>TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 3</b>				

**PROPOSED ULTRA MODERN TRAINING CENTRE FOR MINISTRY OF EDUCATION - CEMASTEIA**  
**CCTV INSTALLATIONS - DATA CENTRE - PHASE II**

ITEM	DESCRIPTION				AMOUNT
					SHS.
	<b>SUMMARY PAGE</b>				
	BROUGHT FORWARD FROM PAGE No. 1				
	BROUGHT FORWARD FROM PAGE No. 2				
	<b>TOTAL CARRIED FORWARD TO ELECTRICAL SERVICES SUMMARY PAGE No. M/S</b>				

**PROPOSED ULTRA MODERN TRAINING CENTRE FOR MINISTRY OF EDUCATION - CEMASTE A**  
**DOOR ACCESS CONTROL SYSTEM INSTALLATIONS - DATA CENTRE**

ITEM	DESCRIPTION	UNIT	QTY.	RATE	AMOUNT
				KSHS	KSHS.
	<b>Supply, install, test and commission the following:-</b>	No.	12		
2.1.01	Door Controller outlet point comprising wiring with 4-pair UTP- 0.5mm plain copper wire PVC insulated and PVC sheathed drawn into installed ducts and conduits to meet category 6 of TIA PN - 3727 and class E of ISO/ IEC 11801 requirements but excluding outlet plates, all accessories included, as Siemon				
2.1.02	Connection relays	Item	1		
2.1.03	Magnetic locks and door contacts	No.	6		
2.1.04	300W 12V DC power supply unit complete with wiring to the control panel	No.	2		
2.1.05	Buzzer unit, reset box to be installed in the server room	No.	1		
2.1.06	Zkteco ZK F22 Biometric Fingerprint Time Attendance And Access Control	No.	12		
2.1.07	Request to exit switch	No.	12		
2.1.08	Key switch	No.	6		
2.1.09	Break glass switch	No.	6		
2.1.10	HiD ISO Card Printer complete all accessories	No.	1		
2.1.11	White HID ISO Proximity Card	No.	50		
2.1.12	Any other item required to complete the works	LOT	1		
2.1.13	Enterprise platform Integrated Security System software to control upto 16 doors and 64 devices Input & Output <b>NB: All equipment to be as Zkteco</b>	Item	1		
2.1.14	Allow for testing and commissioning to Engineers' and Client satisfaction	LOT	1		
2.1.15	Allow for Training of key personnel on usage and operation of systems installed	LOT	1		
	<b>TOTAL CARRIED FORWARD TO SUMMARY PAGE 3</b>				

**PROPOSED ULTRA MODERN TRAINING CENTRE FOR MINISTRY OF EDUCATION - CEMASTEVA**  
**STRUCTURED CABLING INSTALLATIONS - DATA CENTRE**

ITEM	DESCRIPTION	UNIT	QTY.	RATE	AMOUNT
				KSHS	KSHS.
	<b>Supply, install, test and commission the following items. The installations to be tested using Network scanner, documented and labelled</b>				
1.1.01	Telecommunication outlet point comprising wiring with 4-pair 0.5mm shielded copper wire PVC insulated and PVC sheathed drawn into installed trunking and conduits to meet category 6A (Cable Part Number 9A6M4-A5 ) of TIA PN - 3727 and class E of ISO/ IEC 11801 requirements but excluding outlet plates, all accessories included, as Siemon or equal and approved	No.	10		
1.1.02	CAT 6A shielded Single RJ 45 outlet plates as Siemon complete with modules (1 x Z6A-S02D + 10GMX-BFP-02-02) or equal and approved	No.	10		
1.1.03	CAT 6A shielded loaded Patch Panel - 48 ports as Siemon flat 1 u black (Z6AS-PNL-U48K) or equal and approved	No.			
1.1.04	CAT 6A shielded loaded Patch Panel - 24 ports as Siemon flat 1 u black (Z6AS-PNL-U24K) or equal and approved	No.	1		
1.1.05	1 HU Patch guide as Siemon (Multi-access Horizontal cable manager-RWM-I) or equal and approved	No.	1		
1.1.06	CAT 6A 3 metres shielded patch cords - with RJ45 - RJ45 as Siemon ZM6A-S03M-02B or equal and approved	No.	10		
1.1.07	CAT 6A one metre shielded patch cords with RJ45 as Siemon ZM6A-SO1M-02B or equal and approved	No.	10		
1.1.08	Networking Accessories comprising of masking tapes, labels, cable ties etc	LOT	1		
1.1.09	42U metal cabinet (2200mm high x 800mm wide x 800mm deep complete with perforated doors, trays, fans and 4 No.power sockets, V - organisers, Intelligent Power Distribution Units (PDU)	No.	1		
1.1.10	12 core Siemon outdoor optic fibre cable (Singlemode - 9GD8H012G-E201) from the Access Switch to the Data Centre or equal and approved	LM	150		
1.1.11	Fibre patch cords LC - SC duplex as Siemon (FJ2-LCSC5L-01AH) or equal and approved	No	2		
1.1.12	Fibre patch panel as Siemon (FCP3-RACK) or equal and approved	No	2		
	<b>TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 3</b>				

**PROPOSED ULTRA MODERN TRAINING CENTRE FOR MINISTRY OF EDUCATION - CEMASTEVA**  
**STRUCTURED CABLING INSTALLATIONS - DATA CENTRE**

ITEM	DESCRIPTION	UNIT	QTY.	RATE	AMOUNT
				KSHS	KSHS.
1.1.13	SC MM Duplex connectors as Siemon (FC2-SC-MM-B80-B) or equal and approved	No	2		
1.1.14	Fibre dual adapters as Siemon (RIC-F-SC6-01) or equal and approved	No.	2		
1.1.15	Complete earthing of cabinet to IEE requirements comprising of 16sq mm ECC, connected to the electrical installations earthing complete with all accessories (Earth rods, Copper Plates and Grounding Key)	Item	1		
1.1.16	Any other item equired to complete the works	LOT	1		
1.1.17	UNIFI WIFI/AP long range, 300Mbs-100m range and scalable to 100's or equal and approved	No.	2		
1.1.18	High voltage surge protector as Solatec or equal and approved	No.	1		
1.1.19	Telephone sets as Panasonic Model KX - HDV130 IP phone or equal and approved	No.	4		
1.1.20	HDV230B SIP Phone" complete with accessories or equal and approved	No.	1		
1.1.21	Cisco Catalyst C9200L - 24P - 4X - E, 370W (24 - Port PoE with 4 x 10 G SFP+ uplink ports )Layer 3 with advanced IP service licenses, and populated with appropriate SFP transceiver modules for uplinks to the Fiber aggregation switch complete with 3 Years DNA, 8x5xNBD SMARTnet and all accessories - as Cisco or equal and approved	No.	1		
1.1.22	Allow for Fluke Testing and giving report in a 3 No. CD	LOT	1		
1.1.23	Allow for testing and commisioning to Engineers's satisfaction	LOT	1		
<b>TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 3</b>					

**PROPOSED ULTRA MODERN TRAINING CENTRE FOR MINISTRY OF EDUCATION - CEMASTEVA**  
**STRUCTURED CABLING INSTALLATIONS - DATA CENTRE - PHASE II**

ITEM	DESCRIPTION				AMOUNT
					SHS.
	<b>COLLECTION PAGE</b>				
	BROUGHT FORWARD FROM PAGE No. 1				
	BROUGHT FORWARD FROM PAGE No. 2				
	<b>TOTAL CARRIED FORWARD TO</b>				
	<b>ELECTRICAL SERVICES SUMMARY PAGE No. M/S</b>				

**ELECTRICAL SUMMARY PAGE**  
**PROPOSED ULTRA MODERN TRAINING CENTRE FOR MINISTRY OF**  
**EDUCATION - CEMASTEVA - PHASE II**  
**ELECTRICAL SERVICES INSTALLATIONS**

	DESCRIPTION	AMOUNT
		Kshs.
A	PRELIMINARIES	
B	FROM SP 1 FOR STANDBY GENERATOR INSTALLATION	
C	FROM SP 2 ELECTRICAL INSTALLATION	
D	FROM SP 3 FOR SOLAR PV INSTALLATION	
E	FROM SP 4 FOR UPS INSTALLATION	
F	FROM SP 5 FOR RAISED ACCESS FLOOR INSTALLATION	
G	FROM SP 6 FOR CCTV INSTALLATION	
H	FROM SP 7 FOR ACCESS CONTROL INSTALLATION	
I	FROM SP 8 FOR STRUCTURED CABLING INSTALLATION	
	<b>TOTAL CARRIED FORWARD TO ELECTRICAL AND MECHANICAL GRAND SUMMARY PAGE</b>	

Amount in Figures: Kshs.....

Amount in Words: Kenya Shillings.....

Official Stamp & Address: .....

Tenderer's Signature: .....Date:.....

Witness' Name:.....Witness' Signature:.....

Address:.....

Date:.....

**BILL NO. 7**

**MECHANICAL INSTALLATION WORKS**

**PROPOSED ULTRA MODERN TRAINING CENTRE FOR MINISTRY OF  
EDUCATION, CENTRE OF MATHEMATICS, SCIENCE AND TECHNOLOGY –  
CEMASTE A**

<b>CONTENTS</b>	<b>PART</b>
1. General Specifications 01	1
2. General Specifications for Air Conditioning & Mechanical Ventilation Installations	2
3. General Specifications for Refrigeration Equipment Installations	3
4. General Specifications for Automatic Fire Suppression Installations	4

**PART 01**

**GENERAL MECHANICAL SPECIFICATION**

## PART 01

### GENERAL MECHANICAL SPECIFICATION

#### INDEX

<b>CLAUSE No.</b>	<b>DESCRIPTION</b>	<b>PAGE No.</b>
1.	General	B1/1
2.	Quality Of Materials	B1/1
3.	Regulations and Standards	B1/1
4.	Electrical Requirements	B1/2
5.	Transport and Storage	B1/2
6.	Site Supervision	B1/2
7.	Installation	B1/3
8.	Testing	B1/3
8.1	General	B1/3
8.2	Material Tests	B1/3
8.3	Manufactured Plant and Equipment - Works Tests	B1/3
8.4	Pressure Testing	B1/4
9.	Colour Coding	B1/4
10.	Welding	B1/4
10.1	Pressure Testing	B1/4
10.2	Method	B1/4
10.3	Welding Codes and Construction	B1/4
10.4	Welders Qualifications	B1/5

## **PART 01**

### **GENERAL MECHANICAL SPECIFICATION**

#### **1. GENERAL**

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

#### **2. 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 connected by the Sub-Contractor shall carefully be examined on receipt and stored. 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.

#### **3. REGULATIONS AND STANDARDS**

The Sub-Contract Works shall comply with the current edition of the following:-

- (a) The Kenya Government Regulations
- (b) The United Kingdom Institution of Electrical Engineering (IEE) Regulations for the electrical equipment of buildings.
- (c) The United Kingdom Chartered Institute of Building Services Engineers (CIBSE) Guides.
- (d) British Standards 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 Water Authority By-Laws.
- (h) The Kenya Building code of Regulations.

#### 4. **ELECTRICAL REQUIREMENTS**

Plant and equipment supplied under this Sub-Contract shall be complete with all necessary motor starters, control boards, and other control apparatus. Where Control Panels incorporating several starters are supplied, they shall be complete with a main isolator.

The supply power up to and including local isolators shall be provided and installed by the Electrical Sub-Contractor. All other wiring shall be as described in the "Particular Specification".

The Sub-Contractor shall supply three copies of all schematic, cabling and wiring diagrams for the Engineer's approval.

The starting current of all electric motors and equipment shall not exceed the maximum permissible starting currents described in the Kenya Power and Lighting Company's (KP & LC) By-Laws.

All electrical plant and equipment supplied by the Sub-Contractor shall be rated for the supply voltage and frequency obtained in Kenya, that is 415 volts, 50HZ, 3-phase or 240 volts, 50HZ, 1-phase as specified in the "Particular Specification".

Any equipment that is not rated for the above voltages and frequencies may be rejected by the Engineer

#### 5. **TRANSPORT AND STORAGE**

All plant and equipment shall, during transportation be suitably packed, crated and protected to minimise the possibility of damage and to prevent corrosion or other deterioration.

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

Adequate measures shall be taken by the Sub-Contractor to ensure that plant and equipment do not suffer any deterioration during storage.

Prior to installation all piping and equipment shall be thoroughly cleaned.

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

#### 6. **SITE SUPERVISION**

The Sub-Contractor shall ensure that there is an English-speaking supervisor on the site at all times during normal working hours.

## 7. **INSTALLATION**

Installation of all special plant equipment shall be carried out by the Sub-Contractor under adequate supervision from skilled staff provided by the plant and equipment manufacturer or his appointed agent in accordance with the best standards of modern practice and to the relevant regulations and standards described under Clause 3 of this section.

## 8. **TESTING**

### 8.1 **General**

The Sub-Contractor's attention is drawn to Part "A", Sub-Clauses 1.44 and 1.45 Page A/13 of the "Preliminaries and General Conditions".

The following sub-clauses are intended to define the Sub-Contractor's responsibilities with respect to testing and inspection.

### 8.2 **Material Tests**

All material for plant and equipment to be installed under this Sub-Contract shall be tested, unless otherwise directed, in accordance with the relevant B.S. specification concerned.

For materials where no B.S. specification exists, tests are to be made in accordance with the best modern commercial methods to the approval of the Engineer, having regard to the particular type and application of the materials concerned.

The Sub-Contractor shall prepare specimens and performance tests and analyses to demonstrate conformance of the various materials with the applicable standards.

If stock material, which has not been specifically manufactured for the plant and equipment specified is used, then the Sub-Contractor shall submit satisfactory evidence to the Engineer that such materials conform to the requirements stated herein in which case tests of material may be partially or completely waived.

Certified mill test reports of plates, piping and other materials shall be deemed acceptable.

### 8.3 **Manufactured Plant and Equipment - Works Tests**

The rights of the Engineer relating to the inspection, examination and testing of plant and equipment during manufacture shall be applicable to the Insurance Companies or Inspection Authorities so nominated by the Engineer

The Sub-Contractor shall give two week's notice to the Engineer of the manufacturer's intention to carry out work tests and inspections.

The Engineer or his representative shall be entitled to witness such tests and inspections. The costs of such tests and inspections shall be borne by the Sub-Contractor.

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

Plant and 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 and inspection certificates not be approved, new tests may be ordered by the Engineer at the Sub-Contractor's expense.

#### **8.4 Pressure Testing**

All pipe work installations shall be pressure tested in accordance with the requirements of the various section of this specification. The installations may be tested in section to suit the progress of the works but all tests must be carried out before the work is buried or concealed behind building finishes. All tests must be witnessed by the Engineer or his representative and the Sub-Contractor shall give 48 hours notice to the Engineer of his intention to carry out such tests.

Any pipe work that is buried or concealed before witnessed tests have been carried out shall be exposed at the expense of the sub-contractor and the specified tests shall then be applied.

The Sub-Contractor shall prepare test certificates for signature by the Engineer and shall keep a progressive and up-to-date record of the Sections of the work that have been tested.

### **9. COLOUR CODING**

Unless stated otherwise in the Particular Specification all pipe work shall be colour coded in accordance with the latest edition of B.S. 1710.

### **10. WELDING**

#### **10.1 Preparation**

Joints to be made by welding shall be accurately cut to size with edges sheared, flame cut or machined to suit the required type of joint. The prepared surface shall be free from all visible defects such as lamination, surface imperfections due to shearing or flame cutting operation, etc., and shall be free from rust, scale, grease and other foreign matter.

#### **10.2 Method**

All welding shall be carried out by the electric arc process using covered electrodes in accordance with B.S. 639.

Gas welding may be employed in certain circumstances provided that prior approval is obtained from the Engineer

#### **10.3 Welding codes and Construction**

All welded joints shall be carried out in accordance with the following specification:-

(a) Pipe Welding

All pipe welds shall be carried out in accordance with the requirements of B.S.806.

(b) General welding

All welding mild steel components other than pipe work shall comply with the general requirements of B.S. 1856.

10.4 **Welders Qualifications**

Any welder employed on this Sub-contract shall have passed the trade tests as laid down by the Government of Kenya.

The Engineer may require to see the appropriated certificate obtained by any welder and should it be proved that the welder does not have the necessary qualifications the Engineer may instruct the Sub-Contractor to replace him by a qualified welder.

## **PART 02**

**STANDARD SPECIFICATIONS FOR MECHANICAL  
VENTILATION AND AIR CONDITIONING SYSTEMS**

# GENERAL SPECIFICATION FOR MECHANICAL VENTILATION INSTALLATIONS

CONTENT	PAGE
1.0 SCOPE OF WORK-----	3
2.0 SYSTEM COMPONENTS-----	3
3.0 DRAWINGS -----	3
4.0 MATERIALS AND WORKMANSHIP GENERALLY -----	3
5.0 DUCTWORK GENERALLY -----	4
5.1 Ductwork-----	4
5.2 Rectangular ductwork-----	4
6.0 BRACKETS AND SUPPORTS -----	5
7.0 JOINTS-----	6
7.1 Flexible Joints-----	6
7.2 Flexible Connections.-----	6
8.0 FINISH PAINTING -----	7
9.0 AIR INTAKES AND OUTLETS -----	7
10.0 FANS-----	7
10.1 General -----	7
10.2 Axial Flow Fans -----	8
11.0 DAMPERS -----	8
11.1 General -----	8
11.2 Butterfly dampers-----	9
11.3 Bifurcating dampers-----	9
11.4 Multi-leaf dampers	
11.5 Damper Quadrants and Operating Handles	
11.6 Self-closing dampers	
11.7 Sliding Dampers -----	9
11.8 Iris type dampers.-----	10
12.0 GRILLES -----	10
12.1 Supply & Return Registers -----	10
12.2 Extract grilles -----	10
12.3 Fresh Air Grilles -----	10
12.4 Diffusers-----	10
12.5 Louvres-----	10

<b>13.0</b>	<b>ATTENUATORS</b>	<b>10</b>
<b>13.1</b>	<b>General</b>	<b>10</b>
<b>13.2</b>	<b>Rectangular Attenuators</b>	<b>11</b>
<b>13.3</b>	<b>Circular Attenuators</b>	<b>11</b>
<b>13.4</b>	<b>Acoustic Lining</b>	<b>11</b>
<b>14.0</b>	<b>INSTRUMENTS</b>	<b>11</b>
<b>14.1</b>	<b>General</b>	<b>11</b>
<b>14.2</b>	<b>System Static Pressure Gauge</b>	<b>11</b>
<b>15.0</b>	<b>VIBRATION, NOISE AND SOUND INSULATION</b>	<b>12</b>
<b>15.1</b>	<b>Anti-Vibration Mountings</b>	<b>12</b>
<b>15.2</b>	<b>Noise</b>	<b>12</b>
<b>16.0</b>	<b>THERMAL INSULATION</b>	<b>12</b>
<b>16.1</b>	<b>General Description</b>	<b>12</b>
<b>16.2</b>	<b>Ductwork In Plant Room</b>	<b>12</b>
<b>16.3</b>	<b>Ductwork External to plant Rooms</b>	<b>13</b>
<b>17.0</b>	<b>ELECTRICAL EQUIPMENT AND WIRING</b>	<b>13</b>
<b>17.1</b>	<b>Scopes</b>	<b>13</b>
<b>17.2</b>	<b>General</b>	<b>13</b>
<b>17.3</b>	<b>Electrical Motors</b>	<b>13</b>
<b>18.0</b>	<b>INSPECTION, COMMISSION AND TESTING</b>	<b>14</b>
<b>18.1</b>	<b>General</b>	<b>14</b>
<b>18.2</b>	<b>Testing</b>	<b>14</b>
<b>18.2.1</b>	<b>Site Tests</b>	<b>14</b>
<b>18.2.2</b>	<b>Site Tests-Fans</b>	<b>14</b>
<b>18.2.3</b>	<b>Completion of Works – Balancing and Commissioning</b>	<b>14</b>
<b>19.0</b>	<b>CONTROL SYSTEM</b>	<b>15</b>
<b>20.0</b>	<b>NOISE AND SOUND CONTROL</b>	<b>15</b>
<b>21.0</b>	<b>OPERATING AND MAINTAINANCE INSTRUCTION</b>	<b>16</b>
<b>22.0</b>	<b>SPARE PARTS</b>	<b>16</b>

# **GENERAL SPECIFICATION FOR MECHANICAL VENTILATION INSTALLATIONS**

## **1.0 SCOPE OF WORK**

The scope of the works comprises Installation, Testing, and Commissioning of Mechanical Ventilation and Air Conditioning systems in accordance with Specifications and drawings.

All the necessary elements and details for complete system are to be included. Excluded from the specifications are the following:-

- All concrete works
- All block work
- Electrical wiring, isolators and switch boards, except internal wiring for control system from a local isolator.

## **2.0 SYSTEM COMPONENTS**

Dimensions and capacities of ducts and fans are calculated and based on a specific requirements of air, and on an assumed resistance through grilles, silencers etc. However the installer shall be responsible for the correct functioning of the system. Subsequently it is therefore his duty to size the systems' components with consideration to his offered equipment.

## **3.0 DRAWINGS**

The Engineer's drawings show the main layout and principles for the Ventilation and Air Conditioning Systems. If need for further detailing is required in order to carry out the work, working drawings and details shall be produced for approval by the Engineer before the work is executed.

In preparation of the working drawings care should be taken to coordinate the Ventilation and Air Conditioning works with other services involved and avoid any interference with these.

## **4.0 MATERIALS AND WORKMANSHIP GENERALLY**

In the specification, equipment is generally described according to capacities and a given standard in order to aid in identification of the particular equipment to satisfy specifications. The equipment selected shall be of reputable manufacture with adequate Back-Up service.

If the Engineer finds it necessary, samples of the materials will be submitted for approval before placing an order. The Engineer shall reject any materials which he finds to be of unsatisfactory quality.

Works shall be carried out by competent workmen under experienced supervision.

The Engineer shall have the authority to have any substandard work or equipment redone and/ or equipment replaced.

## **5.0 DUCTWORK GENERALLY**

### **5.1 Ductwork**

All seams, joints and connections to plant shall be so made as to reduced air leakage to a minimum. Internal roughness and obstructions to airflow will not be accepted. Sharp edges or corners on the outside of ductwork, flanges, supports, etc will not be accepted. Any part of galvanized ductwork where the galvanizing is damaged during manufacture or erection shall be painted with two coats of aluminum, zinc or other corrosion – resisting paint to the approval of the Engineer.

Where ducts pass through roofs (and external walls where applicable) these shall be fitted with angle flanges and weather cravats to ensure a weather-proof fitting to the building structure.

Connections to equipment shall be made with angle flanged joints. Ductwork which may have to be moved to enable plant to be removed shall incorporate angle flanged joints. For long duct runs, angle flanged joints shall be included at intervals to facilitate any subsequent alternations.

Bends and offsets shall have a minimum throat radius equal to the width of the duct. Where short radius elbows are indicated or agreed by the Engineer as necessary due to site limitations the dimensions and internal vane (s) shall be in accordance with HVCA publication DW/121.

Ductwork shall be constructed by galvanized, cold rolled, close annealed patent flattened sheets. Tests holes shall be provided in branch ducts from grilles and there shall be three or four tests holes on side of duct according to duct depth at each test position. At branch positions there shall be one test hole. Air tight swivel type metal covers shall be fitted over the test holes in such a manner that they shall be readily removed as required.

### **5.2 Rectangular ductwork**

Construction of ductwork shall be as per the following Guidelines:

- Up to 300mm longer side – 22 S.W.G.
- over 300mm and up to 460mm longer size – 20 S.W.G.
- over 460mm and up to 900mm longer side 18 S.W.G (stiffening to be 25mm x 25mm x 3mm. M.S angle at slip joints at 180mm spacing)
- Over 900mm and up to 1370mm. longer side 16 S.W.G. (stiffening to be 30mm x 30mm x 3mm M.S angle at 900mm spacing).

- Over 1370mm longer side – 14 S.W.G. (Stiffening to be 40mm x 40mm x 5mm M.S angle at 900mm. spacing).

Ductwork constructed from 22 and 20 S.W.G sheet shall have folded locked seams and ductwork constructed from 18, 16 and 14 S.W.G. sheets shall have riveted seam with 8 S.W.G rivets at 2” pitch.

Joints for ductwork having a side greater in width than 610mm shall be flanged by means of 30mm x 30mm x 3mm mild steel angles.

Mild steel used as flanges or stiffeners shall be riveted to the ductwork, with 8 S.W.G rivets at 2” pitch. The joint faces of flanges shall be drilled for 10mm bolts at 75mm pitch.

Air tight access doors shall be provided on the ductwork wherever indicated on the drawings. The access doors, of sufficiently heavy construction to avoid distortion, complete with handles, shall be secured by brass wing nuts screwed into studs provided, on galvanized mild steel stiffening frames riveted, or bolted to the ductwork. The access doors shall be provided with felt or rubber gaskets to ensure that when closed they are perfectly tight.

The ductwork shall be installed with all joints air tight and adequately stiffened and braced shall have the largest radius possible with a minimum throat radius of one diameter if possible. Square or miter elbows will only be allowed where shown on the drawings. Turning vanes shall be fitted in square or miter elbows.

Transformer pieces except where situated on fan suction shall be constructed so that the angle on any side does not exceed 15° to the axis of the duct where possible.

Branch ducts shall enter main ducts expansion sections where possible. Where branch ducts occur, at taper or transformation pieces, the length of such pieces in the main duct shall be symmetrical about the axis of the branch.

## **6. BRACKETS AND SUPPORTS**

Supports and brackets for ductworks shall be made adjustable for height, spaced to ensure support and where practicable shall be fitted at each joint of the ductwork. Vertical ductwork shall be supported at each floor level, horizontal ducts at intervals not exceeding 2280mm and adjacent to fans, canvas joints and other equipment. All members of supports in contact with metal ductwork shall be galvanized after fabrication. Socketed joints shall have a minimum overlap of 50mm in the direction of flow. The joint shall be made with an approved type jointing compound with bolts or rivets at centres not exceeding 50mm. wherever access cannot be made for riveting or bolting self tapping screw of the shortest length which will give a satisfactory joint shall be used in lieu of the rivets or bolts, on size or diameters up to 530mm. All slip joints on circular ductwork are to have a spigot carefully swaged damper leaves shall be multi leaf type. The quadrants shall be of robust construction and securely fixed to the ductwork. The leaves shall be linked with a connecting rod and the ends of the spindle shall be housed in bearings. Dampers are to indicate the full and closed positions and are to be marked and then locked after air Volume has been set.

## **7.0 JOINTS**

### **7.1 Flexible Joints**

Flexible joints shall be provided on fan inlet and outlet connections and elsewhere on the ductwork where indicated. They shall be over the full cross-sectional area of the mating fan inlet or outlet section. The ends of the duct and fan connections shall be in line.

Flexible joints shall consist of, or be protected by, material having a fire penetrating time of at least fifteen minutes when tested in accordance with BS 476 Part 1 Section 3. The material shall be of the glass fibre cloth type, canvas or other approved material. The width of joints from metal edge to metal edge shall not be less than 80mm and more than 250mm.

All flexible joints other than fan inlet connections shall be between flanged ends. The flexible material flange shall be backed by an angle or flat iron flange and the flexible joint flat iron bar used with fan inlets shall not be less than 5mm thick.

### **7.2 Flexible Connections.**

Where flexible connections are indicated or required between rigid ductwork and particular components or items of equipment, the internal diameter of the flexible duct shall be equal to the external diameter of the rigid ductwork and of the spigot type. The use of flexible duct between rigid sections of sheet metal ductwork to change direction or plane will not be permitted except where indicated or expressly authorized by the Engineer.

The flexible duct shall have a liner a cover of tough tea-resistant fabric equal in durability and flexibility to glass fibre shall be impregnated and coated with plastics. It shall be reinforced with a bonded galvanized spring steel wire helix or glass fibre cord or equal and shall be bonded to cover to ensure regular convolutions.

Alternatively the flexible duct shall consist of flexible corrugated metal tubing of stainless steel, aluminium, tinplated steel or aluminium coated steel. The metal may be lined on the inside or the outside or both with plastics materials.

The joints to rigid spigots shall be sealed with a brush coat of pipe jointing paste or mastic compound. Ducts up to 150mm diameter shall be secured with a worm drive type hose clip complying with BS 3628. Ducts over 150mm diameter shall be secured with band clip.

The frictional resistance to air flow per unit length of the flexible duct shall not exceed 50% more than the frictional resistance per unit length of galvanized steel ducts of equivalent diameter. The radius ratio  $R/D$  for bends shall not be less than 2, where  $R$  is the centre line radius and  $D$  is the diameter of the flexible duct.

Flexible ducts shall be suitable for an operating temperature range of 18oC to 120oC and shall comply with BS 476 Part 1, Section 2, Clause 7 (Clause 1; surface of very low flame spread).

## **8.0 FINISH PAINTING**

Upon completion of the installation and after all tests have been carried out to the satisfactory of the Engineer, the plant, equipment, supports, etc. shall be examined and all priming coats damaged during erection made good.

Any plant or equipment, ductwork, etc., which is to be insulated, shall have had the priming paint protection made good before the application of the insulation. After the above procedures have been carried out to the satisfaction of the Project Manager, the various surface shall be given the necessary preparation as recommended by the paint and insulation manufacturers and finish painted in colours to be agreed between the Sub-Contractor and Project Manager, at a later date.

For the purposed of the Specification, however, it shall be deemed that the sub-contractor's tender price was based on the identification requirements for the various services detailed in Code of Practice DW/161 Identification of Ductwork as published by the H.V.A.

## **9.0 AIR INTAKES AND OUTLETS**

Unless otherwise indicated fixed louvers on external walls will be fitted at air intake and outlet positions. A galvanized steel wire mesh screen of 20mm diamond mesh and at 2mm diameter wire and complete with a frame of galvanized steel rod with securing lugs or of flat iron shall also be fitted on the inner side of the louvers.

## **10.0 FANS**

### **10.1 General**

Fans shall capable of giving the specified performance when tested in accordance with BS 848. Although estimated values of the resistance to airflow of items of equipment may be indicated, this does not relieve the Contractor to the responsibility for providing fans capable of delivering the required air volume flow through the system.

The make and design of fans shall be approved by the Engineer and evidence supporting noise levels and fan efficiencies shall be provided. Where fans are supplied with noise attenuations, full details of the attenuations shall be given.

Belt driven fans shall be fitted with pulleys suitable for V-belts; pulleys of the taper lock type may be used for drivers up to 30KW output. Alternatively, and in any case above 30KW output, pulleys shall be secured to the fan and the motor shafts by keys fitted into machined keyways. Pulleys shall be keyed to the fan shaft in the overhung position. Keys shall be easily accessible so that they can be withdrawn or tightened and they shall be accurately fitted so that the gib head does not protrude beyond the end of the shaft.

Machined bolts, nuts and washers only shall be used for the assembly of fans; all bearing surfaces for the heads of bolts or washers shall be count faced. Holding down bolts for

fans and meters shall be square section under the head or be fitted with snugs to prevent them tuning in the fan base plate when the nuts are tightened.

Any fan which is too large or too heavy for safe manhandling shall provided with eyebolts or other lifting facilities to enable mechanical lifting equipment to be used.

## **10.2 Axial Flow Fans**

Axial flow fans shall be of either the single stage type or the multi-stage contra-rotating type with each impeller mounted on an independent motor. Casings shall be rigidly constructed of mild steel stiffened and braced to obviate drumming and vibration. Cast iron or fabricated steel feet shall be provided where necessary for bolting to the base or supports. Inlet and outlet ducts shall terminate in flanged rings for easy removal. The length of the fan (s) and motors(s) shall also terminate in flanges in order that the complete section may be removed without disturbing adjacent ductwork. Electrical connections to the motor(s) shall be through an external terminal box secured to the casing. Impellers shall be of steel or aluminum; the blades shall be secured to the hub or the blades and the hub shall be formed in one piece. The hub shall be keyed to a substantial mild steel shaft and the whole statically balanced. Blades shall be of aerofoil section. Shafts shall be carried in two bearings which may be ball roller or sleeve type. Lubricators shall be extended to the outside of the casing.

Where axial flow fans are driven by a motor external to the casing the requirements for pulleys and for V-belt drives and guards shall be met. Unless otherwise indicated a guard is not required for any part of a drive which is within the fan casing. An access door of adequate size shall be provided.

Where axial flow fans of the bifurcated type are indicated the motors shall be out of the air stream. Motors may be placed between the two halves of the casing in the external air or may be placed within the fan casing provided that effective ventilation is given to the motor. Where hot gases or vapors are beings handled the motor and the bearings shall be suitable for operation at the temperature they may experience.

## **11.0 DAMPERS**

### **11.1 General**

Sufficient dampers shall be provided to regulate and balance the system. Dampers on grills or diffusers shall be used for fine or secondary control. All dampers shall be sufficiently rigid to prevent fluttering. Unless otherwise indicated, the air leakage past dampers in the fully-closed position shall not exceed 5% of maximum design air flow in the duct. All duct dampers except fire dampers and self-closing flaps shall be fitted with locking devices and position indicators. Dampers shall be generally in accordance with the appropriate HVCA Specification.

Each Primary control damper shall be fitted with a non-corrodible label stating the actual air flow in M3/S and the cross-sectional area. Alternatively, these figures shall be painted in a visible position on the adjoining ductwork or insulation. The position of a damper as set after final regulation and balancing be indelibly marked on the damper quadrant

## **11.2 Butterfly dampers**

Butterfly dampers shall each consist of two plates edge seamed, and of the same thickness of material as that from which the associated duct is made, and rigidly fixed to each side of a mild steel operating spindle, the ends of which shall be turned and housed in non-ferrous bearings.

## **11.3 Bifurcating dampers**

Bifurcating dampers shall be of 2mm thick sheet for sizes up to 450mm square. For larger sizes, the thickness shall be as indicated. Damper plates shall be rigidly fixed to square section mild steel spindles the ends of which shall be turned and housed in non-ferrous bearings.

## **11.4 Multi-leaf dampers**

Multi – leaf dampers shall consist of two plates of material of the same thickness as the associated duct and rigidly fixed to each side of an operating spindle, the ends of which shall be housed in brass, nylon, oil impregnated sintered metal, PTFE impregnated or ball bearings. The ends of the spindles shall be linked such that one movement of the operating handle shall move each leaf an equal amount. An inspection door shall be provided adjacent to each multi-leaf damper. On low velocity systems only, multi-leaf damper blades may be of a single plate, at least 1.6mm thick and suitably stiffened, and the blade linkages may be within the duct. Those dampers shall have bearings and inspection doors as specified above.

## **11.5 Damper Quadrants and Operating Handles**

Quadrants and Operating handles shall be of die-cast aluminum with the words “OPEN” and “SHUT” cast on the Quadrants. Quadrants shall be securely fixed to the damper spindles and shall be close-fitting in the quadrant hubs to prevent any damper movement when the damper levers are locked.

## **11.6 Self-closing dampers**

Self-closing dampers shall be designed so as to present the minimum of resistance to airflow under running conditions, to take up a firm, non-fluctuating position under running conditions and to give a tight shut-off when closed. They shall incorporate rubber stops to prevent rattling and to give a tight shut-off when closed. They shall incorporate rubber stops to prevent rattling.

## **11.7 Sliding Dampers**

Sliding dampers shall be provided only where indicated. They shall be of 2mm. thick sheet steel for size up to 450mm square. For larger sizes the thickness shall be as indicated. They shall run in guides lined with felt.

**11.8 Iris type dampers.**

Iris type dampers may be used in ducting up to 600mm, dia. Or 450mm square. The control shall be on the outside of the damper. The design shall be such that the leaves of the damper can be easily moved for adjustment.

**12.0 GRILLES**

**12.1 Supply & Return Registers**

Supply registers shall be manufactured from high grade, extruded Aluminium sections with lacquered finish and fixing shall be 32mm with beveled edges.

The registers shall have a front set of blades parallel to the long dimension, of rear set of blades parallel to the short dimension, the blades being at 17mm centres and individually adjustable with opposed blade dampers.

**12.2 Extract grilles**

Extract grilles shall be similar to the Supply Registers described above with the exception that they have only one set of blades parallel to the long dimension.

**12.3 Fresh Air Grilles**

These shall be manufactured from sheet steel with steel fixing flanges and shall be galvanized after manufacture. An insect screen shall be fixed downstream.

**12.4 Diffusers**

These shall be manufactured from high grade extruded sections with lacquered finish, beveled flanges and removable core. Fixing shall be by self-tapping screws through the duct into neck of the diffuser.

**12.5 Louvres**

Discharge and Fresh air Intake louvres shall be manufactured from mild steel and be galvanized after manufacture. A screen shall be fixed to the back of the louvres

**13.0 ATTENUATORS**

**13.1 General**

Purpose made attenuators and sound absorbing material shall be designed to air flow, have adequate strength and cohesion to resist erosion by air flow and do not produce dust. They shall be free of odor and proof against rot, damp and vermin and shall comply with the requirements as to fire and smoke hazards. Adhesives

shall be compatible with the sound absorbent material and should preferably be non-flammable.

Where sound absorbent material and /or special attenuators are indicated they shall either reduce the sound level in the space, due to the equipment, to the specified value or shall give the specified sound level attenuation over the specified range of frequencies. Purpose made attenuators shall be tested in accordance with HVRA Laboratory Report No. 55 (Code for the measurement of the performance of unit silencers). The insertion loss and generated noise level for each octave band and the pressure loss of the silencer shall be stated. Attenuators shall be suitable for internal air pressure of 100N/m<sup>2</sup>, air stream temperatures of up to 40oc and free from air stream erosion for velocities up to 25m/s. The mineral wool lining shall be rot, vermin and fire-proof. Attenuator casing shall be pre-galvanized sheet steel with galvanized pre-drilled flanges.

### **13.2 Rectangular Attenuators**

These shall be rectangular in section with splitters forming air passages in parallel. The mineral wool lining shall be resin bonded.

### **13.3 Circular Attenuators**

Circular section attenuators will have a central pod. The mineral wool lining shall be retained by expanded steel. The end flanges shall be match drilled to suit the fan which they are fixed to.

### **13.4 Acoustic lining**

**Where indicated on the contract drawings, the ductwork shall be acoustically lined. The lining shall consist of resin bonded mineral wool 25mm, thick fixed to the ductwork by a suitable adhesive.**

## **14.0 INSTRUMENTS**

### **14.1 General**

The instruments, gauges etc, detailed in this section shall be provided in addition to those associated with specific items of plate and detailed elsewhere, they shall be mounted in accessible positions and shall be easily read.

### **14.2 System Static Pressure Gauge**

A system static pressure gauge shall be provided for the system. It shall consist of a small inclined manometer gauge similar to a filter gauge. The edge of the gauge shall be connected to the system and the other end shall be left open to the plant room but where fluctuation of the static pressure in the plant room may occur the gauge shall be connected across the main fan. Such fluctuations may be caused by wind pressure affecting large open air intakes to the plant room.

## **15.0 VIBRATION, NOISE AND SOUND INSULATION**

### **15.1 Anti-Vibration Mountings**

Fans, compressors, motors and any other vibration-inducing equipment shall be isolated from the building structure by anti-vibration mountings which shall be compressed machinery cork, spring or rubber dampers or rubber/metal bearers as indicated.

### **15.2 Noise**

The noise produced by the installation in the spaces served, in any adjacent buildings and in the open air surrounding plant rooms shall be kept as low as possible. This shall be specially considered in the selection of fan motors, grilles and the internal finish and arrangements of extraction ducting.

Noise level information for fans based on octave analysis data, shall be stated. The reference level and the testing technique shall be stated.

The sound level in the spaces served, due to the equipment shall comply with the recommended design criteria given in the IHVE Guide (Table 13.1 of 1965 Edition). The maximum sound pressure level due to ventilation system must not exceed value mentioned below measured by a reference value of  $2 \times 10 \times 10^{-5} \text{ N/m}^2$  transferred to a logarithmic scale, and measured at any point 1.5 meters above the floor and 1.0 meters from the walls.

The maximum sound pressure level measured at any point 4 metres from the extract point must not exceed 55dB.

The maximum sound pressure level measured at any point 4 metres from fans must not exceed 60dB.

## **16.0 THERMAL INSULATION**

### **16.1 General Description**

All heated, cooled, and recirculated air ductwork shall be insulated.

Insulation shall be of 25mm thick expanded polystyrene sheet, or spray applied polyurethane foam to a uniform thickness of 25mm. Polystyrene shall be fixed so that the edges butt closely without gap and the insulation shall overlap at corners by the thickness of the insulation. The sheet shall be fixed by means of a suitable adhesive and plastic impingement pines attached to the ductwork.

### **16.2 Ductwork In Plant Room**

The insulation described above in Clause 5.1 above shall be finished by the application of a 15mm thick layer of hard setting finish. Insulation shall bevelled thick to angle of 45o at all connecting flanges, access hatches and all other places where operation or maintenance is likely to cause the breaking of the insulation.

The insulation shall then be given a vapour sealing by the application of two coats of anti-condensation paint.

### **16.3 Ductwork External to plant Rooms**

The insulation described in Clause 5.1 above shall finish by the application of two coats of bitumastic.

## **17.0 ELECTRICAL EQUIPMENT AND WIRING**

### **17.1 Scopes**

The responsibility for electrical equipment and wiring shall be as defined as below:-

An on-off starter shall be provided and placed in the appropriate position for connection of the fans required for the installation and within a time agreed with the Engineer fully detailed wiring diagrams for all connections to them shall be availed.

The Installer shall be responsible for the accuracy of all wiring diagrams provided by him and for the correct internal wiring of all pre-wired equipment supplied. The Installer shall reimburse the full cost of abortive or remedial work arising from any error in these aspects.

### **17.2 General**

Unless otherwise indicated all electrical equipment and installation shall be suitable for use in ambient temperatures up to 40°C and relative humidities up to 90%. For tropical climates, electrical equipment shall be suitable for use in the temperature and humidity as indicated; it shall be proof against atmospheric corrosion, including that of saline air where relevant, and materials shall not be susceptible to mould growth or attack by termite and similar hazards.

### **17.3 Electrical Motors**

Electrical motors shall comply with BS 170 2048 or with BS 2613 and BS 3979 as appropriate. All motors shall have Class E insulation (BS2757) and can be continuously rated.

They shall be screen protected (BS2817) unless otherwise indicated. Under all normal conditions without being overloaded. All motors larger than 0.75kw output shall be three phase, for motors above 15kw output the type of motor and method of starting shall be such as to limit the starting and run-up currents to three times the rated full load current unless otherwise indicated. No motor shall run faster than 25 rev/s unless otherwise indicated.

## **18.0 INSPECTION, COMMISSION AND TESTING**

### **18.1 General**

Unless otherwise indicated tests shall be carried out in accordance with the appropriate BS or CP. Test certificates for works tests, site tests and tests required by BS shall be submitted in duplicate to the Engineer.

### **18.2 Testing**

Where an individual inspection or tests take place at outside the site of the works representatives of the Engineer will be required to be present.

Unless otherwise indicated the contract shall include the cost of all tests, necessary instruments, plant supervision and labour both at work and on site. The accuracy of the instruments shall be demonstrated where so directed by the Engineer.

The site test shall be of at least six hours duration. Any defects or workmanship, materials and performance maladjustments or other irregularities which become apparent during the tests shall be rectified by the supplier at his expense and the tests shall be repeated at his expense to the satisfaction of the Engineer.

The Supplier/Installer's representative present at the site tests shall be fully conversant with the operation of the thermostatic controls and shall be expected to explain the operation and safety controls forming part of the installation to the employer's representatives.

#### **18.2.1 Site Tests**

The Installer shall supply all instruments and equipment necessary to carry out site tests and shall arrange with other parties for the testing of associated equipment which may affect the performance of the plants installed under these works.

#### **18.2.2 Site Tests-Fans**

All fans shall be charged with suitable lubricant and shall be tested upon completion of the auxiliary system erection to ascertain that the performance of each fan complies with the requirements of the specification.

#### **18.2.3 Completion Of Works – Balancing And Commissioning**

Following the site tests and prior to handover, Mechanical Ventilation or Air-Conditioning systems shall be balanced by means of grills, dampers and other special controls installed so to give the required air flow rates and where applicable the required temperatures, pressures and humidity conditions in all areas served by the said systems.

The complete system shall be balanced and commissioned as a whole. Sectional balancing and commissioning on any part of the system where this excludes final complete system balancing and commissioning shall not be accepted.

Test volumes within ducts shall be within +5% of the design volumes, and volumes at grills and diffusers shall be within +10% of the design volumes.

When the system has been balanced to the satisfaction of the project manager, it shall be run under complete automatic control for 72 hours continuous operation to ascertain any faults in operation before acceptance and handover. Any faults discovered during this time shall be corrected and another test or tests of 72 hours duration shall be carried out to ensure satisfactory operation, all at the expense of the Supplier/Installer..

During this phase, particular attention shall be paid to:

- The maintenance of cleanliness of all plant and extraction systems during construction and ensuring that extraction systems are cleaned through as part of commissioning.
- The protection of plant, particularly sensitive or fragile items, from the activities of other trades during construction and from dirt and mal operation during commissioning.
- The protection of electrical of electrical equipment from damp during construction and commissioning.

## **19.0 CONTROL SYSTEM**

Particular attention shall be paid to the following features:

- Satisfactory operation of any automatic or manually operated sequence to be used in the event of fire.
- Safety in the event of failure and of sudden resumption of electricity supply.
- Satisfactory operation of safety interlocks designed for the protection of personnel, such as those associated with the high voltage electrically operated plant.

The following items shall be checked and/or tested and recorded on the site Test Certificate:-

- Set devised value of all control devices
- Satisfactory operation of equipment protection devices.
- Satisfactory operation of all sequencing operations and alternate working selections and automatic or manual change-over of duplicate plant.

## **20.0 NOISE AND SOUND CONTROL**

Sound level reading shall be taken with a simple sound level meter using the 'A' scale weighting network. The spaces in which readings shall be taken shall be as agreed with the Engineer but will in general be the following:-

- Plant rooms
- Occupied rooms adjacent to plant rooms
- Outside plant rooms facing air intakes and exhaust to assess possible nuisance to adjacent accommodation. If the adjacent accommodation is private residential building
- tests may be required at night.
- In the space served by the first grille or diffuser after a fan outlet.
- In any space where, by the addition of special silencing material or techniques of by classification of use, a low level of noise is clearly required.

Alternatively, sound level reading shall be taken using a sound analyzer to give an octave band analysis of the ground spectrum and to pinpoint the frequency values of peak sound levels. The spaces in which readings shall be taken shall be as agreed with the Engineer but will in general be as detailed in paragraph above.

## **21.0 OPERATING AND MAINTAINANCE INSTRUCTION**

The Supplier/Installer shall demonstrate and explain the plant and the method of starting, running and stopping to such staff as the Engineer shall nominate.

He shall provide three sets of operating and maintenance instructions which shall be enclosed in durable covers. The operating and maintenance instructions shall include:-

- A brief outline of the operation of the plant.
- Instructions on how to start and stop the plant, noting any safety and / or sequencing arrangements.
- Details of required maintenance with suggested frequency of action
- Details of all lubricating oils and greases required and filter replacement
- Details of each item of plant including the name and address of the manufacturer, type and model, serial number, duty and rating.

The operating and maintenance instructions shall be handed to the Engineer not later than at the end of the commissioning period.

## **22.0 SPARE PARTS**

The Installer shall submit a priced list of any extra materials which he recommends should be purchased for the Ventilating and Air Conditioning Plants and all associated equipment and control gear and extras not supplied as standard. He shall be required to

give a guarantee that he will hold sufficient running stock of spare parts for the maintenance of the equipment.

**PART 03**

**GENERAL SPECIFICATIONS**

**FOR**

**REFRIGERATION EQUIPMENT**

## **SPECIFICATIONS FOR KITCHEN COLDROOM**

### **A. SCOPE OF WORKS**

The works to be carried out comprises of the supply, delivery, installation, setting to work, testing and commissioning of all materials and equipment called for in this specification and/or shown in the contract drawings.

The tenderer shall include for all appurtenances and appliances not particularly called for in this specification or on the contract drawings but which are necessary for the completion and satisfactory functioning of the system.

No claim for extra payment shall be accepted from the contractor for non-compliance with the above requirements.

If in the opinion of the tenderer there exists difference between the specification and the contract drawings, the tenderer shall clarify the difference with the engineer before tendering.

The Works to be installed under the contract shall comply with the Ministry of Roads and Public Works requirements for contract works under "GENERAL MECHANICAL SPECIFICATION".

### **B. CLIMATIC CONDITIONS**

The following climatic conditions apply at the sites of the works and all materials and equipment used shall be suitable for these conditions: -

<b>PARAMETERS</b>	<b>(STATE CONDITIONS)</b>
Maximum Design Temperature	For Karen, Nairobi
Minimum Temperature	
Relative Humidity	
Altitude	
Longitude	
Latitude	

### **C. DESIGN CONDITIONS - Choose from either of the following:**

#### **MORTUARY**

- |     |                                  |   |                             |
|-----|----------------------------------|---|-----------------------------|
| (a) | Mortuary/ cold room temperatures | - | 2 ± 1 °C                    |
| (b) | Evaporator Temperatures          | - | - 7 ± 2 °C                  |
| (c) | Body Cool down time              | - | three (3) bodies in 6 hours |

## KITCHEN COLD ROOMS – MEAT AND MILK PRODUCTS

- (a) Cold room temperatures -  $0 \pm 2 \text{ }^{\circ}\text{C}$
- (b) Evaporator Temperatures -  $-7 \pm 2 \text{ }^{\circ}\text{C}$

## KITCHEN COLD ROOMS – VEGETABLE PRODUCTS

- (a) Cold room temperatures -  $12 \pm 2 \text{ }^{\circ}\text{C}$
- (b) Evaporator Temperatures -  $4 \pm 2 \text{ }^{\circ}\text{C}$

## KITCHEN FREEZER ROOMS – MEAT AND MILK PRODUCTS

- (a) Freezer room temperatures -  $-20 \pm 5^{\circ}\text{C}$
- (b) Evaporator Temperatures -  $-30 \pm 5 \text{ }^{\circ}\text{C}$

### D. INSTALLATION

Installation of the **mortuary body cold stores/kitchen cold room/kitchen freezer room** shall comprise of the following:

... (*Specify*)... No. Packaged Cold Chambers with ... (*Specify*)... No. bodies each  
Each packaged cold chamber shall have ... (*Specify*)... No. single hinged doors, .....  
.....(*Specify*)... no. Body racks each with ... (*Specify*)... no. Tiers and ... (*Specify*)... No. stretchers.

The overall external dimensions of the mortuary unit shall be approximately ... (*Specify*)... mm wide x ... (*Specify*)... mm high ... (*Specify*)... mm deep.

Or

The overall external dimensions of the kitchen cold room shall be approximately ... (*Specify*)... mm wide x ... (*Specify*)... mm high ... (*Specify*)... mm deep.

Or

The overall external dimensions of the kitchen freezer room shall be approximately ... (*Specify*)... mm wide x ... (*Specify*)... mm high ... (*Specify*)... mm deep.

### E. 1. CONDENSING UNITS

Each condensing unit shall be of capacity to cope with evaporator cooling load of ... (*Specify*)... Kw while using ... (*Specify*)... refrigerant or other ozone friendly refrigerant as the cooling media under the specified conditions.

**The condensing units shall be air-cooled, open type with indirect V-belt drive, similar or equal to those manufactured by KUBA.**

The complete assembly shall be provided with suitable vibration mountings and initial oil charge in the compressor.

The condensing units shall be mounted on belts and pulleys shall be protected by belt guard, which shall be simply demountable for easy access.

The unit shall be complete with compressor, electric motor air-cooled condenser of non-ferrous construction, liquid receiver, all mounted on a common base.

Each condensing unit shall be complete with the following items: -

1. A reciprocating compressor with a flywheel, service valves and initial oil charge
2. An air-cooled condenser of non-ferrous construction with fins mechanically bonded to by seamless tubing
3. A steel welded liquid receiver
4. A 3-phase electric motor fitted with a driving pulley and condenser-cooling fan
5. V-Belts

It shall be the responsibility of the sub-contractor to provide all the necessary anti-vibration mountings and mounting bolts.

#### **F. 1. COOLING COIL UNITS**

Each coil unit shall consist of a cooling coil, air circulating fan and fan-guard, defrost electric heater element, and a thermostatic expansion valve. A timer unit shall be mounted in the control panel to both the de-frosting intervals and defrosting periods, both of which shall be variable.

The cooling coil unit shall be a ... (*Specify*)... Kw cooling capacity under the specified conditions, and shall be of the dry expansion type, and preferably of similar make as that of the condensing units.

The coil shall be manufactured from seamless copper tubing with aluminium fins mechanically bonded to the tubes.

A defrost heater element shall be fitted along side the cooling coil.

The air-circulating fan shall be manufactured from rigid aluminium sheet and finished in white casing. A drip tray with 25mm diameter connections shall be incorporated in the base of the casing.

#### **E. 2. CONDENSING UNITS (*Note: Manufacturer's Brochures must be provided*)**

The condensing units shall be of capacity to cope with the evaporator-cooling load while using refrigerant R134a or other ozone-friendly refrigerant under specified conditions. The units shall be air-cooled semi hermetic with automatic capacity control for evaporator demand.

They shall be provided with suitable anti-vibration mountings and an initial oil charge in the compressor. The units shall be complete with compressor, electric motor, air-cooled condenser of non-ferrous construction, liquid receiver, all mounted on a common base. The units shall be as BITZER INTERNATIONAL or equal and approved and shall be mounted as directed on site/ compressor room.

**F. 2. EVAPORATORS** (*Note: Manufacturer's Brochures must be provided*)

Generally, the evaporators shall consist of a cooling coil, air-circulating fan, fan guard, defrost electric heater element and a thermostatic expansion valve. The valve shall be pressure equalized and manually adjustable. A timer unit shall be mounted in the control panel to control both the de-frosting intervals and defrosting period – both of which shall be variable. They shall be ceiling type unit with a drip tray fitted with a drainpipe to the outside of the building. The units shall be as GUNTER or equal and approved.

**G. REFRIGERATION PIPEWORK.**

Pipework shall be approved copper tubing and fitting and shall be properly fixed in conformity with 'TRANE REFRIGERATION MANUAL'. Good workmanship shall be required to ensure that all the connections are completely airtight. The suction line shall be insulated with at least 25mm thickness of Armaflex or other approved material, which shall not have insulating properties inferior to those of cork.

**H. REFRIGERATION SYSTEM COMPONENTS**

The system shall be provided with the following components all similar to or equal to those manufactured by DANFOSS or other approved manufacturer

- ❖ Filter drier
- ❖ Sight glass with moisture indicator
- ❖ Solenoid valve
- ❖ HP/LP cut out
- ❖ Suction & delivery gauges
- ❖ Room thermostat
- ❖ 100mm diameter surface mounted dial thermometer in degree Celsius

**I. CONTROL PANEL**

Each refrigeration system shall incorporate complete controls to ensure continuous system services. Such controls shall include protection against any possible motor overload and over-heat.

Each system shall be provided for with a purpose made control panel shall be fabricated from mild steel sheet of minimum SWG18 with a hinged door and then powder coated after manufacture. It shall be provided with an integral lock. It shall be complete with;

- ❖ Isolator
- ❖ Contactors
- ❖ Controlling thermostat with temp range from -10°C to +30°C
- ❖ 80mm dial thermometer with temp range from -10°C to +30°C
- ❖ MCBs
- ❖ Phase failure relay
- ❖ Over and under voltage protection
- ❖ Timer switch for defrost control
- ❖ Push buttons for start and stop

- ❖ Audible and visual high temperature alarm with manual reset
- ❖ Heater Contactor
- ❖ Evaporator fan starter with overload protection
- ❖ Compressor starter with overload protection

The panel shall also have the following pilot lamps:

- . Compressor trip – Red
- . Fan trip - Red
- . Compressor run – Green
- . Fan run - Green
- . Heater on – Yellow
- . Door open – Red light
- . Each pilot lamp should be labelled

**J. ELECTRICAL INSTALLATION**

The electrical sub-contractor/tenderer shall be responsible for providing power to the control panel and for providing a fused local Isolator and connecting power to it. The tenderer shall be responsible for the final connections to the above equipment, all control wiring and for all wiring within the control panel.

**K. INTERNAL ELECTRICAL FITTINGS**

The tenderer shall supply and install a bulkhead vapor sealed ... (*Specify*)... W incandescent light fittings in the cold room and a suitable door operated switch. Upon opening the door, the door switch shall put “on” the light and at the same time put “off” the air circulating fan.

**L. DUCTWORK**

Ductwork shall be constructed from 24SWG galvanized mild steel sheet, manufactured to BS 2989. The construction shall conform to the specification for sheet metal ductwork DW/121 for low pressure, low velocity systems.

The duct shall be stiffened as necessary with 25mm x 25mm x3mm thick mild steel angle sections and supported adequately at intervals not exceeding 1500mm.

Ductwork shall be insulated externally with 25mm thick polystyrene/polyurethane insulation or other approved equivalent and shall be finished with 2 coats of bitumastic paint and cladded with a galvanised mild steel 22SWG sheet.

**M. GRILLES**

Supply air and extract grilles shall be similar or equal to non-vision grilles type “z” as manufacture by Myson Group Ltd. They shall be manufactured from high-grade extruded aluminium bars with alum silver grey finish and 32mm beveled edges fixing flanges.

**N. 1. INSULATION AND FINAL WALL FINISHES**

The insulating material shall be pre-fabricated rigid injected polyurethane foam or equal and approved with a conductivity of approximately 0.035 W/M°C and a density of

approximately 40Kgs/m<sup>3</sup>. It shall be CFC free and have a weight of approximately 14.5kg/m<sup>2</sup>. The insulating material shall be encased in sheet metal in galvanized steel, coloured with white lacquer and 80microns of protective film (0.63mm)

The external panels (ceiling, floor and the sides) shall be of 100mm thickness while the chambers dividing panels shall be 50mm thick.

It shall be finished with galvanized sheet with stainless steel front and on the sides.

The panels shall be double jointed for smooth assembly. Only Panels with continuous joints shall be allowed. A pvc panel fastener approximately every 600mm shall be used to allow a fixed, hermetic join of panel or panels and corners.

The hygecobel fastening system or other approved system shall be used to join the panel with a 'turn and pull' movement. They shall be fixed inside by a hexagonal key. The sheet metal covers are cladded on one side and shall have a white, air proof stopper made of hard plastic which shall be highly resistant to wear and tear

**N. 2. INSULATION AND FINAL WALL FINISHES**

The insulating material shall be polystyrene (or equal and approved) with a conductivity of approximately 0.035 W/M°C and a density of approx. 25Kg/m<sup>3</sup> for the walls and ceiling and 40Kgs/m<sup>3</sup> for the floor.

It shall be applied in two/three layers each 50 mm thick with the second/third layers breaking joints with the first/second layers. The proposed freezer/cold/mortuary room insulation shall be 150/100mm thick and installed as described above.

Care must be taken to avoid breaking the vapor seal when fixing the insulation. Two more coats of vapour seal shall then be applied after application of insulation

Hardwood battens shall be provided at regular intervals between insulation. Aluminum sheet (SWG 20) as specified on the drawing shall then be applied and secured on the hardwood. The main contractor shall then finish off the floor with 75 mm reinforced concrete and plaster under supervision of the sub-contractor.

**O. 1. INSULATED DOOR**

The cold chamber unit shall have ... (*Specify*)... No.) Prefabricated and insulated doors of size ... (*Specify*)... and which shall open clear outwards.

Door fasteners shall include spring and roller bolt type mechanism. The locking devices shall provide for the doors to be opened from both outside and inside the cold chambers.

Each door shall be complete with enough gaskets to ensure an air-tight seal. The doorjambes and sills shall be metal clad for protection and door fittings shall be chrome plated.

**O. 2. INSULATED DOORS**

The doors and frames shall be fabricated from heavy seasoned timber and insulated with two layers of 50mm thick polystyrene sand-witched between 10mm thick seasoned wood strips. They shall have a clear height of ... (*Specify*)... m being hinged on one side so that it opens outward. The doors shall be completed with sufficient gaskets to ensure an airtight seal. The doors shall be fitted with automatic plunger type switches for operating the fan motors and interior lights such that when it is open, the light shall go on and the fan shall stop, and when it is closed, the lights shall go off and the fan shall start.

The doors shall be such that they can be padlocked from outside but with an inside release such that they can be opened from inside even when padlocked. All metal parts on the doors shall be chrome plated.

**P. PURGING AND CHARGING THE SYSTEM**

After completion of erection, the tenderer shall purge the system to get off air, moisture etc. and in order to purge effectively, the system shall be evacuated by drawing of vacuum with a vacuum pump and then feeding in a charge of refrigerant which shall then be evacuated again and so on. The compressor of the system shall be set at ... (*Specify temperature range*)... °C.

**R. MORTUARY RACKS**

There shall be ... (*Specify*)... No.) bay mortuary racks of overall dimensions ... (*Specify*)... x ... (*Specify*)... x ... (*Specify*)... mm high. The rack shall be made from 38mm diameter Class B GMS tubing with 25mm diameter pin welded to the shaft.

The shaft to be made from 38mm diameter galvanised mild steel Class B and to have 15mm radius groove all round to accommodate the stretcher and to be complete with ball bearings/rollers.

**S. STRETCHERS**

... (*Specify*)... No. metal stretchers of overall dimensions ... (*Specify*)... x... (*Specify*)... mm each made from 14SWG stainless steel sheet, bent, formed, stiffened and welded to 25mm diameter stainless steel tube welded on the lower side of the stretcher and along the lengths of the stretcher.

**T. TESTING AND COMMISSIONING**

Before insulation of the suction pipe the refrigeration system shall be tested for pressure and leaks using the combined pressure and leaks testing method. The refrigeration system shall be charged with ... (*Specify*)... refrigerant and entire system raised to test pressure using nitrogen or other inert gas. The test pressure shall be twice the working pressure for the system.

Leaks shall be checked using soap bubble followed by using of electronic leak detector. After system is proved leak proof, it shall be maintained under test pressure for 24 hours.

If at the end of this time the gauge pressure has fallen, the complete system shall be re-tested. After the successful completion of the test, the system shall be evacuated using vacuum for 24 hours. If there is loss of vacuum the system shall be dehydrated again and left under vacuum for a further 24 hrs until the system is effectively dehydrated.

After this the system shall be charged with the correct type and quantity of the refrigerant. The system shall then be set to work and adjusted to ensure that it operates correctly and design conditions are archived. It shall be left to operate for 72 Hrs and room temperatures recorded for this period using an automatic room temperature sensor/recorder.

The compressor shall be provided with identification plates stating the type of refrigerant used and the quantity required for the system

**TECHNICAL DATA FOR TENDERED EQUIPMENT**

ITEM	DESCRIPTION	<i>To be filled by the tenderer</i>
<b>A.</b>	<p><b>CONDENSING UNIT</b></p> <p>a. Manufacturer .....</p> <p>b. Model.....</p> <p>c. Length (mm) .....</p> <p>d. Width (mm) .....</p> <p>e. Height (mm) .....</p> <p>f. Weight (kg) .....</p> <p>g. Capacity .....</p> <p>h. Refrigerant .....</p> <p>i. Power .....</p> <p>j. State if air cooled .....</p>	
<b>B</b>	<p><b>EVAPORATOR UNIT</b></p> <p>a. Manufacturer .....</p> <p>b. Model .....</p> <p>c. Length (mm) .....</p> <p>d. Width (mm) .....</p> <p>e. Height (mm) .....</p> <p>f. Weight (kg) .....</p> <p>g. Fan diameter (mm) .....</p> <p>h. Capacity .....</p> <p>i. Air throw .....</p> <p>j. Power .....</p>	
<b>C</b>	<p><b>INSULATION</b></p> <p>a. Material .....</p> <p>b. Thickness (mm) .....</p> <p>c. Thermal Conductivity .....</p> <p>d. Working temperature range .....</p> <p>e. Density – for wall and ceiling .....</p> <p style="padding-left: 40px;">- for floor .....</p>	
<b>D</b>	<p><b>INSTRUMENTATION &amp; CONTROL</b></p> <p>a. Temperature Gauge .....</p> <p>b. Alarm .....</p> <p>c. Automatic controls .....</p> <p>d. Thermostats .....</p> <p>e. Solenoid Valve .....</p> <p>f. LP/HP cut-out switch .....</p> <p>g. Sight Glass .....</p> <p>h. Filter Drier .....</p> <p>i. State any other .....</p>	

**PART 04**

**GENERAL SPECIFICATIONS  
FOR  
AUTOMATIC  
FIRE SUPPRESSION SYSTEMS**

## **GENERAL SPECIFICATIONS FOR FIRE SUPPRESSION SYSTEM**

### **1.1 General**

The specifications described here make reference to Argon 200 fire suppression system.

However, alternative systems utilizing inert gases may be used subject to the condition that they meet all the requirements of this specification.

The Argon 200 shall be used to extinguish fires in the rooms to be specified.

The gas shall be stored under pressure in liquefied form inside cylinders and piped to fire protected areas. Each Argon system in a given zone shall be supplied complete with its control Unit that shall receive the signal from smoke detectors or break glass and automatically release the gas after sounding an alarm bell and switching off any existing Ventilation systems. The fire detection system in all areas where Argon gas system is not installed shall be supplied and installed by ` but the Sub-Contractor shall liaise with him and extend detection signal outputs into the Master Alarm Control Panel.

1.1.1 The Design and installation shall be made in accordance with these specifications, drawings and the following standards:

- a) **NFPA 2001-Clean Agent Fire Extinguishing systems**
- b) **NFPA 70-National Electrical Code**
- c) **NFPA 72-National Fire Alarm Code**
- d) **Local authority requirements**

1.1.2 The fire suppression systems shall be designed by competent personnel who are trained and authorized by the equipment manufacturer for design of total flooding Argon 200 systems and the integrated detection systems. Working Drawings shall be provided in sufficient detail to indicate the type, size, and arrangement of component materials and devices; and the dimensions needed for installations and correlation with other materials and equipment.

All Working Drawings shall be submitted for review and approval prior to installation.

1.1.3 Detailed literature outlining the operation, recharge and service of the system, Maintenance procedures for the owner shall be provided.

1.1.4 Equipment manufacturer shall provide a **12 month** warranty Details of this warranty shall be furnished upon request.

1.1.5 All devices, components and equipment shall be products of the same manufacturer and shall be U.L listed or FM approved.

### **1.2 SYSTEM ARRANGEMENT**

- 1.2.1 Argon 200 fire suppression system shall be of the engineered, permanently piped, fixed nozzle type with all pertinent components of the same manufacturer. All agent storage containers shall be centrally located as vertical, free-standing cylinders with wall mounted retaining brackets. Where multiple cylinders are required for the same hazard, a common manifold should be employed.

Manifolds shall be constructed from seamless schedule 80 piping. They shall be complete with a safety relief valve. Manifoldded cylinders shall employ a flexible discharge hose to facilitate installation and system maintenance. Each cylinder on a manifold shall also include an agent check valve installed to the manifold inlet.

Where a set of manifolded cylinders shall be required to serve multiple zones, selector valves shall be used to direct the extinguishing agent to the respective zone.

- 1.2.2 Detection system shall be of the engineered type, suitable for direct interface with the Argon fire suppression system. Detectors shall be wired in Sequential Detection method of operation or standard Cross-Zoned detection.

For each hazard, both Ionization and Photoelectric type smoke detectors shall be used to provide automatic input to the control panel.

In addition, manual pull station(s) shall be provided for the direct electric release of the Argon Fire Suppression System.

- 1.2.3 Automatic operation of each protected area shall be as follows:

- a) Actuation of one (1) detector, within the system to:
  - i) Illuminate the “ALARM” LED on the control panel face.
  - ii) Energize the audible notification appliances within the protected space with a unique pattern to indicate a first alarm condition
  - iii) Transfer sets of 5 Amp rated auxiliary contacts which can perform auxiliary system functions such as: Operate door holder/closures on access doors, Transmit a signal to the fire alarm system, Shutdown HVAC equipment, etc
  
- b) Actuation of a 2nd detector, within the system, to:

- i) Illuminate the “PRE-DISCHARGE” LED on the control panel face; energize the audible notification appliances within the protected space with a unique pattern to indicate a second alarm (predischARGE) condition, Shut down the HVAC system and/or close dampers, Start time-delay sequence (not to exceed 60 seconds), enable System abort sequence, Light an individual LED on a graphic annunciator.
- ii) After completion of the time-delay sequence, the system shall activate and the following shall occur: Illuminate a “RELEASE” LED on the control panel face, Energize the audible notification appliances within the protected space with a continuous on pattern to indicate a release condition, Shutdown of all power to high-voltage equipment, Energize a visual indicator(s) outside the hazard in which the discharge occurred, Energize a “System Fired” audible device.

The system shall be capable of being actuated by manual discharge devices located at each hazard exit. Operation of a manual device shall duplicate the sequence description above except that the time delay and abort functions SHALL be bypassed. The manual discharge station shall be of the electrical actuation type and shall be supervised at the main control panel.

### **1.3 DESIGN PARAMETERS – ARGON**

- 1.3.1 Design of the total flooding Argon system shall be based upon the enclosure being sufficiently tight against agent leakage with all ventilation shut down and / or fire dampered or provide for static air condition upon discharge.

Agent quantity calculations shall be determined from dimensions furnished on the construction drawings and/or in the particular specification using a design concentration based on fire hazard class of the protected zone and the NFPA 2001 standards. As a minimum a concentration of 38 % at the minimum anticipated hazard temperature of 20<sup>0</sup> C shall be used.

Calculation for the maximum design concentration shall be based upon maximum anticipated hazard temperature of 32<sup>0</sup> C.

When applicable, agent quantity shall be adjusted for:

- i) Altitudes of more than (915m) above sea level.
- ii) Non-flooded false ceiling volume.
- iii) Multiple hazards from a common agent supply.
- iv) Manufacturer standard tanks and fill increments
- v) Duct volume for HVAC system.

- 1.3.2 The system shall be designed to discharge the calculated agent quantity in a nominal 60 second period.
- 1.3.3 Nozzle spacing shall be in accordance with the listed approved coverage for each nozzle type. In all cases, the need for additional nozzle shall be considered based upon site conditions and manufacturer's recommendations.
- 1.3.4 Hydraulic calculations for each system shall be used upon two-phase flow equations for unbalanced systems as defined by **NFPA** regardless if a single nozzle or balanced piping network is used.

Computerized verification of hydraulic calculations shall be submitted for each Argon system.

- 1.3.5 The contractor shall provide data to indicate the free venting area required per **NFPA** standards for each hazard volume.

#### 1.3.6 **DESIGN PARAMETERS – DETECTION**

- 1.3.6.1 The design of the detection/control system shall be based on a clean, vibration free, electrical non-hazardous environment

- 1.3.6.2 As a minimum detector spacing shall be based upon **NFPA** recommended practices for ceiling construction, air flow and manufacturer recommendations.

At least one smoke detector of each type (ionization and photoelectric) shall be used in each protected area.

Where multiple detectors are used, detection shall alternate such that ionization are adjacent to photoelectric.

- 1.3.6.3 Unless otherwise stated on the drawings manual pull station(s) shall be located at all points of exit from the protected area.

Unless otherwise stated on the drawings at least one alarm device shall be located within the protected area for the general alarm function.

Battery capacity shall be sufficient to permit normal non-alarm condition for 24 hours with subsequent general alarm for 5 minutes after loss of primary line power. The contractor shall be required to furnish calculations to back up the battery capacity to be installed.

### 1.4 **EQUIPMENT AND MATERIAL**

#### 1.4.1 **General**

All materials and equipment shall be of new, unused, and undamaged condition in strict accordance with the requirement of this section. Equipment shall be required to meet the specified standards; **ISO 14520, NFPA**.

All equipments and materials shall only be used for their intended application, in locations for which they were designed, and installed in accordance with the manufacturer's instructions and /or recognized standard trade practice.

#### 1.4.2 **Pipe Material – Argon 200 bar System.**

Argon 200 system piping shall be of non-combustible materials having physical and chemical characteristics such that its integrity under stress can be predicted with reliability. Materials other than listed below, such as stainless steel or nonferrous piping or tubing, may be used if the materials satisfy the applicable requirements of NFPA.

As a minimum, piping materials and manifolds shall be schedule 40 seamless steel pipe conforming to BS specifications and capable of 65 bar operating pressure (ASTM Grade A-106B). Under no conditions shall ordinary cast iron pipe, steel pipe or non-metallic pipe be used.

Argon system piping joints shall be suitable for the design conditions and shall be selected with consideration of joint tightness and mechanical strength.

As a minimum, fittings shall be black class 300 malleable iron fittings. Ordinary cast iron fittings shall not be permitted.

Piping shall be installed in accordance with good commercial practice to the appropriate codes, securely supported with listed hangers, and arranged with close attention to the design layout since deviations may alter the design flow performance as hydraulically calculated.

All piping must be reamed, blown clear, and swabbed with appropriate solvent to remove mill varnish and cutting oils before assembly. The piping shall also be finished off with two coats of red paint after testing. Multi-outlet fittings other than tees shall not be permitted.

Assembly of all joints shall conform to the appropriate standards. Threaded pipe joints shall utilize Teflon tape applied to male threads only.

#### 1.4.2 Agent Storage Tank

Argon agent storage containers shall be of welded steel construction in accordance with NFPA Specification and finished in (baked red enamel) (red epoxy) paint.

Tank assemblies shall be filled with Argon pressurized to 200 bar at (21 °C).

Initial filling of the cylinders and recharge shall be done in accordance with the manufacturer's established procedures and shall not require replacement components for normal service.

The size and fill weights of all cylinders shall be of the following nominal sizes: \_

- i) 80 kg
- ii) 140kg

Nominal 270kg tank assembly shall be equipped with an internal liquid level measuring rod, marked in ¼ inch increments to allow direct reading of the liquid level and conversion to the weight of Argon within the tank.

Tank assemblies shall be vertical, free standing modules employing suitable wall mounted retaining brackets. Tank assemblies shall be listed or approved to perform in the temperature range -20C to 50C.

Aluminum **name plates** indicating manufacturer's name and part number, agent fill weight, total charged weight date of fill, shall be permanently bonded to each tank.

Each tank assembly shall have the means to accommodate lifting devices to facilitate weighing removal and replacing.

Tank assembly shall include a pressure gauge and a low pressure switch that operates at approximately 180 bar to facilitate continuous supervision of tank pressure.

##### 1.4.2.1 Tank Valve

Agent storage tank assemblies shall include an integral, high flow valve assembly connected to the tank by a machined thread and sealed by an O-ring.

Valve outlet sizes shall be based on the nominal tank capacity with a one inch size for 18,33,54 and 72 pound assemblies, and three inch for 600 pound assemblies.

The valve design shall be of the differential pressure type which utilizes tank pressure to seal the valve assembly. The valve shall be compatible with separate, removable, stackable type actuators for electric, pneumatic, and/or manual actuation.

Operation of the valve by the stackable type actuator shall be such that pressure is relieved from the upper chamber of the valve causing the valve to open. Valves shall be forged brass construction with an o-ring sealed brass spool incorporating the main electrometric seal surface.

The valve assembly shall include recessed pressure gauge 0 to 250 bar, overpressure safety relief disc assembly, normally pressurized connection port for an optional low pressure switch, normally unpressurized connection port used as pneumatic source for a slave cylinder valve actuation, and brass shipping caps on exposed thread connection.

When pneumatically operated main/reserve systems are used, pilot valves shall be equipped with actuation isolators.

All tank valves shall be F.M or LPCB Approved.

#### **1.4.2.2 Tanks Brackets**

Each Argon tank shall be furnished with a stainless steel, two part, strap type retaining bracket designed to secure the cylinders to the wall or any other suitable surface as may be recommended by the system manufacturer.

#### **1.4.2.3 Valve Actuator system**

Argon valve actuator system shall consist of a pneumatically operated cylinder actuator assembly and a **solenoid type** Electric actuator package.

The solenoid actuator package shall consist of the solenoid valve mounted either on a rechargeable slave nitrogen cylinder or on the Argon gas cylinder. A signal from the control panel shall operate the solenoid valve to discharge the gas in the pilot cylinder. The discharged gas shall then open the cylinder actuator assembly mounted on the Argon cylinder discharge valve. This process shall release the stored Argon gas for fire extinguishing.

Where multiple zones are protected from the same storage system, selector valves shall be used. These valves shall be actuated by the nitrogen gas from the actuation package.

Manual override actuators shall be designed to attach to electric actuator or directly to the valve assembly and permit manual operation of the pilot cylinder tank assembly. Manual actuator positions shall be clearly marked and operating instructions provided.

All actuators shall be LPCB Approved.

#### **1.4.3 Discharge Nozzles**

Argon discharge nozzles shall be of one piece (brass) construction sized to provide flow rates in accordance with system design hydraulics.

Orifice (s) shall be machined in the nozzle body to provide a horizontal discharge in

90<sup>0</sup>, 180<sup>0</sup>, or 360<sup>0</sup> patterns based upon the approved coverage arrangements. Separate, interchangeable orifice plates are not acceptable.

Nozzles shall be permanently marked with the manufacturer's part number, number of orifice and orifice code. The nozzle shall be threaded directly to the discharge piping without the use of special adaptors.

Nozzles shall be LPCB Approved.

## **1.5 Warning Signs**

Etched aluminum Warning Signs shall be provided at all Entrance and Exits of the protected area.

Entrance sign shall read: "WARNING \DO NOT ENTER ROOM WHEN ALARM SOUNDS, **ARGON** BEING RELEASED."

Exit sign shall read: " WHEN ALARM SOUNDS, VACATE AT ONCE, **ARGON** BEING RELEASED.."

## **1.6 EQUIPEMENT AND MATERIAL –ELECTRICAL**

### **1.6.1 General Materials**

All electrical trunkings and conduits shall be employed in accordance with applicable codes and intended use and contain only those electrical circuits associated with the fire detection and control system and shall not contain any circuit that is unrelated to the system.

Unless specifically provided otherwise in each case, all conductors shall be enclosed in steel conduit, rigid or thin walled as conditions dictate, except in computer room where they shall be PVC conduit concealed in building fabrics.

All wiring shall be of the proper size to conduct the circuit current The use of aluminium wire is strictly prohibited.Splicing of circuits shall be kept to a minimum and are only to be found in an electrical device suited for the purpose.Wire spliced together shall have the same colour insulation. Wire splices shall be made with appropriate devices suited for the purposes.

All wire terminations shall be made with crimp terminals unless the device at the termination is designed for bare wire termination.

All electrical circuits shall be numerically tagged with suitable devices at its terminating point and/ or splice. All circuits numbers shall correspond with the installation drawings.

The use of coloured wires is encouraged. White coloured wire shall be used exclusively for the identification of the neutral conductor of an alternating current circuit.

Green coloured wire shall be used exclusively for the identification of the earth ground conductor of an AC and DC circuit.

### **1.6.2 Control Panels – General**

All control panels shall be F.M Approved and be utilized with listed or approved operating devices and shall be capable of the following features,:

- a. Supervised Detection Circuits (s) with a first stage and a second stage circuit.
- b. Supervised Alarm Circuit allowing for a first stage alarm, second stage alarm and the third stage for gas release.
- c. Supervised Release Circuit
- d. Supervised Manual Electric Pull Circuit
- e. Supervised Manual mechanical Pull Circuit
- f. 0-60 second Programmable Time Delay
- g. Battery Standby
- h. Front Panel Indicating Lamps and 4x20 character display
- i. Key Lock Steel Enclosure with a glass panel covering the controls

The internal power supply shall operate from 240V 50Hz A.C power supply. A fused polarity reversing , 1 amp, 24VDC supervised dedicated release circuit for use with approved fire suppression system releasing devices shall be provided.

The control unit shall provide provisions for housing its own set of “on-line” float charged emergency batteries within the enclosure.; Battery supervision shall be provided for condition and placement of the batteries.

A supervised dedicated manual pull circuit designated for immediate operation of the release circuit shall be provided.

An auxiliary trouble circuit for supervision of other normally closed accessory devices shall be provided.

The control unit shall be housed in steel cabinet of approved type with conduit knockouts in a (red) (beige) enamel finish.

The control unit shall be F.M or LPCB Approved as an alarm/releasing control unit

### **1.6.3 Smoke Detector - Ionization**

Ionization type smoke detector shall be dual chamber type and compatible with the control unit. The detector shall have an LED in its base which is illuminated in a steady “on” mode when in alarm. Reset of the detector shall be performed by the control unit reset switch.

The design of the ionization detector compensating circuits shall provide stable operation with regard to minor changes in temperature, humidity, and atmosphere conditions.

The sensitivity voltage shall be factory set per U.L 268. A special locking screw shall be provided to lock the head to the base, The head to base connection shall be by use of bifurcated contacts. Terminal connections to the base shall be of the screw type.

The detector shall be F.M or LPCB Approved.

#### **1.6.4 Smoke Detector - Photoelectric**

Photoelectric detector shall be a solid-state sensing chamber unit providing stable operations (sensitivity) and compatible with the control unit. The detector shall utilize a light sensing photodiode and a pulse signal processor to measure the density of the combustion products within the sensing chamber. The detector head shall have a stainless steel mesh to prevent foreign objects from entering the sensing chamber.

The sensitivity voltage shall be factory set.

A special locking screw shall be provided to lock the head to the base. The head to base connection shall be by use of bifurcated contacts. Terminal connections to the base shall be of the screw type.

The detector shall be F.M or LPCB Approved.

#### **1.6.5 Alarm Bells**

The vibrating Alarm Bell shall be approved for use with the listed control unit. The polarized alarm bell shall be rated at 24VDC and draw no more than .063 amps and shall contain a series diode for use in supervised systems. It shall also incorporate a flashing strobe light.

It shall have a dB level of 86 – 90 at 3 metres.

The bell shall be constructed of high quality materials to ensure reliability and long life and have a baked red enamel finish.

The device shall be F.M or LPCB Approved.

#### **1.6.6 Manual Pull Stations (Fire man's switch)**

The Manual Pull Station shall be provided for the release (electrical) of the Argon in case of an emergency. The unit shall be contained within a metal body having a (single) (double) pole switch.

The device shall be F.M or LPCB Approved.

#### **1.6.7 Abort Switch**

The abort switch shall be used where an investigation delay is desired between detection and actuation of the Argon System.

The Abort Station shall be the "Dead Man" type and shall be located next to each manual switch. "Locking" or "Keyed" abort stations **shall not** be permitted. The Abort Station shall indicate a trouble condition at the Control Panel, if depressed, and no alarm condition exists. The Abort Station shall be located adjacent to each manual station and can be furnished in combination with a Manual Release Switch.

The device shall be U.L listed or F.M Approved for a delay switch.

#### **1.6.8 Pressure Switch**

This pneumatically actuated switch shall be used to give positive identification of release of Argon in the piping system.

The switch shall have one set of normally open and one set of normally closed contacts.

## **1.7 SYSTEM INSPECTION AND TESTING**

The completed installation shall be inspected by authorized personnel and shall include a full operational test of all components per the equipments manufacturer recommendation including agent discharge.

This shall be done in the presence of the owner's representative and other insuring authority having jurisdiction.

All mechanical and electrical components shall be tested according to the manufacturer's recommended procedure to verify system integrity.

The inspection and testing shall be carried out by the contractor. The tests shall demonstrate that the entire control system functions as designed and intended. All circuits shall be tested: automatic actuation, solenoid and manual actuation, HVAC and power shutdowns, audible and visual alarm devices and manual override of abort functions. Supervision of all panel circuits, including AC power and battery power supplies, shall be tested and qualified. Inspection shall include a complete checkout of and certification of weight and cylinder pressure. A written report shall be filed with the Engineer..

Two copies of drawings shall be provided by Contractor indicating the installed details. All routing or piping and electrical conduit and accessories shall be noted.

Equipment, Installation and Maintenance Manuals shall be provided in FOUR copies, in addition to the as-built drawings.

Prior to final acceptance, the contractor shall provide operational training in all concepts of this system to the owner's key personnel. Training shall consist of :-

- i) System Control Unit Operation
- ii) Troubleshooting Procedures
- iii) Abort Procedures
- iv) Emergency Procedures
- v) Safety Requirements
- vi) A functional test shall be completed prior to the concentration test consisting of detection, release alarm, accessories related to system, control unit, and a review of the tanks, piping, fittings, hangers and cylinder pressure.

## **1.8 WARRANTY**

All system components shall be guaranteed against defects in design, materials and workmanship for the full warranty period which shall in no case be less than one (1) year from the date of system acceptance.

**PROPOSED ULTRA MODERN TRAINING CENTRE FOR MINISTRY OF EDUCATION, CENTRE OF MATHEMATICS, SCIENCE AND TECHNOLOGY - GEMASTE A**

**MECHANICAL INSTALLATIONS - DATA CENTRE AIR CONDITIONING INSTALLATIONS**

**SECTION 1: BILLS OF QUANTITIES FOR DATA CENTRE AIR CONDITIONING INSTALLATIONS**

Item	Description	Unit	Qty	Rate (Kshs)	Amount (Kshs)
<b>1</b>	<b>DATA CENTRE CLOSE CONTROL UNIT</b>				
<b>1.1</b>	Supply, install test and commission close control down flow precision cooling				
<b>a</b>	unit complete with an air cooled condenser unit as STULZ - Model ASD171A				
	or its equivalent having a cooling capacity of 18.5 KW at				
	35 Deg. C complete with Electric Heating. Fan Power: 1.6kW, Noise Level: 50.7dBA				
	Units to be EPOXY baked powder coated.				
	Unit Dimensions: 950mm (L) x 890mm (W) x 1980mm (H)				
	Condensate tray to be stainless steel. The System to be complete with the following:-				
<b>i</b>	Stulz C7000 Micro-processor controller compatible and Suitable for connection to all common BMS systems with digital display/touch pad, communication via internet protocols (HTTP/SNMP) or e-mail and alert for alarms, provision for fire alarm interface, water detection alarm	No.	5		
	All these alarm alerts via GSM modem. System to have floor stand adjustable +/-25 mm				
<b>ii</b>	EC fans with direct drive				
<b>iii</b>	High efficiency Zig-Zag filter and low pressure drop				
<b>iv</b>	C7000 Advanced Regelsystem, Refrigerant R407C, Filter class G4				
<b>iv</b>	System to have floor stand adjustable +/-25 mm				
	The units should consist of a complete, functional construction unit that includes all the necessary components for the operation of the indoor unit.				
	The system should be capable of restarting automatically following a power failure				
<b>b</b>	Allow for scheduling the above air conditioning units so that 4No. are operational at any one time and the 5th one is on standby mode on a cycle to be determined (daily/weekly/monthly/yearly). In the event of that any duty unit is unavailable, the next available AC unit takes over automatically and an alert is displayed on the control panel. The alert to be communicated to a selected computer on the computer network connected to the room	Item	1		
<b>1.2</b>	<b>REFRIGERANT COPPER PIPES</b>				
<b>i</b>	16 mm diameter liquid line copper pipe.	LM	175		
<b>ii</b>	28 mm diameter suction line copper pipe.	LM	125		
<b>iii</b>	28 mm condensate drain (copper) line.	LM	85		
<b>1.3</b>	<b>EXTRA OVER COPPER PIPES</b>				
<b>i</b>	28mm Elbow	No.	111		
<b>ii</b>	16 mm Elbow	No.	135		
<b>iii</b>	28 mm coupling sockets	No.	112		
<b>iv</b>	16 mm coupling sockets	No.	107		
<b>v</b>	28 mm 'tee' for drain line.	No.	80		
<b>1.4</b>	<b>REFRIGERANT INSULATION</b>				
<b>i</b>	28 mm armflex insulation 20 mm thick	LM	150		
<b>ii</b>	16 mm dia. Armflex insulation 20 mm thick.	LM	175		
<b>iii</b>	Paint all insulation with chlorinated rubber paint three coats.	Item	1		
<b>iv</b>	Indoor unit floor stand for close control unit complete with air discharge varies and ducts.	No.	5		
<b>Total carried Forward to the next Page</b>					.....

Item	Description	Unit	Qty	Rate	Amount
				(Kshs)	(Kshs)
	<b>Total Brought Forward from the previous Page</b>				.....
<b>1.5</b>	<b>AIR DISTRIBUTION DUCTING</b>				
	Supply, install, test and commission the following. All rectangular ducts shall be in Phenolic Board( Pre-Insulated Duct) with aluminum finish on both the inside and outside. Duct fabrication and installations shall be as per SMACNA. Tenderers should ensure that the gauge of the materials to be used for duct fabrication meets the required thickness, stiffness, reinforcement and bracing. Rates must allow for duct jointing, sealing, hanging brackets, pressure testing, balancing etc.				
i	1000 x 600mm Ductwork in straight, bends, branches, transformation pieces etc	LM	165		
ii	600 x 600mm air supply grille with opposed blade volume control damper and complete with adjustable vertical and horizontal vanes	No.	10		
<b>1.6</b>	<b>OTHER ACCESSORIES</b>				
a	Liquid line sight glass	No.	5		
b	Liquid line filter/drier as manufactured by danfoss.	No.	5		
c	Electronic expansion valve	No.	5		
d	Allow for electrical connections including inter connecting control cables from indoor to outdoor unit and all controls and panel.	Item	5		
e	Vacuuming and dehydrating the whole system to hold for 24 hrs	Item	5		
f	Refrigerant charge as recommended by the manufacturer for all circuits.	Item	5		
g	Pressure test pipe work at 500 PSI for 24 hrs holding before termination to machines and after termination at 300 PSI for 24 hrs. (Dry Nitrogen) (for the whole system).	Item	5		
h	Provide water detection kit installed under the unit visual and audible alert for each A/C unit including.	Item	5		
<b>1.6</b>	<b>GAS EXTRACT SYSTEM SERVER ROOM</b>				
a	Supply, delivery and install Wall mounted extract fan as XpelAir model WX12 size 434 x 434 mm with a flowrate of 0.476m <sup>3</sup> /s at 100 Pa complete with motor rating of 1 PH 50 HZ 0.085 Kw, internal and external wall grilles and mounted at the level of the false ceiling	No	4		
	<b>Total for Data Centre Precision Cooling Installations C/F to Collection Page</b>				.....

Item	Description	Unit	Qty	Rate	Amount
				(Kshs)	(Kshs)
<b>2</b>	<b>DATA CENTRE SPLIT SYSTEM</b>				
	<i>Supply, deliver to site, install, test and commission the following as described below: Note. The Model mentioned is only a guide, other Equivalent models can be suggested subject to Engineers approval.</i>				
<b>2.1</b>	<b>AIR COOLING UNIT</b>				
a	Ceiling Convertible Split System air cooling unit of capacity 14.1kw cooling as "LG Evaporator and condensing unit suitable for the outdoor unit or equal and approved. The unit shall be supplied complete with room thermometer and controls or remote control device so as to operate as duty and standby. The unit shall be such that if the power supply goes off, it will restart automatically after power is restored.	item	2		
b	Allow for refrigerant pipework complete with lagging 7/8 "refrigerant pipes and lagging (gas line)	Lm	60		
c	3/8" refrigerant pipe (liquid line)	Lm	60		
	Refrigerant pipe trunking where they are exposed	Lm	60		
	R410a Refrigerant (Initial charge)	Lm	1		
d	Drain				
	32mm PVC pipe complete with fittings	Lm	60		
e	Electrical				
	Allow for associated Electrical works from the isolator to the A/C and from indoor unit to outdoor unit.	Item	1		
f	Surge protector				
	Power surge protector as SOLATEC to suite	No.	2		
g	Mounting bracket				
	Mounting bracket for the outdoor units to suite	No.	2		
<b>Total for Data Centre Split Air Conditioning Installations C/F to Collection Page</b>					

Item	Description	Unit	Qty	Rate	Amount
				(Kshs)	(Kshs)
<b>3</b>	<b>UPS SPLIT SYSTEM</b>				
	<i>Supply, deliver to site, install, test and commission the following as described below: Note. The Model mentioned is only a guide, other Equivalent models can be suggested subject to Engineers approval.</i>				
<b>3.1</b>	<b>AIR COOLING UNIT</b>				
a	Highwall Split System air conditioning unit of capacity 7.1kw cooling as "LG Evaporator and condensing unit suitable for the outdoor unit or equal and approved. The unit shall be supplied complete with room thermometer and controls or remote control device so as to operate as duty and standby. The unit shall be such that if the power supply goes off, it will restart automatically after power is restored.	item	2		
b	Allow for refrigerant pipework complete with lagging 5/8 " refrigerant pipes and lagging (gas line)	Lm	60		
c	3/8" refrigerant pipe (liquid line)	Lm	60		
	Refrigerant pipe trunking where they are exposed	Lm	45		
	R410a Refrigerant (Initial charge)	Lm	1		
d	Drain				
	32mm PVC pipe complete with fittings	Lm	60		
e	Electrical				
	Allow for associated Electrical works from the isolator to the A/C and from indoor unit to outdoor unit.	Item	1		
f	Surge protector				
	Power surge protector as SOLATEC to suite	No.	2		
g	Mounting bracket				
	Mounting bracket for the outdoor units to suite	No.	2		
<b>Total for UPS Split Air Conditioning Installations C/F to Collection Page</b>					





**PROPOSED ULTRA MODERN TRAINING CENTRE FOR MINISTRY OF EDUCATION, CENTRE OF MATHEMATICS, SCIENCE AND TECHNOLOGY - CEMASTE A**

MECHANICAL INSTALLATIONS - DATA CENTRE PRECISION COOLING INSTALLATIONS

**SECTION 6: BILLS OF QUANTITIES FOR SERVER ROOM FIRE SUPPRESSION SYSTEM**

Item	Description	Unit	Qty	Tendered Sum	
				Rate (Kshs)	Amount (Kshs)
	<b>DATA CENTRE FIRE SUPPRESSION SYSTEM</b>				
	<b>Supply, deliver, install, test and commission the following</b>				
	<b>items, all of which must be UL-listed and/or FM-approved.</b>				
1	FM200 80kgs Cylinder. & 1 1/2" Valve Assembly complete with FM200 Agent in storage containers filled at the factory	No	3		
2	Electric Control Head. 24 VDC	No	2		
3	1 1/2" x 24" Discharge Hose	No	2		
4	Cylinder Strap	No	2		
5	3/4" NPT Brass Discharge Nozzles (360 degrees)	No	6		
6	3/4" NPT Brass Discharge Nozzles Deflector Shield	No	6		
7	1/2" NPT Brass Discharge Nozzles (360 degrees)	No	3		
8	Manifold for Two cylinders	No	1		
9	13" Carriage Bolt & Nut	No	2		
10	Back Frame 2 Cylinders	No	1		
11	Lever Release W/Handle & Pin	No	1		
12	1 1/4" NPT Orifice Union	No	1		
13	HF Electric Actuator	No	1		
14	Booster Actuator	No	1		
15	Warning Plate - Inside Wall	No	1		
16	Warning Plate - Outside Wall	No	1		
	<b>DETECTION SYSTEM</b>				
17	Suppression Control Panel 240V, 50 Hz AC input with 7 initiating, 3 notification, 2 release circuits and 4 relays c/w door mounted release and abort switches	No	1		
18	Extra Relay Card	No	1		
19	Advanced Ionization Smoke Detector	No	10		
20	Advanced Photoelectric Smoke Detector	No	10		
21	2 wire standard Base	No	6		
22	24 VDC 15/75 cd Multi tone-Strobe	No	2		
23	24 VDC 6" Motor Bell	No	2		
24	Manual Release Station	No	1		
25	Suppression Abort Station	No	1		
26	Manual / Auto Switch	No	1		
27	Traffic Light (LED Indicator)	No	1		
28	Mimic Panel	No	1		
<b>P1</b>	<b>TOTAL CARRIED FORWARD TO SUMMARY PAGE</b>				

ITEM	DESCRIPTION	UNIT	QTY.	RATE	TOTAL Kshs.
1	1.2 AH 12 VDC lead acid battery	No	2		
2	UL Listed 300x300mm Pressure Vent	No	1		
3	GSM/Email Module complete with Temperature and Humidity Sensor ( With Free 1 Year Subscription)	Item	1		
	<b>Pipework</b>				
5	40mm Seamless Steel Black Pipe, Schedule 80	LM	85		
6	32mm ditto	LM	40		
7	25mm ditto	LM	27		
	<b>Elbows</b>				
8	40mm, Schedule 80	No.	15		
9	32mm ditto	No.	18		
10	25mm ditto	No.	15		
	<b>Tees</b>				
11	40mm, Schedule 80	No.	9		
12	32mm ditto	No.	12		
13	25mm ditto	No.	12		
14	15mm ditto	No.	12		
15	Any other plumbing item/fitting to enable the system work properly	Item	1		
16	Allow for all electrical wiring, accessories, conduiting, screws, brackets and fixing as necessary for the peroper functioning of the entire suppression and detection systems	Item	1		
	<b><u>AIR CONDITIONING SYSTEM INTERFACING</u></b>				
17	Allow for interfacing of the fire suppression system with the data center air conditioning system such that when the gas discharges, the AC systems shuts down	Item	1		
P2	<b>TOTAL CARRIED FORWARD TO SUMMARY PAGE</b>				

ITEM	DESCRIPTION	UNIT	QTY.	RATE	TOTAL Kshs.
	<b>SUMMARY PAGE</b>				
A	TOTAL FOR PRELIMINARIES				
B	TOTAL CARRIED FROM PAGE P1				
C	TOTAL CARRIED FROM PAGE P2				
D	Allow for Working Drawings to Engineer's Approval	Item	1		
E	Allow for "As - installed drawings and operation and maintenance manuals plus a soft copy	Sets	4		
F	Allow for training of at least 3 No. client personnel on the operation and maintenance of the system	Item	1		
G	Allow for setting to work, testing and commissioning of the entire fire suppression system	Item	1		
	<b>TOTAL FOR DATA CENTER FIRE SUPPRESSION INSTALLATIONS TO SUMMARY PAGE</b>				

**PROPOSED ULTRA MODERN TRAINING CENTRE FOR MINISTRY OF EDUCATION, CENTRE OF MATHEMATICS, SCIENCE AND TECHNOLOGY - CEMASTEAM  
MECHANICAL INSTALLATIONS - MECHANICAL INSTALLATIONS  
SUMMARY PAGE**

ITEM	DESCRIPTION	AMOUNT (Kshs)
<b>A</b>	<b>TOTAL FOR SERVER ROOM AIR CONDITIONING</b>	
i	TOTAL FOR DATA CENTRE AIR CONDITIONING INSTALLATIONS	
	<i>Sub-Totals for Data Centre Air Conditioning Installations</i>	
<b>B</b>	<b>TOTAL FOR DATA CENTRE FIRE SUPPRESSION INSTALLATIONS</b>	
i	TOTAL FOR DATA CENTER FIRE SUPPRESSION INSTALLATIONS	
	<i>Sub-Totals for Data Centre Fire Suppression Installations</i>	
	<b>GRAND TOTAL FOR MECHANICAL INSTALLATIONS TO MAIN SUMMARY PAGE</b>	

**PART NO. 8**  
**PROVISIONAL SUMS**

NO.	DESCRIPTION		
	<b>PART NO. 8</b>		
	<b>PROVISIONAL SUMS</b>		
	<b>ELEMENT NO. 1</b>		
	<b>NOTES:</b>		
	1. The following sums may be expended in whole or in part at the sole discretion and on the sole written authority of the Project Manager.		
	2. The following sums <b>include</b> 16% V.A.T.  Provide Provisional Sums to cover the cost of the following items to be carried out at Main Contractor's Bill rates or rates pro-rata thereto:		
<b>A</b>	<b>Professional Fees</b>		
	Shillings Twelve Million ( <b>Shs. 12,000,000.00</b> ) only for Professional Fees;(Kshs. 7,000,000.00 for the Electrical Engineer's Consultancy fees and Kshs. 5,000,000.00 for the Mechanical Engineer's Consultancy fees)	Item	12,000,000.00
<b>B</b>	<b>On-costs and Attendance</b>		
	Shillings Twelve Million ( <b>Shs. 12,000,000.00</b> ) only for On-costs on Specialists work and Attendance by the Main Contractor;	Item	12,000,000.00
<b>C</b>	<b>Contingencies</b>		
	Shillings Twelve Million ( <b>Shs. 12,000,000.00</b> ) only for contingencies to cover cost of any unforeseen or minor additional works;	Item	12,000,000.00
	<b>Total Amount of Element No. 1 Provisional Sums Carried to Part Summary</b>		<b>36,000,000.00</b>

NO.	DESCRIPTION								
	<p><u>SUMMARY</u></p> <p style="text-align: center;"><u>PROVISIONAL SUMS</u></p> <table border="0"> <thead> <tr> <th><u>ELEMENT NO.</u></th> <th><u>ELEMENT</u></th> <th></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">Provisional Sums</td> <td style="text-align: right;">36,000,000.00</td> </tr> </tbody> </table>		<u>ELEMENT NO.</u>	<u>ELEMENT</u>		1	Provisional Sums	36,000,000.00	
<u>ELEMENT NO.</u>	<u>ELEMENT</u>								
1	Provisional Sums	36,000,000.00							
	<b>TOTAL FOR PROVISIONAL SUMS TO MAIN SUMMARY</b>		<b>36,000,000.00</b>						

## **PART 9**

### **MAIN SUMMARY**

Based on stated Completion of 10 (Ten ) CALENDAR MONTHS

(4 Months Construction and 6 Months Defect Liability Period)

**PART NO. 9**

**SPECIFICATIONS**  
**AND**  
**BILLS OF QUANTITIES**  
**FOR**

**PROPOSED ULTRA MODERN TRAINING CENTER (DATA CENTRE SERVICES INSTALLATIONS**  
**WORK)**

**FOR**  
**MINISTRY OF EDUCATION STATE DEPARTMENT OF BASIC EDUCATION**

**MAIN SUMMARY**

PART NO.	PART	PAGE NO.	KSHS.	CTS.
	<u>BILLS OF QUANTITIES FOR: -</u>			
6	Electrical Services Installations	6/21		
7	Mechanical Services Installations	7/3		
	<b><u>Sub-Total</u></b>	<b>Shs.</b>		
4	Particular Preliminaries	175		
5	General Preliminaries	191		
8	Provisional Sums	8/2	36,000,000	00
<b><u>TOTAL AMOUNT OF TENDER (V.A.T Inclusive)</u></b>		<b>KSHS</b>		

**TOTAL AMOUNT OF TENDER IN WORDS KENYA SHILLINGS:**

**PART NO. 9**  
**SPECIFICATIONS**  
**AND**  
**BILLS OF QUANTITIES**  
**FOR**

**PROPOSED ULTRA MODERN TRAINING CENTER (DATA CENTRE SERVICES INSTALLATIONS WORK)**  
**FOR**  
**MINISTRY OF EDUCATION STATE DEPARTMENT OF BASIC EDUCATION**

**MAIN SUMMARY (Ctd).**  
**(TENDER )**

Signature of Tenderer .....

Name of Tenderer .....

Address .....

.....

Date .....

Signature of Witness .....

Name of Witness .....

Address .....

.....

Date .....