

REPUBLIC OF KENYA



COUNTY GOVERNMENT OF KIRINYAGA  
P.O. BOX 260- 10304,  
KUTUS.

DEPARTMENT OF MEDICAL SERVICES, PUBLIC HEALTH AND  
SANITATION

OPEN TENDER

FOR

RE-TENDER FOR NOMINATED SUB- CONTRACT FOR SUPPLY,  
DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF  
MEDICAL GASES PLANTS AND PIPING SYSTEM OF COMPLEX AT  
KERUGOYA  
LEVEL 5 HOSPITAL.

TENDER NEGOTIATION NO: 824618-2-2020/2021

**County Specific Procurement**

CLOSING DATE: FRIDAY 23<sup>RD</sup> APRIL, 2021 AT 2.00 PM

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## SECTION I - INVITATION FOR TENDER

Tender Name: RE-TENDER FOR NOMINATED SUB- CONTRACT FOR SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF MEDICAL GASES PLANTS AND PIPING SYSTEM COMPLEX AT KERUGOYA LEVEL 5 HOSPITAL.

**Tender Negotiation No. 824618-2-2020/2021**

The County Government of Kirinyaga invites sealed bids from all interested and eligible tenderers for the **RE-TENDER FOR NOMINATED SUB-CONTRACT OR SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF MEDICAL GASES PLANTS AND PIPING SYSTEM COMPLEX AT KERUGOYA LEVEL 5 HOSPITAL.**

Interested and eligible Contractors may obtain further information from and inspect the tender documents at Director Supply Chain Management Office, 1st Floor, Kirinyaga County Headquarters, Kutus during normal working hours.

A complete set of tender documents may be obtained by interested bidders from the County website [www.kirinyaga.go.ke](http://www.kirinyaga.go.ke) and also online via IFMIS SUPPLIER PORTAL. Once you have logged in the supplier portal, you search for the respective negotiation number. (Search published negotiations > select number> type the number > click Go). Bidders who download the documents from the website **MUST forward their particulars (name, contacts, physical address and the Tender Negotiation No. and Description) immediately to [procurement@kirinyaga.go.ke](mailto:procurement@kirinyaga.go.ke) for recording.**

Prices quoted should be inclusive of all taxes and delivery costs and must be expressed in Kenya shillings and shall remain valid for a period of 120 days from the closing date of the tender.

Tenders must be accompanied by a Bid Security of Kshs 500,000 from a reputable bank or insurance firm approved by PPRA in the format provided valid for an additional 30 days beyond the tender validity period.

Completed Tenders are to be saved as PDF documents marked **TENDER NEGOTIATION NO: 824618-2-2020/2021 For NOMINATED SUB- CONTRACT TENDER FOR SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF MEDICAL GASES PLANTS AND PIPING SYSTEM COMPLEX AT KERUGOYA LEVEL 5 HOSPITAL** so as to be received on or before Friday 23<sup>rd</sup> April, 2021 AT 2.00 PM

**A Pre-Bid Meeting shall be held on Friday 16<sup>th</sup> April, 2021 AT 11.00AM.** Bidders shall converge at the 3rd Floor Conference Room, County Headquarters Complex, at Kutus Town, Kirinyaga County.

HEAD, SUPPLY CHAIN MANAGEMENT  
FOR: COUNTY SECRETARY

## DEFINITIONS

The following terms and expressions used in the contract document shall have the following meanings:

The Employer Represented by:	County Government of Kirinyaga THE CHIEF OFFICER COUNTY MEDICAL SERVICES, PUBLIC HEALTH AND SANITATION P.O. Box 24 -0 10300 <u>KERUGOYA</u>
Architect:	Chief Architect State Department of Public Works P.O. Box 30743-00100 <u>NAIROBI</u>
Engineer:	Chief Engineer Mechanical (BS) State Department of Public Works P.O. Box 41191 - 00100 <u>NAIROBI</u>
Quantity Surveyor:	Chief Quantity Surveyor State Department of Public Works P.O. Box 30743-00100 <u>NAIROBI</u>
Structural Engineer:	Chief Engineer (Structural) State Department of Public Works P.O. Box 30743-00100 <u>NAIROBI</u>
Electrical Engineer:	Chief Engineer (Electrical) State Department of Public Works P.O. Box 41191-00100 <u>NAIROBI</u>
Project Manager:	The Works Secretary State Department of Public Works P.O. Box 30743-00100 <u>NAIROBI</u>
Main contractor:	Solitaire Construction Limited P.O. Box 39780-00623 <u>NAIROBI</u>
Site:	Kerugoya      County      Hospital Compound.

### SPECIAL NOTES

1. These notes shall form part of the Instructions to Tenderers and Conditions of Contract.
2. The tenderer is required to check the number of pages in this document and should he find any missing, or in duplicate, or indistinct he should inform the Chief Engineer-Mechanical (BS), State Department of Public Works.
3. Should the tenderer be in any doubt about the precise meaning of any item or figure, for any reason whatsoever, he must inform the Chief Engineer-Mechanical (BS), State Department of Public Works, in order that the correct meaning may be decided before the date of submission of tender.
4. No liability will be admitted nor claim allowed, in respect of errors in the tender due to mistakes in the specification, which should have been rectified in the manner, described above.
5. All tenderers must make a declaration that they have not and will not make any payment to any person which can be perceived as an inducement to enable them to win this tender.
6. Any tenderer whose firm uses the titles “Engineer” and “Engineers” must produce evidence of registration of at least one of the directors by the Engineers Board of Kenya to avoid disqualification.

## FORM OF TENDER

To: The Chief Officer  
County Medical Services, Public Health and Sanitation  
P.O. Box 24 - 010300  
Kerugoya

Dear Sir,

### **NOMINATED SUB- CONTRACT TENDER FOR SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF MEDICAL GASES PLANTS AND PIPING SYSTEM COMPLEX AT KERUGOYA LEVEL 5 HOSPITAL**

TENDER NEGOTIATION NO: 824618-2-2020/2021

1. In accordance with the Instructions to Tenderers, Conditions of Contract, Specifications and Bills of Quantities for the execution of the above named Works, we, the undersigned offer to construct, install and complete such Works and remedy any defects therein for the sum of:

Kshs..... [Amount in figures]

Kenya Shillings.....

.....

.....[Amount in words]

2. We undertake, if our tender is accepted, to commence the Works as soon as is reasonably possible after the receipt of the Employer's Representative's notice to commence, and to complete the whole of the Works comprised in the Contract within the time stated in the Appendix to Conditions of Contract.
3. We agree to abide by this tender for a period of 120 days from the date of tender opening and shall remain binding upon us and may be accepted at any time before that date.
4. Unless and until a formal Agreement is prepared and executed this tender together with your written acceptance thereof, shall constitute a binding Contract between us.
5. Understand that you are not bound to accept the lowest or any tender you may receive.

Dated this ..... day of .....20....

Signature .....in the capacity of .....  
duly authorized to sign tenders for and on behalf of:

.....[Name of Tenderer] of

..... [Address of Tenderer]

PIN No. ....

VAT CERTIFICATE No. ....

Witness: Name .....

Address .....

Signature .....

## FORM OF TENDER SECURITY FROM BANK

WHEREAS..... (hereinafter called “the Tenderer”) has submitted his tender dated..... For NOMINATED SUB- CONTRACT TENDER FOR SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF MEDICAL GASES PLANTS AND PIPING SYSTEM COMPLEX AT KERUGOYA LEVEL 5 HOSPITAL.

KNOW ALL PEOPLE by these presents that WE ..... Having our registered office at ..... (hereinafter called “the Bank”), are bound unto ..... (hereinafter called “the Employer”) in the sum of Kshs.....

for which payment well and truly to be made to the said Employer, the Bank binds itself, its successors and assigns by these presents sealed with the Common Seal of the said Bank this .....Day of .....20 .....

THE CONDITIONS of this obligation are:

1. If after tender opening the Tenderer withdraws his tender during the period of tender validity specified in the instructions to Tenderers
- Or
2. If the Tenderer, having been notified of the acceptance of his tender by the Employer during the period of tender validity:
  - (a) fails or refuses to execute the form of Agreement in accordance with the Instructions to Tenderers, if required; or
  - (b) fails or refuses to furnish the Performance Security, in accordance with the Instructions to Tenderers;

We undertake to pay to the Employer up to the above amount upon receipt of his first written demand, without the Employer having to substantiate his demand, provided that in his demand the Employer will note that the amount claimed by him is due to him, owing to the occurrence of one or both of the two conditions, specifying the occurred condition or conditions.

This guarantee will remain in force for a period of 150 days from the date of tender opening, and any demand in respect thereof should reach the Bank not later than the said date.

.....  
(date)

.....  
(Signature of the Bank)

..... (witness) (seal)

## FORM OF TENDER SECURITY FROM INSURANCE

WHEREAS..... (hereinafter called “the Tenderer”) has submitted his tender dated For the nominated sub-contract tender for supply, delivery, installation, testing and commissioning of medical gases plants and piping system complex at Kerugoya level 5 hospital

KNOW ALL PEOPLE by these presents that WE .....  
Having our registered office at .....  
(hereinafter called “the Insurance”), are bound unto .....  
(hereinafter called “the Employer”) in the sum of Kshs.....  
for which payment well and truly to be made to the said Employer, the Insurance binds itself, its successors and assigns by these presents sealed with the Common Seal of the said Insurance this ..... Day of ..... 20 .....

THE CONDITIONS of this obligation are:

3. If after tender opening the Tenderer withdraws his tender during the period of tender validity specified in the instructions to Tenderers
- Or
4. If the Tenderer, having been notified of the acceptance of his tender by the Employer during the period of tender validity:
  - (a) fails or refuses to execute the form of Agreement in accordance with the Instructions to Tenderers, if required; or
  - (b) fails or refuses to furnish the Performance Security, in accordance with the Instructions to Tenderers;

We undertake to pay to the Employer up to the above amount upon receipt of his first written demand, without the Employer having to substantiate his demand, provided that in his demand the Employer will note that the amount claimed by him is due to him, owing to the occurrence of one or both of the two conditions, specifying the occurred condition or conditions.

This guarantee will remain in force for a period of 150 days from the date of tender opening, and any demand in respect thereof should reach the Insurance not later than the said date.

.....  
(date) (Signature of the Insurance)

..... (witness) (seal)



**SECTION A:**  
**INSTRUCTIONS TO TENDERERS.**

INSTRUCTIONS TO TENDERERS  
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## INSTRUCTIONS TO TENDERERS.

1. 1. General/Eligibility/Qualifications/Joint venture/Cost of tendering
  - 1.1 The Employer as defined in the Appendix to Conditions of Contract invites tenders for Works Contract as described in the tender documents. The successful tenderer will be expected to complete the Works by the Intended Completion Date specified in the tender documents.
  - 1.2 All tenderers shall provide the Qualification Information, a statement that the tenderer (including all members of a joint venture and subcontractors) is not associated, or has not been associated in the past, directly or indirectly, with the Consultant or any other entity that has prepared the design, specifications, and other documents for the project or being proposed as Project Manager for the Contract. A firm that has been engaged by the Employer to provide consulting services for the preparation or supervision of the Works, and any of its affiliates, shall not be eligible to tender.
  - 1.3 All tenderers shall provide in the Form of Tender and Qualification Information, a preliminary description of the proposed work method and schedule, including drawings and charts, as necessary.
  - 1.4 In the event that pre-qualification of potential tenderers has been undertaken, only tenders from pre-qualified tenderers will be considered for award of Contract. These qualified tenderers should submit with their tenders any information updating their original pre-qualification applications or, alternatively, confirm in their tenders that the originally submitted pre-qualification information remains essentially correct as of the date of tender submission.
  - 1.5 Where no pre-qualification of potential tenderers has been done, all tenderers shall include the following information and documents with their tenders, unless otherwise stated:
    - (a) copies of original documents defining the constitution or legal status, place of registration, and principal place of business; written power of attorney of the signatory of the tender to commit the tenderer:
    - (b) total monetary value of construction work performed for each of the last five years:
    - (c) experience in works of a similar nature and size for each of the last five years, and details of work under way or contractually committed; and names and addresses of clients who may be contacted for further information on these contracts;
    - (d) major items of construction equipment proposed to carry out the Contract and an undertaking that they will be available for the Contract.
    - (e) qualifications and experience of key site management and technical personnel proposed for the Contract and an undertaking that they shall be available for the Contract.
    - (f) reports on the financial standing of the tenderer, such as profit and loss statements and auditor's reports for the past five years;

- (g) evidence of adequacy of working capital for this Contract (access to line(s) of credit and availability of other financial resources);
  - (h) authority to seek references from the tenderer's bankers;
  - (i) information regarding any litigation, current or during the last five years, in which the tenderer is involved, the parties concerned and disputed amount; and
  - (j) proposals for subcontracting components of the Works amounting to more than 10 percent of the Contract Price.
- 1.6 Tenders submitted by a joint venture of two or more firms as partners shall comply with the following requirements, unless otherwise stated:
- (a) the tender shall include all the information listed in clause 1.5 above for each joint venture partner;
  - (b) the tender shall be signed so as to be legally binding on all partners;
  - (c) all partners shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms;
  - (d) one of the partners will be nominated as being in charge, authorized to incur liabilities, and receive instructions for and on behalf of all partners of the joint venture; and
  - (e) The execution of the entire Contract, including payment, shall be done exclusively with the partner in charge.
- 1.7 To qualify for award of the Contract, tenderers shall meet the following minimum qualifying criteria;
- (a) annual volume of construction work whose value is equal to the estimated annual cash flow for the Contract;
  - (b) experience as main contractor in the construction of at least one project whose nature and complexity is equivalent to the Works over the last 10 years (to comply with this requirement, works cited should be at least 70 percent complete);
  - (c) proposals for the timely acquisition (own, lease, hire, etc.) of the essential equipment listed as required for the Works;
  - (d) a Contract manager with at least five years' experience in works of an equivalent nature and volume, including no less than three years as Manager; and
  - (e) Liquid assets and/or credit facilities, net of other contractual commitments and exclusive of any advance payments which may be made under the Contract, of no less than 4 months of the estimated payment flow under this Contract.
- 1.8 The figures for each of the partners of a joint venture shall be added together to determine the tenderer's compliance with the minimum qualifying criteria of clause 1.7 (a) and (e); however, for a joint venture to qualify, each of its partners must meet at least 25 percent of minimum criteria 1.7 (a), (b) and (e) for an individual

tenderer, and the partner in charge at least 40 percent of those minimum criteria. Failure to comply with this requirement will result in rejection of the joint venture's tender. Subcontractors' experience and resources will not be taken into account in determining the tenderer's compliance with the qualifying criteria, unless otherwise stated.

- 1.9 Each tenderer shall submit only one tender, either individually or as a partner in a joint venture. A tenderer who submits or participates in more than one tender (other than as a subcontractor or in cases of alternatives that have been permitted or requested) will cause all the proposals with the tenderer's participation to be disqualified.
- 1.10 The tenderer shall bear all costs associated with the preparation and submission of his tender, and the Employer will in no case be responsible or liable for those costs.
- 1.11 The tenderer, at the tenderer's own responsibility and risk, is encouraged to visit and examine the Site of the Works and its surroundings, and obtain all information that may be necessary for preparing the tender and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the tenderer's own expense.

A Pre-bid Meeting shall be held on Wednesday 11th December, 2019 starting from 11.00am. Bidders shall converge at the 3rd Floor Conference Room, County Headquarters Complex, at Kutus Town, Kirinyaga County.

- 1.12 The procuring entity's employees, committee members, board members and their relative (spouse and children) are not eligible to participate in the tender.
- 1.13 The price to be charged for the tender document shall not exceed Kshs.5,000/=
- 1.14 The procuring entity shall allow the tenderer to review the tender document free of charge before purchase.

## 2. Tender Documents

- 2.1 The complete set of tender documents comprises the documents listed below and any addenda issued in accordance with Clause 2.4.
  - (a) These Instructions to Tenderers
  - (b) Form of Tender and Qualification Information
  - (c) Conditions of Contract
  - (d) Appendix to Conditions of Contract
  - (e) Specifications
  - (f) Drawings
  - (g) Bills of Quantities
  - (h) Forms of Securities
- 2.2 The tenderer shall examine all Instructions, Forms to be filled and Specifications in the tender documents. Failure to furnish all information required by the tender documents, or submission of a tender not substantially responsive to the tendering documents in every respect will be at the tenderer's risk and may result in rejection of his tender.
- 2.3 A prospective tenderer making an inquiry relating to the tender documents may notify the Employer in writing or by cable, telex or facsimile at the address indicated in the letter of invitation to tender. The Employer will only respond to requests for clarification

received earlier than seven days prior to the deadline for submission of tenders. Copies of the Employer's response will be circulated to all persons issued with tendering documents, including a description of the inquiry, but without identifying its source.

- 2.4 Before the deadline for submission of tenders, the Employer may modify the tendering documents by issuing addenda. Any addendum thus issued shall be part of the tendering documents and shall be communicated in writing or by cable, telex or facsimile to all tenderers. Prospective tenderers shall acknowledge receipt of each addendum in writing to the Employer.
- 2.5 To give prospective tenderers reasonable time in which to take an addendum into account in preparing their tenders, the Employer shall extend, as necessary, the deadline for submission of tenders, in accordance with Clause 4.2 here below.

### 3. Preparation of Tenders

- 3.1 All documents relating to the tender and any correspondence shall be in English language.
- 3.2 The tender submitted by the tenderer shall comprise the following:
  - (a) These Instructions to Tenderers, Form of Tender, Conditions of Contract, Appendix to Conditions of Contract and Specifications;
  - (b) Tender Security;
  - (c) Priced Bill of Quantities ;
  - (d) Qualification Information Form and Documents;
  - (e) Alternative offers where invited; and
  - (f) Any other materials required to be completed and submitted by the tenderers.
- 3.3 The tenderer shall fill in rates and prices for all items of the Works described in the Bill of Quantities. Items for which no rate or price is entered by the tenderer will not be paid for when executed and shall be deemed covered by the other rates and prices in the Bill of Quantities. All duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause relevant to the Contract, as of 30 days prior to the deadline for submission of tenders, shall be included in the tender price submitted by the tenderer.
- 3.4 The rates and prices quoted by the tenderer shall only be subject to adjustment during the performance of the Contract if provided for in the Appendix to Conditions of Contract and provisions made in the Conditions of Contract.
- 3.5 The unit rates and prices shall be in Kenya Shillings.
- 3.6 Tenders shall remain valid for a period of sixty (60) days from the date of submission. However in exceptional circumstances, the Employer may request that the tenderers extend the period of validity for a specified additional period. The request and the tenderers' responses shall be made in writing. A tenderer may refuse the request without forfeiting the Tender Security. A tenderer agreeing to the request will not be required or permitted to otherwise modify the tender, but will be required to extend the validity of Tender Security for the period of the extension, and in compliance with Clause 3.7 - 3.11 in all respects.

- 3.7 The tenderer shall furnish, as part of the tender, a Tender Security in the amount and form specified in the appendix to invitation to tenderers.
- 3.8 The format of the Tender Security should be in accordance with the form of Tender Security included in Section G - Standard forms or any other form acceptable to the Employer. Tender Security shall be valid for 30 days beyond the validity of the tender.
- 3.9 Any tender not accompanied by an acceptable Tender Security shall be rejected. The Tender Security of a joint venture must define as “Tenderer” all joint venture partners and list them in the following manner: a joint venture consisting of” .....”, ” ..... ”, and “”.
- 3.10 The Tender Securities of unsuccessful tenderers will be returned within 28 days of the end of the tender validity period specified in Clause 3.6.
- 3.11 The Tender Security of the successful tenderer will be discharged when the tenderer has signed the Contract Agreement and furnished the required Performance Security.
- 3.12 The Tender Security may be forfeited
- (a) if the tenderer withdraws the tender after tender opening during the period of tender validity;
  - (b) if the tenderer does not accept the correction of the tender price, pursuant to Clause 5.7;
  - (c) in the case of a successful tenderer, if the tenderer fails within the specified time limit to
    - (i) sign the Agreement, or
    - (ii) furnish the required Performance Security.
- 3.13 Tenderers shall submit offers that comply with the requirements of the tendering documents, including the basic technical design as indicated in the Drawings and Specifications. Alternatives will not be considered, unless specifically allowed in the invitation to tender. If so allowed, tenderers wishing to offer technical alternatives to the requirements of the tendering documents must also submit a tender that complies with the requirements of the tendering documents, including the basic technical design as indicated in the Drawings and Specifications. In addition to submitting the basic tender, the tenderer shall provide all information necessary for a complete evaluation of the alternative, including design calculations, technical specifications, breakdown of prices, proposed construction methods and other relevant details. Only the technical alternatives, if any, of the lowest evaluated tender conforming to the basic technical requirements shall be considered.

3.14 Clarification of tenders shall be requested by the tenderer to be received by the procuring entity not later than 7 days prior to the deadline for submission of tenders.

3.15 The procuring entity shall reply to any clarifications sought by the tenderer within 3 days of receiving the request to enable the tenderer to make timely submission of its tender.

#### 4. Submission of Tenders

4.1 Tenderers may modify or withdraw their tenders by giving notice in writing before the deadline prescribed in clause 4.2. Each tenderer's modification or withdrawal notice shall be prepared, sealed, marked, and delivered in accordance with clause 3.13 and 4.1, with the outer and inner envelopes additionally marked "MODIFICATION" and "WITHDRAWAL", as appropriate. No tender may be modified after the deadline for submission of tenders.

4.2 Withdrawal of a tender between the deadline for submission of tenders and the expiration of the period of tender validity specified in the invitation to tender or as extended pursuant to Clause 3.6 may result in the forfeiture of the Tender Security pursuant to Clause 3.11.

4.3 Tenderers may only offer discounts to, or otherwise modify the prices of their tenders by submitting tender modifications in accordance with Clause 4.4 or be included in the original tender submission.

#### 5. Tender Opening and Evaluation

5.1 The tenders will be opened by the Employer, including modifications made pursuant All bids Document shall automatically close after the closing date and time and thereafter they shall be electronically opened in the presence of Tenderers' representatives who choose to attend.

5.2 The tenderers' names, the tender prices, the total amount of each tender and of any alternative tender (if alternatives have been requested or permitted), any discounts, tender modifications and withdrawals, the presence or absence of Tender Security, and such other details as may be considered appropriate, will be announced by the Employer at the opening. Minutes of the tender opening, including the information disclosed to those present will be prepared by the Employer.

5.3 Information relating to the examination, clarification, evaluation, and comparison of tenders and recommendations for the award of Contract shall not be disclosed to tenderers or any other persons not officially concerned with such process until the award to the successful tenderer has been announced. Any effort by a tenderer to influence the Employer's officials, processing of tenders or award decisions may result in the rejection of his tender.



- 5.4 To assist in the examination, evaluation, and comparison of tenders, the Employer at his discretion, may ask any tenderer for clarification of the tender, including breakdowns of unit rates. The request for clarification and the response shall be in writing or by cable, telex or facsimile but no change in the price or substance of the tender shall be sought, offered, or permitted except as required to confirm the correction of arithmetic errors discovered in the evaluation of the tenders in accordance with Clause 5.7.
- 5.5 Prior to the detailed evaluation of tenders, the Employer will determine whether each tender (a) meets the eligibility criteria defined in Clause 1.7; (b) has been properly signed; (c) is accompanied by the required securities; and (d) is substantially responsive to the requirements of the tendering documents. A substantially responsive tender is one which conforms to all the terms, conditions and specifications of the tendering documents, without material deviation or reservation.  
A material deviation or reservation is one (a) which affects in any substantial way the scope, quality, or performance of the works; (b) which limits in any substantial way, inconsistent with the tendering documents, the Employer's rights or the tenderer's obligations under the Contract; or (c) whose rectification would affect unfairly the competitive position of other tenderers presenting substantially responsive tenders.
- 5.6 If a tender is not substantially responsive, it will be rejected, and may not subsequently be made responsive by correction or withdrawal of the non-conforming deviation or reservation.
- 5.7 Tenders determined to be substantially responsive will be checked for any arithmetic errors. Errors will be corrected as follows:
- (a) where there is a discrepancy between the amount in figures and the amount in words, the amount in words will prevail; and
  - (b) Where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will prevail, unless in the opinion of the Employer, there is an obvious typographical error, in which case the adjustment will be made to the entry containing that error.
  - (c) In the event of a discrepancy between the tender amount as stated in the Form of Tender and the corrected tender figure in the main summary of the Bill of Quantities, the amount as stated in the Form of Tender shall prevail.
  - (d) The Error Correction Factor shall be computed by expressing the difference between the tender amount and the corrected tender sum as a percentage of the corrected Builder's Work (i.e. Corrected tender sum less P.C. and Provisional Sums)
  - (e) The Error Correction Factor shall be applied to all Builders' Work (as a rebate or addition as the case may be) for the purposes of valuations for Interim Certificates and valuation of variations.

- (f) the amount stated in the tender will be adjusted in accordance with the above procedure for the correction of errors and, with Concurrence of the tenderer shall be considered as binding upon the tenderer. If the tenderer does not accept the corrected amount, the tender may be rejected and the Tender Security may be forfeited in accordance with clause 3.11.

5.8 The Employer will evaluate and compare only the tenders determined to be substantially responsive in accordance with Clause 5.5.

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

- (a) making any correction for errors pursuant to clause 5.7;
- (b) Excluding provisional sums and the provision, if any, for contingencies in the Bill of Quantities, but including Dayworks where priced competitively.
- (c) making an appropriate adjustment for any other acceptable variations, deviations, or alternative offers submitted in accordance with clause 3.12; and
- (d) making appropriate adjustments to reflect discounts or other price modifications offered in accordance with clause 4.6

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

5.11 The tenderer shall not influence the Employer on any matter relating to his tender from the time of the tender opening to the time the Contract is awarded. Any effort by the Tenderer to influence the Employer or his employees in his decision on tender evaluation, tender comparison or Contract award may result in the rejection of the tender.

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

## 6. Award of Contract

6.1 Subject to Clause 6.2, the award of the Contract will be made to the tenderer whose tender has been determined to be substantially responsive to the tendering documents and who has offered the lowest evaluated tender price, provided that such tenderer has been determined to be (a) eligible in accordance with the provision of Clauses 1.2, and (b) qualified in accordance with the provisions of clause 1.7 and 1.8.

6.2 Notwithstanding clause 6.1 above, the Employer reserves the right to accept or reject any tender, and to cancel the tendering process and reject all tenders, at any time prior to the award of Contract, without thereby incurring any liability to the affected tenderer or tenderers or any obligation to inform the affected tenderer or tenderers of the grounds for the action.

6.3 The tenderer whose tender has been accepted will be notified of the award prior to expiration of the tender validity period in writing or by cable, telex or facsimile. This notification (hereinafter and in all Contract documents called the "Letter of Acceptance") will state the sum (hereinafter and in all Contract documents called the "Contract Price") that the Employer will pay the Contractor in consideration of the execution, completion, and maintenance of the Works by the Contractor as prescribed by the Contract. At the same time the other tenderers shall be informed that their tenders have not been successful.

The contract shall be formed on the parties signing the contract.

6.4 The Agreement will incorporate all agreements between the Employer and the successful tenderer. Within 14 days of receipt the successful tenderer will sign the Agreement and return it to the Employer.

6.5 Within 21 days after receipt of the Letter of Acceptance, the successful tenderer shall deliver to the Employer a Performance Security in the amount stipulated in the Appendix to Conditions of Contract and in the form stipulated in the Tender documents. The Performance Security shall be in the amount and specified form

6.6 Failure of the successful tenderer to comply with the requirements of clause 6.5 shall constitute sufficient grounds for cancellation of the award and forfeiture of the Tender Security.

6.7 Upon the furnishing by the successful tenderer of the Performance Security, the Employer will promptly notify the other tenderers that their tenders have been unsuccessful.

6.8 Preference where allowed in the evaluation of tenders shall not be allowed for contracts not exceeding one year (12 months)

6.9 The tender evaluation committee shall evaluate the tender within 30 days of the validity period from the date of opening the tender.

6.10 The parties to the contract shall have it signed within 30 days from the date of notification of contract award unless there is an administrative review request.

6.11 Contract price variations shall not be allowed for contracts not exceeding one year (12 months)

6.12 Where contract price variation is allowed, the variation shall not exceed 15% of the original contract price.

6.13 Price variation request shall be processed by the procuring entity within 30 days of receiving the request.

6.14 The procuring entity may at any time terminate procurement proceedings before contract award and shall not be liable to any person for the termination.

6.15 The procuring entity shall give prompt notice of the termination to the tenderers and on request give its reasons for termination within 14 days of receiving the request from any tenderer.

6.16 A tenderer who gives false information in the tender document about its qualification or who refuses to enter into a contract after notification of contract award shall be considered for debarment from participating in future public procurement.

**7. Corrupt and Fraudulent practices**

7.1 The procuring entity requires that tenderers observe the highest standards of ethics during procurement process and execution of contracts. A tenderer shall sign a declaration that he has not and will not be involved in corrupt and fraudulent practices.

## TENDER EVALUATION CRITERIA

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

1. Preliminary Evaluation;
2. Technical Evaluation;
3. Financial Evaluation; and
4. Recommendation for Award.

### STAGE 1: PRELIMINARY EVALUATION

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

These conditions shall include the following:

- i) Company Certificate of incorporation/registration;
- ii) Current category of Registration with National Construction Authority (NCA 3 and above) in the relevant Mechanical Engineering works category.
- iii) Current Class of Licenses with the relevant statutory bodies e.g. Energy Regulatory Commission, Communication Authority of Kenya, County Governments, Water Management Boards etc where applicable;
- iv) The Bid has been submitted in the format required by the procuring entity;
- v) Provision of a tender Security that is in the required format, amount and that the tender is valid for the period required;
- vi) Duly filled Form of Tender;
- vii) Valid Tax Compliance Certificate; will be verified with TTC checker
- viii) Duly filled Confidential Business Questionnaire;
- ix) Duly signed Statement of Compliance;
- x) Bidders should attach a Pre- Bid Certificate issued at a Pre-Bid Meeting/Site visit which shall be held on **Friday 16<sup>th</sup> April, 2021 AT 11.00AM**
- xi) Proof of authorization shall be furnished in the form of a written power of attorney which shall accompany the tender if the signatory to the tender is not a director of the company (Provide name and attach proof of citizenship of the signatory to the Tender).
- xii) Manufactures authorization where required.
- xiii) Proof of Registration within Kirinyaga. Submit copy of valid current Trading License / Single Business Permit issued by the County Government of Kirinyaga
- xiv) Since this is a County Specific Procurement reserved for Kirinyaga County Residents, any acceptable evidence/proof is required e.g. proof of physical location of the company by attaching evidence (title deed, lease agreement, utility bills) etc.

Note:

- a) The bid security shall be in accordance with clauses 13 and 23.2 of Instruction to Tenderers which states as follows:
  - Clause 13.1 of Instruction to Tenderers, "the tenderers shall furnish as part of his tenders a Bid surety in the amount stated in the tender document in the Appendix to Instructions to Tenderers".
  - Clause 13.2 of Instruction to Tenderers, "the unconditional Tender surety shall be in Kenya shillings and be in form of a certified cheque, bank draft, an irrevocable letter of credit or a guarantee from a reputable Bank/ Insurance approved by PPRAB located in the Republic of Kenya. The format of the surety shall be in accordance with the sample form included in the tender documents and the tender surety shall be valid for 150 days from the date of tender opening".
  - Clause 23.2 of Instruction to Tenderers: "For the purposes of this clause, a substantially responsive tender is one which conforms to all terms and condition and specifications of the tender document without material deviation or

reservation and has a valid Bank/Insurance guarantee”.

- b) The employer /procuring entity may seek further clarification/confirmation if necessary, to confirm authenticity/compliance of any condition of the tender. Further, in case of a discrepancy between the amounts stated in the appendix to instruction to tenderers and the one stated in the advertisement or invitation letter, the bid security shall be taken as the amount in the advertisement/ letter of invitation.

The tenderers who do not satisfy any of the above mandatory requirements shall be considered Non-Responsive and their tenders will not be evaluated further.

## **STAGE 2: TECHNICAL EVALUATION**

The tender document shall be examined based on clause 2.2 of the Instruction to Tenderers which states as follows:

In accordance with clause 2.2 of Instruction to Tenderers, the tenderers will be required to provide evidence for eligibility of the award of the tender by satisfying the employer of their eligibility under sub clause 2.1 of Instructions to Tenderers and their capability and adequacy of resources to effectively carry out the subject contract.

In order to comply with provisions of clause 2.2 of Instruction to Tenderers, the tenderers shall be required;

- a) To fill the Standard Forms provided in the bid document for the purposes of providing the required information. The tenderers may also attach the required information if they so desire;
- b) To supply equipment's/items which comply with the technical specifications set out in the bid document. In this regard, the bidders shall be required to submit relevant technical brochures/catalogues with the tender document, highlighting the Catalogue Numbers of the proposed items. Such brochures/catalogues should indicate comprehensive relevant data of the proposed equipment/items which should include but not limited to the following:
  - (i) Standards of manufacture;
  - (ii) Performance ratings/characteristics;
  - (iii) Material of manufacture;
  - (iv) Electrical power ratings; and
  - (v) Any other necessary requirements (Specify).

The bid will then be analyzed, using the information in the technical brochures, to determine compliance with General and Particular technical specifications for the works as indicated in the tender document. The tenderer shall also fill in the Technical Schedule as specified in the tender document for Equipment and Items indicating the Country of Origin, Model/Make/Manufacturer and catalogue numbers of the Items/Equipment's they propose to supply.



The award of points considered in this section shall be as shown below:

<u>PARAMETER</u>	<u>MAXIMUM POINTS</u>
(i) Compliance with Technical Specifications.....	40
(ii) Tender Questionnaire.....	3
(iii) Key personnel.....	12
(iv) Contract Completed in the last Five (5) years -----	9
(v) Schedules of on-going projects -----	4
(vi) Schedules of contractors equipment -----	12
(vii) Audited Financial Report for the last 3 years -----	6
(viii) Evidence of Financial Resources -----	9
(ix) Name, Address and Telephone of Banks (Contractor to provide)	
.....	3
(x) Litigation History.....	2
<b>TOTAL</b>	<b><u>100</u></b>

The pass-mark under the Technical Evaluation is 70 percent.

\*Monthly Cash Flow = Tender Sum / Contract Period



The detailed scoring plan shall be as shown in table 1.

TABLE 1: Technical Evaluation

Item	Description	Points Scored	Max. Point	
1	Compliance with Technical Specifications <ul style="list-style-type: none"><li>Compliant _____ .....40</li><li>Non-compliant.....  0</li></ul> (Note: Tender Evaluation Committee to carryout analysis showing how decision on this requirement has been arrived at)		40	
2	Tender Questionnaire Form    <ul style="list-style-type: none"><li>Completely filled 5</li><li>Not filled 0</li></ul>		5	
3	Key Personnel (Attach evidence)                      A-14			
	Director of the firm <ul style="list-style-type: none"><li>Holder of degree in relevant Engineering field ----- ----- 4</li><li>Holder of diploma in relevant Engineering field----- 3</li><li>Holder of certificate in relevant Engineering field ----- -----2</li><li>Holder of trade test certificate in relevant Engineering field ----- ----- 1</li><li>No relevant certificate  0</li></ul>		4	12
	At least 1No. degree/diploma holder of key personnel in relevant field <ul style="list-style-type: none"><li>With over 10 years relevant experience ----- ----- 4</li><li>With over 5 years relevant experience ----- ----- 2</li><li>With under 5 years relevant experience----- -----1</li></ul>		4	
	At least 1No certificate holder of key personnel in relevant field <ul style="list-style-type: none"><li>With over 10 years relevant experience ----- ----- 2</li></ul>		2	

\*Monthly Cash Flow = Tender Sum / Contract Period

	<ul style="list-style-type: none"> <li>With over 5 years relevant experience ----- 1</li> <li>With under 5 years relevant experience ----- 0.5</li> </ul>			
	At least 2No artisan (trade test certificate in relevant field) <ul style="list-style-type: none"> <li>Artisan with over 10 years relevant experience ----- 2</li> <li>Artisan with under 10 years relevant experience -----1</li> <li>Non skilled worker with over 10 years relevant experience----- 0</li> </ul>		2	
4	Contracts completed in the last five (5) years (Max of 3No. Projects)- <u>Provide Evidence</u> <ul style="list-style-type: none"> <li>Project of similar nature, complexity or magnitude ----- 3</li> <li>Project of similar nature but of lower value than the one in consideration _____ 2</li> <li>No completed project of similar nature ----- 0</li> </ul>		9	

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Item	Description	Points Scored	Max. Point
5	On-going projects - <u>Provide Evidence</u> <ul style="list-style-type: none"> <li>No Project of similar nature, complexity and magnitude ----- 4</li> <li>Three and below Projects of similar, nature complexity and magnitude - _____ 3</li> <li>Four and above Projects of similar nature, complexity and magnitude ----- 2</li> </ul>		4
6	Schedule of contractors equipment and transport (proof or evidence of ownership/Lease)		6 1 2
	a) Relevant Transport <ul style="list-style-type: none"> <li>Means of transport (Vehicle)----- 6</li> <li>No means of transport 0</li> </ul>		
	b) Relevant Equipment <ul style="list-style-type: none"> <li>Has relevant equipment for work being tendered ----- 6</li> <li>No relevant equipment for work being tendered ----- 0</li> </ul>		
7	Financial report		6
	a) Audited financial report (last three (3) years) <ul style="list-style-type: none"> <li>Average Annual Turn-over equal to or greater than the cost of the project 6</li> <li>Average Annual Turn-over above 50% but below 100% of the cost of the project _____ 3</li> <li>Average Annual Turn-over below 50% of the cost of the project ----- 1</li> </ul>		

\*Monthly Cash Flow = Tender Sum / Contract Period

	b) Evidence of Financial Resources (cash in hand, lines of credit, over draft facility etc ) <ul style="list-style-type: none"> <li>• Has financial resources to finance the projected monthly cash flow* for three months.....9</li> <li>• Has financial resources equal to the projected monthly cash flow* ---6</li> <li>• Has financial resources less the projected monthly cash flow*--- ..... 3</li> <li>• Has not indicated sources of financial resources -----0</li> </ul>		9
8	Name, Address and Telephone of Banks (Contractor to provide) <ul style="list-style-type: none"> <li>• Information Provided ----- 3</li> <li>• No Information Provided 0</li> </ul>		3
9	Litigation History <ul style="list-style-type: none"> <li>• Duly Filled ..... - 2</li> <li>• Not filled _ 0</li> </ul>		2
	TOTAL		100

Any bidder who scores 70 points and above shall be considered for further evaluation.

\*Monthly Cash Flow = Tender Sum / Contract Period

### **STAGE 3 - FINANCIAL EVALUATION**

Upon completion of the technical evaluation a detailed financial evaluation shall follow.

The evaluation shall be in three stages

- a) Determination of Arithmetic errors
- b) Comparison of Rates; and
- c) Consistency of the Rates.

#### **A) Determination of Arithmetic Errors**

Arithmetic Errors will be corrected by the Procuring Entity as follows:

- i) In the event of a discrepancy between the tender amount as stated in the form of Tender and the corrected tender figure in the Main summary of the Bills of Quantities, the amount as stated in the Form of Tender shall prevail. Pursuant to Section 82 of the Public Procurement and Asset Disposal Act 2015, the tender sum as submitted and read out during the tender opening shall be absolute and final and shall not be the subject of correction, adjustment or amendment in any way by any person or entity;
  - ii) Error correction factor shall be computed by expressing the difference between the amount and the corrected tender sum as a percentage of the corrected contract works (i.e. corrected tender sum less P.C; and Provisional Sums);
  - iii) The Error correction factor shall be applied to all contract works (as a rebate or addition as the case may be) for the purposes of valuations for Interim Certificates and valuation of variations.

#### **B) Comparison of rates**

Items that are underpriced or overpriced may indicate potential for non-delivery and front loading respectively. The committee shall promptly write to the tenderer asking for detailed breakdown of costs for any of the quoted items, relationship between those prices, proposed construction/installation methods and schedules.

The evaluation committee shall evaluate the responses and make an appropriate recommendation to the procuring entity giving necessary evidence. Such recommendations may include but not limited to:

- a) Recommend no adverse action to the tenderer after a convincing response;
- b) Employer requiring that the amount of the performance bond be raised at the expense of the successful tenderer to a level sufficient to protect the employer against potential financial losses;
- c) Recommend non-award based on the response provided and the available demonstratable evidence that the scope, quality, completion timing, administration of works to be undertaken by the tenderer, would adversely be affected or the rights of the employer or the tenderers obligations would be limited in a substantial way.

#### **C) Consistency of the Rates**

The evaluation committee will compare the consistency of rates for similar items and note all inconsistencies of the rates for similar items.

### **STAGE 4 - RECOMMENDATION FOR AWARD**

## SECTION B

### I.CONDITIONS OF CONTRACT

## CONDITIONS OF CONTRACT

### 1.0 Definitions

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

“Bills of quantities” means the priced and completed bill of quantities forming part of the tender.

“Compensation Events” are those defined in clause 24 hereunder

“Completion date” means the date of completion of the works as certified by the Project Manager, in accordance with Clause 31.

“The Contract” Means the agreement entered into between the Employer and the Contactor as recorded in the Agreement Form and signed by the parties including all attachments and appendices thereto and all documents incorporated by reference therein to execute, complete, and maintain the Works,

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

“The Contractor’s Tender” is the completed tendering document submitted by the Contactor to the Employer.

“The Contract Price” is the price stated in the Letter of Acceptance and thereafter as adjusted in accordance with the provisions of the Contract.

“Days” are calendar days; “months” are calendar months.

“Defects” is any piece of work not completed in accordance with the Contract.

“The Defects Liability Certificate” is the certificate issued by project Manager upon correction of defects by the Contractor.

“The Defects Liability Period” is the period named in the Contract Data and calculated from the Completion Date.

“Drawings” include calculations and other information provided or approved by the Project Manager for the execution of the Contract.

“Dayworks” are Work inputs subject to payment on a time basis for labour and the associated materials and plant.

“Employer” or the “procuring entity” as defined in the Public Procurement Regulations (i.e. Central or Local Government administration, Universities, Public Institutions and Corporations, etc) is the party who employs the Contractor to carry out the Works.  
“Equipment” is the Contractor’s machinery and vehicles brought temporarily to the Site for the execution of the Works.

“The intended completion date” is the date on which it is intended that the Contractor shall complete the works. The intended Completion Date may be revised only by the Project manager by issuing an extension of time or acceleration in the Works.

“Materials” are all supplies, including consumables, used by the Contractor for incorporation in order.

“Plant” is any integral part of the Works that shall have a mechanical, electrical, chemical or biological function.

“Project Manager” is the person named in the Appendix to Conditions of Contract (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 and shall be an “Architect” or a “Quantity Surveyor” registered under the Architects and Quantity Surveyors Act Cap 525 or an “Engineer” registered under Engineers Registration Act Cap 530.

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

“Site Investigation Reports” are those reports that may be included in the tendering documents which are factual and interpretative about the surface and subsurface conditions at the Site.

“Specifications” means the Specification of the Works included in the Contract and any modification or addition made or approved by the Project Manager.

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

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

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

“Employer’s Representative” is the person appointed by the Employer and notified to the Contractor for the purpose of supervision of the Works.

“A Variation” is an instruction given by the Employer’s Representative which varies the Works.

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

## 2. Interpretation

- 2.1. In interpreting the Conditions of Contract, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning in English Language unless specifically defined. The Project Manager will provide instructions clarifying queries about these Conditions of Contract.
- 2.2. If sectional completion is specified in the Appendix to Conditions of Contract, reference in the Conditions of Contract to the Works, the Completion Date and the Intended Completion Date apply to any section of the Works (other than references to the Intended Completion Date for the whole of the Works).
- 2.3. The following documents shall constitute the Contract documents and shall be interpreted in the following order of priority;
  - (1) Agreement,
  - (2) Letter of acceptance,
  - (3) Contractor's Tender,
  - (4) Appendix to Conditions of Contract,
  - (5) Conditions of Contract,
  - (6) Specifications,
  - (7) Drawings,
  - (8) Bills of Quantities,
  - (9) Any other documents listed in the Appendix to Conditions of Contract as forming part of the contract.
- 2.4. Immediately after the execution of the contract, the Project Manager shall furnish both the Employer and the Contractor with two copies each of all the Contract documents. Further, as and when necessary the Project manager shall furnish the Contractor {always with a copy to the Employer) with three ({3} copies of such further drawings or details or descriptive schedules as are reasonably necessary either to explain or amplify the Contract drawings or to enable the Contractor to carry out and complete the Works in accordance with these Conditions.

## 3. Language and Law

- 3.1. Language of Contract and the law governing the Contract shall be English language and the Laws of Kenya respective unless otherwise stated.



#### **4. Project Manager's Decisions**

- 4.1. Except where otherwise specifically stated, the Project Manager will decide contractual matters between the Employer and the Contractor in the role representing the Employer.

#### **5. Delegation**

- 5.1. The Project manager may delegate any of his duties and responsibilities to others after notifying the Contractor.

#### **6. Communications**

- 6.1. Communication between parties 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 etc. as listed in the Appendix to Conditions of Contract and also with the Employer, as per the directions of the Project Manager. The Contractor shall also provide facilities and services for them. The employer may modify the said List of Other Contractors etc., and shall notify the Contractor of any such modification.

#### **9. Personnel**

- 9.1. The Contractor shall employ the key personnel named in the Qualification Information, to carry out the functions stated in the said information or other personnel approved by the Project Manager. The Project Manager will approve any proposed replacement of key personnel only if their relevant qualifications and abilities are substantially equal to or better than those of the personnel listed in the Qualification Information. 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.

#### **10. Works**

- 10.1. The Contractor shall construct and install the works in accordance with the Specifications and

Drawings. The Works may commence on the Start Date and shall be carried out 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.

## **11. Safety and Temporary Works**

- 11.1. The Contractor shall be responsible for the design of temporary works. However before erecting the same, he shall submit his designs including specifications and drawings to the Project Manager and to any other relevant third parties for their

approval. No erection of temporary works shall be done until such approvals are obtained.

- 11.2. The Project Manager's approval shall not alter the Contractor's responsibility for design of the Temporary works and all drawings prepared by the Contractor for the execution of the temporary or permanent works, shall be subject to prior approval by the Project Manager before they can be used. The Contractor shall be responsible for the safety of all activities on the Site.

## **12. Discoveries**

- 12.1. Anything of historical or other interest or of significant value unexpectedly discovered on 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.

## **13. Work Program**

- 13.1. Within the time stated in the appendix to Conditions of Contract, 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. 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.
- 13.2. The Contractor shall submit to the Project Manager for approval an updated program at intervals no longer than the period stated in the Appendix to Conditions of Contract.
- 13.3. If the Contractor does not submit an updated program within this period, the Project Manager may withhold the amount stated in the said Appendix 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.
- 13.4. 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.

## **14. Possession of Site**

- 14.1. 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 Appendix to Conditions of Contract, the Employer will be deemed to have delayed the start of the relevant activities, and this will be Compensation Event.

## **15. Access to Site**

- 15.1. The Contractor shall allow the Project manager and any other 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.

## **16. Instructions**

- 16.1. The Contractor shall carry out all instructions of the Project Manager which are in accordance with the Contract.

## **17. Extension of Acceleration of Completion Date**

- 17.1. The Project manager shall extend the Intended Completion Date if a Compensation Event occurs or a variation is issued 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. The Project Manager shall decide whether and by how much to extend the Intended Completion Date with 21 days of the Contractor asking the Project Manager in writing 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 caused by such failure shall not be considered in assessing the new (extended) Completion Date.
- 17.2. No bonus for early completion of the Works shall be paid to the Contractor by the Employer

## **18. Management Meetings**

- 18.1. A Contractor management meeting shall be held monthly and attended by the Project Manager and the Contractor. Its business shall be to review the plans for the remaining Work and to deal with matters raised in accordance with the early warning procedure. The Project manager shall record the minutes of management meetings and provide copies of the same to those attending the meeting and 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.

## **19. Early Warning**

- 19.1. The Contractor shall warn the Project 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.

- 19.2. The Contractor shall cooperate with the Project Manager in making and considering proposals on 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.

## **20. Defects**

- 20.1. The Project Manager shall inspect the Contractor's work and notify the Contractor of any defects that are found. Such inspection shall not affect the Contractor's responsibilities. The 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 defects.

- 20.2. Should the defect be found, the cost of uncovering and making good shall be borne by the Contractor. However, if there is no defect found, the cost of uncovering and making good shall be treated as a variation and added to the Contract Price.
- 20.3. The Project Manager shall give notice to the Contractor of any defects before the end of the Defect Liability Period, which begins at completion, and is defined in the Appendix to Conditions of contract. The Defects Liability Period shall be extended for as long as defects remain to be corrected.
- 20.4. 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. If the Contractor has not corrected a defect within the time specified in the Project Manager's notice, the Project Manager will assess the cost of having the defect corrected by other parties and such cost shall be treated as a variation and be deducted from the Contract Price.

## 21. Bills of Quantities

- 21.1. The Bills of Quantities shall contain items for the construction, installation, testing and commissioning of the work to be done by the Contractor. The Contractor will be paid for the quantity of the work done at the rate in the Bills of Quantities for each item.
- 21.2. If the final quantity of the work done differs from the quantity in the Bills of Quantities for the particular item by more than 25 percent and provided the change exceeds 1 percent of the Initial Contractor price, the Project Manager shall adjust the rate to allow for the change.
- 21.3. If requested by the Project Manager, the Contractor shall provide the Project manager with a detailed cost breakdown of any rate in the Bills of Quantities.

## 22. Variations

- 22.1. All variations shall be included in updated programs produced by the Contractor.
- 22.2. The Contractor shall provide the Project Manager with a quotation for carrying out the variations when requested to do so. The Project Manager shall assess the quotation, which shall be given within seven days of the request or within any longer period as may be stated by the Project Manager and before the Variation is ordered.
- 22.3. If the work in the variation corresponds with an item description in the Bills of Quantities and if in the opinion of the Project Manager, the quantity of work is not above the limit stated in Clause 21.2 or the timing of its execution does not cause the cost per unit of quantity to change, the rate in the Bills 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 Bills of Quantities, the quotation by the contractor shall be in the form of new rates for the relevant items of work.

- 22.4. 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 cost
- 22.5. If the Project Manager decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the works, no quotation shall be given and the variation shall be treated as a Compensation Event.
- 22.6. The Contractor shall not be entitled to additional payment for cost that could have been avoided by giving early warning.
- 22.7. When the Program is updated, the Contractor shall provide the Project Manager with an updated cash flow forecast.

### **23. Payment Certificates, Currency of Payments and Advance Payments**

- 23.1. The Contractor shall submit to the Project Manager monthly applications for payment giving sufficient details of the Work done and materials on Site and the amounts which the Contractor considers himself to be entitled to. The Project Manager shall check the monthly application and certify the amount to be paid to the Contractor within 14 days. The value of work executed and payable shall be determined by the Project Manager.
- 23.2. The value of work executed shall comprise the value of the quantities of the items in the Bills of Quantities completed; materials delivered on site, variations and compensation events. Such materials shall become the property of the Employer once the Employer has paid the Contractor for their value. Thereafter, they shall not be removed from site without the Project Manager's instructions except for use upon the works.
- 23.3. Payments shall be adjusted for deductions for retention. The Employer shall pay the Contractor the amounts certified by the Project Manager within 30 days of the date of issue of each certificate. If the Employer makes a late payment, the Contractor shall be paid simple interest on the late payment in the next payment. Interest shall be calculated on the basis of number of days delayed at a rate three percentage points above the Central Bank of Kenya's average rate for base lending prevailing as of the first day the payment becomes overdue.
- 23.4. If an amount certified is increased in a later certificate of a result of an award by 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.
- 23.5. Items of the works for which no rate or price has been entered in will not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.
- 23.6. The Contract Price shall be stated in Kenya Shillings. All payments to the contractor shall be made in Kenya Shillings and foreign currency in the proportion indicated in the tender, or agreed prior to the execution of the Contract Agreement and indicated therein.

23.7. The rate of exchange for the calculation of the amount of foreign currency payment shall be the rate of exchange indicated in the Appendix to Conditions of Contract. If the contractor indicated foreign currencies for payment other than the currencies of the countries of origin of related goods and services. The Employer reserves the right to pay the equivalent at the time pf payment in the currencies of the countries of such goods and services.

23.8. The Employer and the Project manager shall be notified promptly by the Contractor of an changes in the expected foreign currency requirements of the Contractor during the execution of the works as indicated in the Schedule of Foreign Currency Requirements and the foreign and local currency portions of the balance of the Contract Price shall then be amended by agreement between Employer and the Contractor in order to reflect appropriately such changes.

23.9. In the event that an advance payment is granted, the following shall apply:-

- a) On signature of the Contract, the Contractor shall at his request, and without furnishing proof of expenditure, be entitled to an advance of 10% (ten percent) of the original amount of the contract. The advance shall not be subject to retention money.
- b) No advance payment may be made before the Contractor has submitted proof of the establishment of deposit or a directly liable guarantee satisfactory to the Employer in the amount of the advance payment. The guarantee shall be in the same currency as the advance.
- c) Reimbursement of the lump sum advance shall be made by deductions from the Interim payments and where applicable from the balance owing to the contractor. Reimbursement shall begin when the amount of the sums due under the Contract reaches 20% of the original amount of the contract. It shall have been completed by the time 80% of this amount is reached.

23.10. The amount to be repaid by way of successive deductions shall be calculated by means of the formula:

$$R = \frac{A(X^1 - X^{11})}{80 - 20}$$

Where:

R = the amount to be reimbursed

A = the amount of the advance which has been granted

X<sup>1</sup> = the amount of proposed cumulative payments as a percentage of the original amount of the Contract. This will exceed 20% but not exceed 80%.

X<sup>11</sup> = the amount of the previous cumulative payments as a percentage of the original amount of the Contract. This figure will be below 80% but not less than 20%.

With each reimbursement the counterpart of the directly liable guarantee may be reduced accordingly.



## 24. Compensation Events

24.1. The following issues shall constitute Compensation Events.

- a) The Employer does not give access to a part of the site by the Site Possession Date stated in the Appendix to Conditions of Contract.
- b) The Employer modifies the List of Other Contractors, etc., 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 the 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<sup>3</sup> adverse than could reasonably have been assumed before issuance of the Letter of Acceptance from the information issued to tenderers (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 works 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 effects on the Contractor of any of the Employer's risks.
- j) The Project Manager unreasonably delays issuing a Certificate of Completion.
- k) Other compensation events described in the Contract or determined by the Project manager shall apply

24.2. 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.

24.3. 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.

- 24.4. 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 will assume that the Contractor will react competently and promptly to the event.
- 24.5. The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the Contractor not having given early warning or not having co-operated with the Project Manager.
- 24.6. Prices shall be adjusted for fluctuations in the cost of inputs only if provided for in the Appendix to Conditions of Contract.
- 24.7. The Contractor shall give written notice to the Project Manager of his intention to make a claim within thirty days after the event giving rise to the claim has first arisen. The claim shall be submitted within thirty days thereafter.
- 24.8. Provided always that should the event giving rise to the claim of continuing effect, the Contractor shall submit an interim claim within the said thirty days and a final claim within thirty days of the end of the event giving rise to the claim.

## 25. Price Adjustment

- 25.1. The Project Manager shall adjust the Contract Price if taxes, duties and other levies are changed between the date 30 days before the submission of tenders for the Contract and the date of Completion. The adjustment shall be the change in the amount of tax payable by the Contractor.
- 25.2. The Contract Price shall be deemed to be based on exchange rates current at the date of tender submission in calculating the cost to the Contractor of materials to be specifically imported (by express provision in the Contract Bills of Quantities or Specifications) for permanent incorporation in the Works.
- 25.3. Unless otherwise stated in the Contract, if any time during the period of the Contract exchange rates shall be varied and this shall affect the cost to the Contractor of such materials, then the Project Manager shall assess the net difference in the cost of such materials. Any amount from time to time so assessed shall be added to or deducted from the Contract Price, as the case may be.
- 25.4. Unless otherwise stated in the Contract, the Contract Price shall be deemed to have been calculated in the manner set out below and in sub-clauses 25.4 and 25.5 and shall be subject to adjustment in the events specified thereunder;
  - i) The price contained in the Contract Bills of Quantities shall be deemed to be based upon the rates of wages and other emoluments and expenses as determined by the Joint Building Council of Kenya (J.B.C.) and set out in the schedule of basic rates issued 30 days before the date for submission of tenders. A copy of the schedule used by the Contractor in his pricing shall be attached in the Appendix to Conditions of Contract.
  - ii) Upon J.B.C. determining that any of the said rates of wages or other emoluments and expenses are increased or decreased, then the Contract Price shall be increased or decreased by the amount assessed by the Project Manager based upon the difference, expressed as a percentage, between the rate set out in the schedule of basic rates issued 30 days before the date for submission of tenders and the rate published by the J.B.C. and applied to the quantum of labour incorporated within the amount of work remaining to be executed at the date of publication of such increase or decrease.

- iii) No adjustment shall be made in respect of changes in the rates of wages and other emoluments and expenses which occur after the date of Completion except during such other period as may be granted as an extension of time under clause 17.0 of these Conditions.

- 25.5. The price contained in the Contract Bills of Quantities shall be deemed to be based upon the basic prices of materials to be permanently incorporated in the works as determined by the J.B.C. and set out in the schedule of basic rates issued 30 days before the date for submission of tenders. A copy of the schedule used by the Contractor in his pricing shall be attached in the Appendix to Conditions of Contract.
- 25.6. Upon the J.B.C. determining that any of the said basic prices are increased or decreased then the Contract Price shall be increased or decreased by the amount to be assessed by the Project Manager based upon the difference between the price set out in the schedule of basic rates issued 30 days before the date for submission of tenders and the rate published by the J.B.C. and applied to the quantum of the relevant materials which have not been taken into account in arriving at the amount of any interim certificate under clause 23 of these Conditions issued before the date of publication of such increase or decrease.
- 25.7. No adjustment shall be made in respect of changes in basic prices of materials which occur after the date for Completion except during such other period as may be granted as an extension of time under clause 17.0 of these Conditions.
- 25.8. The provisions of sub-clause 25.1 to 25.2 herein shall not apply in respect of any materials included in the schedule of basic rate.

## 26. Retention

- 26.1. The Employer shall retain from the payment due to the Contractor the proportion stated in the Appendix to Conditions of Contract until Completion of the whole of the works. On Completion of the whole of the works, half the total amount retained shall be repaid to the Contractor and the remaining half when the Defects Liability Period has passed and the Project manager has certified that all defects notified to the Contractor before the end of this period have been corrected.

## 27. Liquidate Damages

- 27.1. The Contractor shall pay liquidated damages to the Employer at the rate stated in the Appendix to Conditions of Contract for each day that the actual Completion Date is later than the Intended Completion Date. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages shall not alter the Contractor's liabilities.
- 27.2. 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 rate specified in Clause 23.30.

## 28. Securities

- 28.1. The Performance Security shall be provided to the Employer not later than the date specified in the Letter of Acceptance and shall be issued in an amount and form and by a reputable bank acceptable to the Employer, and denominated in Kenya shillings. The Performance Security shall be valid until a date 30 days beyond the date of issue of the Certificate of Completion.

## 29. Dayworks

- 29.1. If applicable, the Dayworks rates in the Contractor's tender shall be used for small additional amounts of work only when the Project Manager has given written instructions in advance for additional work to be paid for in that way.
- 29.2. 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.
- 29.3. The Contractor shall be paid for Dayworks subject to obtaining signed Dayworks forms.

## 30. Liability and Insurance

- 30.1. From the Start Date until the Defects Correction Certificate has been issued, the following are the 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 Employer's design, or due to war or radioactive contamination directly affecting the place where the works are being executed.
- 30.2. From the Completion Date until the Defects Correction Certificate has been issued, the risk of loss of or damage to the works, plant, and materials is the Employer's risk except loss or damage due to;
- a) a defect which existed on or before the Completion Date.
  - b) An event occurring before the Completion Date, which was not itself the Employer's risk.
  - c) The activities of the Contractor on the Site after the Completion Date.
- 30.3. From the Start Date until the Defects Correction 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 risk are contractor's risks.

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 stated in the Appendix to Conditions of Contract for the following events;

- 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.

- 30.4. 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 required to rectify the loss or damage incurred.
- 30.5. 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 from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.
- 30.6. Alterations to the terms of insurance shall not be made without the approval of the Project Manager. Both parties shall comply with any conditions of insurance policies.

### **31. Completion and Taking over**

- 31.1. Upon deciding that the works are complete, the Contractor shall issue a written request to the Project Manager to issue a Certificate of Completion of the works. The Employer shall take over the site and the works within seven (7) days of the Project manager's issuing a Certificate of Completion.

### **32. Final Account**

- 32.1. The Contractor shall issue the Project Manager with a detailed account of the total amount that the Contractor considers payable to him by the Employer under 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 30 days of receiving the Contractor's account if it is correct and complete.
- 32.2. If it is not, the Project Manager shall issue within 30 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.
- 32.3. The Employer shall pay the Contractor the amount due in the Final certificate within 60 days.

### 33. Termination

- 33.1. The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract. These fundamental breaches of Contract shall include, but shall not be limited to, the following;
- a) The Contractor stops work for 30 days 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 30 days.
  - c) The Contractor is declared 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 30 days (for Interim Certificate) or 60 days (for Final Certificate) of issue.
  - 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.

The Contractor does not maintain a security, which is required.

- 33.2. When either party to the contract gives notice of Contract to the Project Manager for a cause other than those listed under Clause 33.1 above, the Project Manager shall decide whether the breach is fundamental or not.
- 33.3. Notwithstanding the above, the Employer may terminate the Contract for convenience.
- 33.4. If the Contractor is terminated, the contractor shall stop work immediately, make the site safe and secure, and leave the site as soon as reasonably possible.
- 33.5. The Project Manager shall immediately thereafter arrange for a meeting for the purpose of taking record of the works executed and materials, goods, equipment and temporary buildings on site.

### 34. Payment Upon Termination

- 34.1. 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 and delivered to site up to the issue of the certificate. 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 by the contractor.
- 34.2. 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.

- 34.3. The Employer may employ and pay other persons to carry out and complete the works and to rectify and defects and may enter upon the works and use all materials on the site, plant, equipment and temporary works.
- 34.4. The contractor shall, during the execution or after the completion of the works under this clause remove from the site as and when required, within such reasonable time as the Project Manager may in writing specify, any temporary building, plant, machinery, appliances, goods or materials belonging to or hired by him, and in default the Employer may (without being responsible for any loss or damage) remove and sell any such property of the Contractor, hold the proceeds less all costs incurred to the credit of the Contractor.
- 34.5. Until after completion of the works under this clause the Employer shall not be bound by any other provision of this Contract to make any payment to the Contractor, but upon such completion as aforesaid and the verification within a reasonable time of the accounts therefore the Project Manager shall certify the amount of expenses properly incurred by the Employer and, if such amount added to the money paid to the Contractor before such determination exceeds the total amount which would have been payable on due completion in accordance with this Contract the difference shall be a debt payable to the Employer by the Contractor; and if the said amount added to the said money be less than the said total amount, the difference shall be a debt payable by the Employer to the Contractor.

### 35. Release from Performance

- 35.1. 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.

### 36. Corrupt gifts and Payment of Commission

- 36.1. The Contractor shall not;
- ) Offer or give or agree to give to any person in the service of the Employer any gift or consideration of any kind as an inducement or reward for doing or forbearing to do or for having done or forborne to do any act in relation to the obtaining or execution of this or any other Contract for the Employer or for showing or forbearing to show favour or disfavour to any person in relation to this or any other contract for the Employer.
  - b) Enter into this or any other contract with the Employer in connection with which commission has been paid or agreed to be paid by him or on his behalf or to his knowledge, unless before the Contract is made particulars of any such commission and of the terms and conditions of any agreement for the payment thereof have been disclosed in writing to the Employer.
- 36.2. Any breach of this Condition by the Contractor or by anyone employed by his or acting on his behalf (whether with or without the knowledge of the Contractor) shall be an offence under the provisions of the Public Procurement Regulations issued under the Exchequer and Audit Act Cap 412 of the Laws of Kenya.

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### 37. Settlement of Disputes

- 37.1. In case any dispute or difference shall arise between the Employer or the Project

Manager on his behalf and the Contractor, either during the progress or after the completion or termination of the works, such dispute shall be notified in writing by either party to the other with a request to submit it to arbitration and to concur in the appointment of an Arbitrator within thirty days of the notice. The dispute shall be referred to the arbitration and final decision of a person to be agreed between the parties. Failing agreement to concur in the appointment of an Arbitrator, the Arbitrator shall be appointed by the Chairman or Vice Chairman of any of the following professional institutions;

- (i) Architectural Association of Kenya
- (ii) Institute of Quantity Surveyors of Kenya
- (iii) Association of Consulting Engineers of Kenya
- (iv) Chartered Institute of Arbitrators (Kenya Branch)
- (v) Institute of Engineers of Kenya

37.2. On the request of the applying party, the institution written to first by the aggrieved party shall take precedence over all other institutions.

37.3. The arbitration may be on the construction of this Contract or on any matter or thing of whatsoever nature arising hereunder or in connection therewith, including any matter or thing left by this Contract to the discretion of the Project Manager, or the withholding by the Project Manager of any certificate to which the Contractor may claim to be entitled to or the measurement and valuation referred to in clause 23.0 of these conditions, or the rights and liabilities of the parties subsequent to the termination of Contract.

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

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

37.6. Notwithstanding anything stated herein the following matters may be referred to arbitration before the practical completion of the works or abandonment of the works or termination of the Contract by either part:

- a. The appointment of a replacement Project Manager upon the said person ceasing to act.
- b. Whether or not the issue of an instruction by the Project Manager is empowered by these Conditions.
- c. Whether or not a certificate has been improperly withheld or is not in accordance with these Conditions.
- d. Any dispute or difference arising in respect of war risks or war damage.

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37.7. All other matter shall only be referred to arbitration after the completion or alleged completion of the works or termination or alleged termination of the Contract,



unless the Employer and the Contractor agree otherwise in writing.

- 37.8. The Arbitrator shall, without prejudice to the generality of his powers, have powers to direct such measurements, computations, tests or valuations as may in his opinion be decision, requirement or notice and to determine all matters in dispute which shall be submitted to him in the same manner as if no such certificate, opinion, decision requirement or notice had beengiven.
- 37.9. The award of such Arbitrator shall be final and binding upon the parties.

APPENDIX TO CONDITIONS OF CONTRACT

THE EMPLOYER IS

Name: COUNTY GOVERNMENT OF KIRINYAGA

Address: P. O BOX 240- 10300 KERUGOYA

Name of Authorized Representative: CHIEF OFFICER

Telephone: +254(020)-2723255

Facsimile: +254(020) 2714806

The Project Manager is

Name: WORKS SECRETARY, STATE DEPARTMENT OF PUBLIC WORKS.

Address: P. O BOX 30743 NAIROBI.

Telephone: 020 2723101

Facsimile: 2716737

The name (and identification number) of the Contract is PROPOSED CONSTRUCTION OF A COMPLEX AT KERUGOYA COUNTY HOSPITAL IN KERUGOYA TOWN

TENDER NEGOTIATION NO: 824618-2-2020/2021

The Works consist of SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF MEDICAL GASES PLANTS AND PIPING SYSTEM INSTALLATION WORKS

The Start Date shall be AGREED WITH THE PROJECT MANAGER.

The Intended Completion Date for the whole of the Works shall be ..... WEEKS FROM DATE OF POSSESSION.

The following documents also form part of the Contract:  
AS LISTED IN CLAUSE 2.3 OF CONDITIONS OF CONTRACT.

The Contractor shall submit a revised program for the Works within \_\_\_\_\_ 7 \_ days of delivery of the Letter of Acceptance.

The Site Possession Date shall be AGREED WITH THE PROJECT MANAGER.

The Site is located Kerugoya County Hospital Compound, Kirinyaga County

The Defects Liability period is .....6..... Months.

Amount of Tender Security is Kshs 800,000.00

The following events shall be Compensation Events:

1. AS LISTED IN CLAUSE 24 OF THE CONDITIONS OF CONTRACT.
2. DELAYED PAYMENTS WILL BE COMPENSATED FOR INTEREST AND TIME 3.

\_\_\_\_\_

4. \_\_\_\_\_

The period between Program updates is 7 days.

The amount to be withheld for late submission of an updated Program is WHOLE

CERTIFICATE The period of honouring certificate is 30 days.

The proportion of payments retained is 10%

percent. The Limit of Retention is 5% percent.

The Price Adjustment Clause SHALL NOT apply

The liquidated damages for the Sub-contract Works is Kshs. 80,000.00\_(per week or part thereof)

The Performance Security shall be for the following minimum amounts equivalent as a percentage of the Contract Price-----5%----- percent (%)

The rate of exchange for calculation of foreign currency payments is NOT APPLICABLE

Advance Payment SHALL NOT BE granted.

## SECTION B

## II. SUB-CONTRACT AGREEMENT (KABCEC)

### AGREEMENT AND CONDITIONS OF SUB-CONTRACT FOR BUILDING WORKS

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	(ii)	
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1.0 AGREEMENT

1.1 This agreement is made on .....  
between .....  
of (or whose registered office is situated at) .....

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

..... and

..... of

(or whole registered office is situated at) .....

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

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

.....

Between .....

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

1.3 WHEREAS the contractor is desirous of sub-letting to the Sub-Contractor

.....

.....

.....

hereinafter called "the sub-contractor works"

at.....

on Land Reference No being part of the main contract works.

1.4 And whereas the Sub-Contractor has supplied the Contractor with a priced

copy of the bills of quantities (hereinafter referred to as "the sub-contractor bills"), where applicable, which together with the drawings numbered.....

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

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

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

NOW IT IS HEREBY AGREED AS FOLLOWS:

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

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

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

- 1.8 The term 'Architect', 'Quantity Surveyor' and 'Engineer', where applicable, shall refer to the persons appointed by the Employer to

- 1.9 Administer the sub-contract in accordance with the main contract agreement. Where applicable, reference to the Architect shall be deemed to include reference to the Engineer.

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

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

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

- 1.13 AS WITNESS the hands of the said

parties; Signed by the said

.....(Contractor

) In the presence of

Name .....

Address .....



Signed by the said

.....(Sub-Contractor)

In the presence of

Name .....

Address .....

CONDITIONS OF SUB-CONTRACT

## 2.0 GENERAL OBLIGATIONS OF THE CONTRACTOR

The Contractor shall:

- 2.1 Timeously obtain from the Architect on behalf of the Sub-Contractor all drawings, necessary details, instructions and other information required by the Sub-Contractor for the proper carrying out of the sub-contract works.
- 2.2 Provide all such facilities and attend upon the Sub-Contractor as required and as provided in the specifications, bills of quantities and these conditions to the extent compatible with the provisions of the main contract
- 2.3 Observe, perform and comply with all the provisions of the main contract and of this sub-contract on the part of the Contractor to be observed, performed and complied with to ensure satisfactory completion of the sub-contract works.

## 3.0 GENERAL OBLIGATIONS OF THE SUB-CONTRACTOR

- 3.1 The Sub-Contractor shall be deemed to have notice of all the provisions of the main contract except the detailed prices of the Contractor included in the bills of quantities or in the schedule of rates.
- 3.2 The Sub-Contractor shall carry out and complete the sub-contract works in accordance with this sub-contract and in all respects to the reasonable satisfaction of the Contractor and of the Architect and in conformity with all reasonable directions and requirements of the Contractor regulating the due carrying out of the contract works.
- 3.3 The Sub-Contractor shall observe, perform and comply with all the provisions of the main contract on the part of the Sub-Contractor to be observed, performed and complied with so far as they relate and apply to the sub-contract works or any portion thereof and are not inconsistent with the expressions of this sub-contract as if all the same were set out herein.
- 3.4 Without prejudice to the generality of the foregoing requirements, the Sub-Contractor shall especially observe perform and comply with the provisions of clauses 9.0, 18.0, 19.0, 22.0, 30.0, 31.0, 34.0 and 36.0 of the main contract as they apply to the sub-contract works

## 4.0 SUB-CONTRACT DOCUMENTS

- 4.1 The sub-contract documents for use in the carrying out of the sub-contract works shall be:-
  - 4.1.1 The agreement and these conditions
  - 4.1.2 The sub-contract drawings as listed in the agreement
  - 4.1.3 The sub-contract bill of quantities or schedule of rates as applicable
  - 4.1.4 The specifications as separately supplied or as contained in the sub-contract bills.
- 4.2 Upon the execution of the sub-contract, the Contractor shall register the agreement with the relevant statutory authority and pay all fees, charges, taxes, duties and all costs arising therefrom.
- 4.3 The manner of supplying contract documents, their custody, display on site and their interpretation in the event of discrepancies shall be as provided in the main contract in respect of the main contract documents with the necessary amendments made to refer to the sub-contract.

5.0 GENERAL LIABILITY OF THE SUB-CONTRACTOR

- 5.1 The Sub-Contractor shall be liable for and shall indemnify the Contractor against and from:
- 5.1.1 Any breach, non-observance or non-performance by the Sub-Contractor, his servants or agents of any of the said provisions of the main contract and of this subcontract.
  - 5.1.2 Any act or omission of the Sub-Contractor, his servants or agents which involve the Contractor in any liability to the Employer under the main contract
  - 5.1.3 Any claim, damage, loss or expense due to or resulting from any negligence or breach of duty on the part of the Sub-Contractor, his servants or agents.
  - 5.1.4 Any loss or damage resulting from any claim under any statute or common law by an employee of the Sub-Contractor in respect of personal injury or death arising out of or in the course of his employment.
- 5.2 Provided that nothing contained in this sub-contract shall impose any liability on the Sub-Contractor in respect of any negligence or breach of duty on the part of the Employer, the Contractor, other sub-contractors or their respective servants or agents nor create any privity of contract between the Sub-Contractor and the Employer or any other sub-contractor.

6.0 INSURANCE AGAINST INJURY TO PERSONS AND PROPERTY

- 6.1 Without prejudice to his liability to indemnify the Contractor under clause 5.0 above, the Sub-Contractor shall maintain: -
- 6.1.1 Such insurances as are necessary to cover the liability of the Sub-Contractor in respect of injury or damage to property including damage to the works arising out of or in the course of or by reason of the carrying out of the sub-contract works except for liability against the contingencies specified at clause 6.3 herein.
  - 6.1.2 The insurances required under sub clause 6.1.1 and 6.1.2 above shall be placed with insurers approved by the Contractor and the Architect.
- 6.2 Notwithstanding the provisions of clause 23.0 of these conditions, the Contractor shall not be obliged to make payments to the Sub-Contractor before the said policies have been provided.
- 6.3 Where clause 13.0 of the main contract applies, the sub-contract works, including materials and goods of the sub-Contractor delivered to the works, shall as regards loss or damage by the contingencies stated at clause 13.0 therein, namely, fire, earthquake, fire following earthquake, lightning, explosion, storm, tempest, flood, bursting or overflowing of water tanks, apparatus or pipes, aircraft and other aerial devices or articles dropped there from, riot and civil commotion, be at the sole risk of the contractor. The Contractor shall cover his liability for the works by procuring insurances as required in the said clause.
- 6.4 Where clause 14.0 or 15.0 of the main contract applies, the sub-contract works, including materials and goods of the Sub-Contractor delivered to the works shall, as regards loss or damage by the contingencies stated therein be at the sole risk of the Employer. The Employer shall cover his liability for the works by procuring insurances as required in the said clause.
- 6.5 The Sub-Contractor shall observe and comply with the conditions contained in the policy or policies of insurance of the Contractor or of the Employer, as the case may be, as regards loss or damage which may be caused by the stated contingencies. For this purpose, the Contractor or the Employer as the case may be, shall avail the said policies to the SubContractor for his perusal.
- 6.6 If any loss or damage affecting the sub-contract works or any part thereof or any unfixed goods or materials is occasioned by any one or more of the said contingencies, then,

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

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

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

## 7.0 PERFORMANCE BOND

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

## 8.0 POSSESSION OF SITE AND COMMENCEMENT OF WORKS

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

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

## 9.0 ARCHITECT'S INSTRUCTIONS

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

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

## 10.0 VARIATIONS

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

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

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

## 11.0 LIABILITY FOR OWN EQUIPMENT

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

## 12.0 PROVISION OF FACILITIES BY THE CONTRACTOR

- 12.1 Where provided in the main contract, the Contractor shall supply at his own cost all necessary water, lighting, electric power, telephones and security required for the sub-contract works. Where not so provided, the Sub-Contractor shall provide the said services at his own cost.
- 12.2 Except as otherwise provided in the main contract, the Sub-Contractor shall construct at his own expense all necessary workshops, stores, offices, workers' accommodation and other temporary buildings required for the carrying out of the works at such places on site as the Contractor shall identify. The Contractor undertakes to give the sub-Contractor the required space and all reasonable facilities for such construction. Upon practical completion of the works, the Sub-contractor shall remove the said facilities and reinstate disturbed surface to the satisfaction of the Contractor.
- 12.3 The Contractor shall provide, without charge, general attendance to the Sub-Contractor to facilitate the carrying out of the works which attendance shall include facilities for access to and movement within the site and sections or parts of the building or buildings where the subcontract works are being carried out, the use of temporary roads, paths and access ways, sanitary and welfare facilities.
- 12.4 The Contractor shall permit the Sub-Contractor to use, without charge, at all reasonable times, any scaffolding and hoisting equipment belonging to or provided by the Contractor while it remains so erected upon the site. The use by the Sub-Contractor of any other equipment, facilities or services provided by the Contractor for the works shall be subject to private arrangements between the parties hereto and shall not be regulated by these conditions.
- 12.5 Provided that such use of the scaffolding and hoisting equipment shall be on the express condition that no warranty or other liability on the part of the Contractor shall be created or implied in regard to fitness, condition or suitability for the intended purpose except that the Sub-Contractor shall be liable for any damage caused thereto or thereby.
- 12.6 Where required, the Contractor shall provide the facilities, equipment and the like and carry out any necessary builder' works within a reasonable time of the request by the Sub-Contractor to enable timely performance of the sub-contract.

## 13.0 LIABILITY FOR OWNWORK

- 13.1 The Contractor and the Sub-Contractor shall be liable for the due carrying out of their respective works in accordance with their respective contracts without causing damage or injury to the works of the other sub-contractors, and in particular:
- 13.2 Should the carrying out of the sub-contract works cause injury or damage to the main contract works, or to the work of the other sub-contractors, the Sub-contractor shall rectify the damage so caused at his own cost.
- 13.3 Should the carrying out of the main contract works cause damage or injury to the sub-contract works, the Contractor shall rectify the damage at his own cost.
- 13.4 If in the course of carrying out the sub-contract works, the Sub-Contractor is required to carry out work not included in his sub-contract by reason of any materials of workmanship not being in accordance with the main contract or with other sub-contracts, the Contractor shall reimburse the Sub-Contractor the expenses incurred therein.

## 14.0 CO-OPERATION IN USE OF FACILITIES

- 14.1 The Contractor and the Sub-Contractor undertake to co-operate with each other and coordinate work arrangements and procedures required in carrying preventing interference, disruption or disturbance to the progress of the works or to the activities of other subcontractors.
- 14.2 The Contractor and the Sub-Contractor undertake not to wrongfully use or interfere with equipment, scaffolding, appliances, ways, temporary works, temporary buildings and other property belonging to or provided by the other part or by other sub-contractors.
- 14.3 Provided that nothing contained in this clause shall prejudice or limit the rights of the

Contractor or of the sub-Contractor in carrying out their respective statutory and or contractual duties under this sub-contract or under the main contract.

**15.0 ASSIGNMENT AND SUBLETTING**

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

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

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

**16.0 WORK PRIOR TO APPOINTMENT OF CONTRACTOR**

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

16.2 Where the Sub-Contractor is appointed before the Contractor is appointed, the Subcontractor shall be permitted, when the identity of the Contractor is known and within 30 days thereof, to raise objections (on reasonable grounds) against entering into a sub-contract with the Contractor

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

**17.0 SUB-CONTRACTOR DESIGN**

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

**18.0 SPECIFICATION OF GOODS, MATERIALS AND WORKMANSHIP**

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

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

**19.0 COMPLIANCE WITH STATUTORY AND OTHER REGULATIONS**

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

**20.0 ROYALTIES AND PATENT RIGHTS**

20.1 All royalties or other sums payable in respect of the supply and use of any patented articles,

processes or inventions in carrying out the works as described by or referred to in the subcontract bills, specifications or drawings shall be deemed to have been included in the subcontract price.

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

## 21.0 ANTIQUITIES AND OTHER OBJECTS OF VALUE

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

## 22.0 SUSPENSION OF WORKS

- 22.1 An instruction by the Architect to postpone or suspend the works under clause 28.0 of the main contract shall have the same effect on the sub-contract works as it has on the main contract works.
- 22.2 If the suspension arises due to default by the contractor and the sub-contract works are adversely affected by the suspension, the sub-contractor shall be entitled to reimbursement by the contractor of all expenses arising therefrom.
- 22.3 If the suspension arises due to default by the sub-contractor, the sub-contractor shall be liable to the contractor for all expenses arising therefrom.
- 22.4 A notice by the contractor to suspend the works under clause 29.0 of the main contract shall have the same effect on the sub-contract works as it has on the main contract works.
- 22.5 Should the sub-contract works be adversely affected by suspension under clause 29.0 of the main contract, the sub-contractor shall be entitled to the remedies provided for at clauses 25.0 and 26.0 of this sub-contract.

## 23.0 PAYMENTS

- 23.1 Procedures for originating and processing applications for payments and payment certificates as regards the sub-contract works shall be the same as those prescribed for the Contractor in the main contract at clause 34.0. All references therein to the contractor shall be deemed to include references to the Sub-contractor.
- 23.2 Before submitting an application for payment to the Quantity Surveyor in accordance with clause 34.1 of the main contract, the Contractor shall give the Sub-Contractor a notice of not less than 7 days to submit the details of the amounts which the Sub-Contractor considers himself entitled to for the relevant period. Such details, when received, shall be annexed to the said Contractor's application.
- 23.3 Where it is necessary to measure the sub-contract works for purpose of interim valuation or for the preparation of the final account, the Quantity Surveyor shall give the Sub-Contractor a reasonable opportunity to be present at the time of the measurements and to take notes and measurements as he may require.
- 23.4 Neither the Quantity Surveyor nor the Architect shall be bound to issue a valuation or a payment certificate in respect of the sub-contract works, as the case may be, whose value is less than the amount stated in the appendix to these conditions as the minimum amount of a payment certificate before the issue of the certificate of practical completion of the main contract or of the sub-contract, as applicable.
- 23.5 Provided that where the minimum amount of a certificate inserted in the appendix to these conditions has been achieved but the corresponding minimum inserted in the appendix to the main contract in respect of the Contractor's work has not been achieved, or the Contractor has not applied for payment within the stated period, the Architect may with the consent of the Contractor, issue a payment certificate directly to the Sub-Contractor for payment by the Employer.
- 23.6 Within 7 days of receipt by the Contractor of payment by the Employer, the Contractor shall

notify and pay to the Sub-Contractor the total value certified therein in respect of the subcontract works less the portion of the retention money attributable to the sub-contract works and less amounts previously paid to the Sub-Contractor.

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

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

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

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

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

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

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

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

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

#### 24.0 PRACTICAL COMPLETION AND DEFECTS LIABILITY

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

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

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

- 24.4 The balance of the retention money shall be released to the Sub-Contractor after the defects



appearing in the works have been rectified in accordance with sub-clause 41.6 and 41.7 of the main contract and after the Contractor has received the said payment as provided for in sub clause 34.16.3 of the main contract.

## 25.0 EXTENSION OF TIME

25.1 Upon it becoming reasonably apparent that the progress of the sub-contract works is or will be delayed, the Sub-Contractor shall forthwith give written notice of the cause of the delay to the Contractor and to the Architect with supporting details showing the extent of delay caused or likely to be caused. Thereafter, the Architect shall evaluate the information supplied by the Sub- Contractor and if in his opinion the completion of the works is likely to be or has been delayed beyond the date for practical

completion stated in the appendix to these conditions or beyond any extended time previously fixed under this clause, by any of the reasons entitling the Contractor to extension of time under sub- clause 36.1 of the main contract, then the Architect shall, so soon as he is able estimate the length of the delay beyond the date or time aforesaid, recommend to the Contractor a fair and reasonable extension of time to be granted for the completion of the sub-contract works.

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

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

## 26.0 LOSS AND EXPENSE CAUSED BY DISTURBANCE OF REGULAR PROGRESS

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

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

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

## 27.0 DAMAGES FOR DELAY IN COMPLETION

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

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

## 28.0 FLUCTATIONS

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

- 28.2 The sub-contract price shall be deemed to be based on currency exchange rates current at the date of tender as regards materials or goods to be specifically imported for permanent incorporation in the works.
- 28.3 Should duties, taxes and exchange rates vary during the period of the contract, compensation thereof shall be calculated in accordance with sub-clause 35.1 and 35.2 of the main contract.
- 28.4 Compensation for change in prices of goods and materials incorporated in the works and in the rates of wages provided for at sub-clause 35.3, 35.4 and 35.5 of the main contract shall not apply to the sub-contract unless specifically provided for in the bill of quantities or specifications.

#### **29.0 TERMINATION OF MAIN CONTRACT**

- 29.1 If, for any reason, the contractor's employment is terminated either under clause 38.0, 39.0 or 40.0 of the main contract, this sub-contract shall thereupon also terminate.
- 29.2 Upon termination, the sub-contractor shall cease all work and vacate the site. He shall not remove any equipment or any materials brought onto the site for the carrying out of the works without the written approval of the contractor and the Architect
- 29.3 Where the termination of the main contract occurs without the default of the sub-contractor, the sub-contractor shall be paid by the contractor for work done in the like manner as the Contractor is paid at clause 39.5 of the main contract.
- 29.4 Where the termination of main contract arises from the default by the sub-contractor, the adjustment of the sub-contract accounts shall be performed in the like manner as is provided at sub-clause 38.8 of the main contract regarding the main contract accounts.

#### **30.0 TRMINATION OF SUB-CONTRACT.**

- 30.1 Without prejudice to any other rights and remedies which the contractor may possess, if the sub-contractor shall make default in any one or more of the respects which would entitle the employer to terminate the main contract under clause 38.0 therein, the contractor shall give the sub-contractor a notice, with a copy to the Architect and to the employer by registered post of recorded delivery specifying the default. Should the sub-contractor continue the default for 14 days after receipt of such notice or at any time thereafter repeat such default and should the Architect certify that the sub-contractor is in default, the contractor may terminate the Sub- contract forthwith after the expiry of the notice provided that the notice is not given unreasonably or vexatiously. The termination letter shall be copied to the Architect and to the Employer.
- 30.2 Where the sub-contract is terminated due to the default of the sub-contractor as in sub-clause 30.1 herein, the adjustment of sub-contract accounts shall be performed in the like manner as is provided at sub-clause 38.8 of the main contract regarding the main contract accounts.
- 30.3 Without prejudice to any other rights and remedies which the Sub-Contractor may possess, if the Contractor shall make default in one or more of the respects which, if committed by the Employer, would entitle the contractor to terminate the main contract under clause 39.0 therein, the Sub-Contractor shall give the Contractor a notice, with a copy to the Architect and to the Employer, by registered post or recorded delivery specifying the default. Should the contractor continue the default for 14 days after receipt of such notice or at any time thereafter repeat such default, and should the Architect certify that the contractor is in default, the Sub-Contractor may terminate the sub-contract forthwith after expiry of the notice, provided that the notice is not given unreasonably or vexatiously. The termination letter shall be copied to the Architect and to the Employer.
- 30.4 If the Sub-Contract is terminated due to the default of the Contractor as in sub-clause 30.3 herein, the Contractor shall pay the sub-contractor for work done in the like manner as the Contractor would be paid at sub-clause 39.5 of the main contract where the termination is done by the Contractor.
- 30.5 Where the sub-contract is terminated due to the default of the Contractor, all expenses arising from the termination shall be done wholly by the Contractor and the termination shall not create any liability on the Employer.

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

### **31.0 SETTLEMENT OF DISPUTES**

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

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

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

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

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

31.4.2 The extend of the recommended time, or

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

31.4.4 The issue of an instruction which the sub-contractor contends is not authorised by the main contract or the sub-contract, or

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

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

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

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

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

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

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

31.9.2 Whether or not a payment certificate has been improperly withheld or is not in accordance

with the main contract or these conditions or though issued, it has not been honoured.

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

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

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

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

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

CONTRACTOR'S PERFORMANCE BOND

BY THIS AGREEMENT we ..... (SURETY)  
of .....  
are bound to ..... (CONTRACTOR) in  
the sum of Kenya shillings .....  
.....(Kshs. .... )  
to be paid by us to the said ..... (CONTRACTOR)  
WHEREAS by an agreement in writing dated .....  
.....(SUB-  
CONTRACTOR) entered into a sub-contract with .....(CONTRACTOR)

to carry out and complete the works therein stated in the manner and by the time therein specified all in  
accordance with the provisions of the said sub-contract, namely: (description of works)  
.....

NOW the condition of the above written bond is such that if the said sub-contractor, his executors,  
administrator, successors or assigns shall duly perform his obligations under the sub-contract, or if on default  
by the sub-contractor the surety shall satisfy and discharge the damages sustained by the contractor thereby  
up to the amount of the above written bond, then this obligation shall be void, otherwise it shall remain in  
full force and effect. Upon default, and without prejudice to his other rights under the sub-contract, the  
contractor shall be entitled to demand forfeiture of the bond and we undertake to honour the demand in  
the amount stated above.

PROVIDED always and it is hereby agreed and declared that no alteration in the terms of the said sub-contract  
or in the extent or nature of the works to be carried out and no extension of time by the contractor under  
the sub-contract shall in any way release the surety from any liability under the above written bond.

IN WITNESS whereof we have set out hand this..... day of .....

.....  
Surety

.....  
Witness

Authorised of Power of Attorney No.....

# APPENDIX

## Clause

Name of sub-contractor's insurers	6.0 .....
Name of sub-contractor's surety	7.0 .....
Amount of surety	7.0 .....
Period of possession of site	8.1 .....
Date of commencement of works	8.2 .....
Date for practical completion	8.2 .....
Interval for application of payment certificates	23.1 .....
Minimum amount of payment certificate	23.4 .....
Percentage of certified value retained	23.6 .....
Limit of retention fund, if any	23.6 .....
Name of the sub-contractor's bank for purposes of interest calculation ..	23.7,23.8 .....
Defects liability period	23.11 .....
Period of final measurement and valuation	23.12 .....
Damages of delay in completion	27.1 at the rate of Kshs .....

Signed by the said:

.....

CONTRACTOR

.....

SUB-CONTRACTOR

## APPENDIX TO THE AGREEMENT AND CONDITIONS OF SUB-CONTRACT FOR BUILDING WORKS

Kenya Building and Civil Engineering Contractors (KABCEC) document

1.    **CLAUSE 7.0**  
Change to read “.....in the sum equivalent to five per cent (5%) of the subcontract price and from a well-established and reputable bank or insurance.....”
2.    **CLAUSE 17.0**  
Where the term Architect is used, it shall imply project manager.
3.    **CLAUSE 28.0**  
Fluctuation shall apply as per the main works document.

**SECTION C**

**CONTRACT PRELIMINARIES AND**

**GENERAL CONDITIONS**



## CONTRACT PRELIMINARIES AND GENERAL CONDITIONS

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## SECTION C

### CONTRACT PRELIMINARIES AND GENERAL CONDITIONS

#### **1.01**    Examination of Tender Documents

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

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

- a)        Work detailed in the Specification and in the Contract Drawings.
- b)        The Republic of Kenya Document “General Conditions of Contract for Electrical and Mechanical Works”.
- c)        Other documents to which reference is made.

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

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

#### **1.02**    Discrepancies

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

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

#### **1.03**    Conditions of Contract Agreement

The contractor shall be required to enter into a contract with the Employer.

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

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

#### **1.04    Payment**

Payment will be made through certificates to the Contractor. All payments will be less retention as specified in the Main Contract. No payment will become due until materials are delivered to site.

#### **1.05    Definition of Terms**

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

- i)        Employer: The term “Employer” shall mean The COUNTY GOVERNMENT OF KIRINYAGA.
- ii)       Architect: The term “Architect” shall mean The Chief Architect, Ministry of Transport, Infrastructure, Public Works, Housing and Urban Development - State Department of Public Works
- iii)      Quantity Surveyor: The term “Quantity Surveyor” shall mean The Chief Quantity Surveyor, Ministry of Transport, Infrastructure, Public Works, Housing and Urban Development -State Department of Public Works
- iv)       Civil/Structural Engineers: The term “Civil/Structural Engineers ” shall mean The Chief Engineer( Structural), Ministry of Transport, Infrastructure, Public Works, Housing and Urban Development -State Department of Public Works
- v)        Engineer: The term “Engineer” shall mean Chief Engineer Mechanical (BS), Ministry of Transport, Infrastructure, Public Works, Housing and Urban Development -State Department of Public Works
- vi)       Contractor: The term “Contractor” shall mean the firm or company appointed to carry out the Air Conditioning Works and shall include his or their heir, executors, assigns, administrators, successors, and duly appointed representatives.
- vii) Contract Works: The term “contract Works” shall mean all or any portion of the work, materials and articles, whether the same are being manufactured or prepared, which are to be used in the execution of this contract and whether the same may be on site or not.

- viii) Contract Drawings: The term “Contract Drawings” shall mean those drawings required or referred to herein and forming part of the Bills of Quantities.
- ix) Working Drawings: The term “Working Drawings” shall mean those drawings required to be prepared by the contractor as hereinafter described.
- x) Record Drawings: The term “Record Drawings” shall mean those drawings required to be prepared by the contractor showing “as installed” and other records for the contract Works.

xi)

Abbreviations:

CM shall mean Cubic Metre  
 SM shall mean Square Metre  
 LM shall mean Linear Metre  
 LS shall mean Lump Sum mm  
 shall mean Millimetres No.  
 shall mean Number Kg. shall  
 mean Kilogramme  
 KEBS shall mean Kenya Bureau of Standards  
 BS shall mean. Current standard British Standard Specification published by the British Standard Institution, 2 Park Street, London W1, England

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

#### 1.06 Site Location

The site of the Contract Works is situated within Kerugoya County Hospital Compound in Kirinyaga County.

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

#### 1.07 Duration of Contract

The Contractor shall be required to phase his work in accordance with the works programme (or its revision). The programme is to be agreed with the Project Manager.

#### 1.08 Scope of Contract Works

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

The contractor shall supply all accessories, whether of items or equipment supplied but to be fixed and commissioned under this contract.

#### 1.09 Extent of the contractor's Duties

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

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

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

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

#### 1.10 Execution of the Works

The works shall be carried out strictly in accordance with:

- a) All relevant Kenya Bureau of Standards Specifications.
- b) All relevant British Standard Specifications and Codes of Practice (hereinafter referred to as B.S. and C.P. respectively).
- c) This Specification.
- d) The Contract Drawings.
- e) The Bye-laws of the Local Authority.
- f) The Engineer's Instructions.

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

#### 1.11 Validity of Tender

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

#### 1.12 Firm - Price contract

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

1.13 Variation

No alteration to the contract Works shall be carried out until receipt by the contractor of written instructions from the Project Manager.

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

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

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

1.14 Prime Cost and Provisional Sums

A specialist Contractor may be nominated by the Project Manager to supply and/or install any equipment covered by the Prime Cost or Provisional Sums contained within the Contract documents.

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

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

1.15 Bond

The tenderer must submit with his tender the name of one Surety who must be an established Bank only who will be willing to be bound to the Employer for an amount equal to 5 % of the contract amount as Clause 31 of the Main Contract.

1.16 Government Legislation and Regulations

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

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

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

1.17 Import Duty and Value Added Tax

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



1.18 Insurance Company Fees

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

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

1.19 Provision of Services by the Contractor

Contractor shall make the following facilities available for his use:

- a) Attendance and the carrying out of all work affecting the structure of the building which may be necessary, including all chasing, cutting away and making good brickwork, all plugging for fixing, fittings, machinery, fan ducting, etc., and all drilling and tapping of steel work. Any purpose made fixing brackets shall not constitute Builder's Work and shall be provided and installed by the contractor unless stated hereinafter otherwise.
- b) The provision of temporary water, lighting and power: All these services utilised shall be paid for by the Contractor
- c) Fixing of anchorage and pipe supports in the shuttering, anchorage with fully dimensioned drawings detailing the exact locations.
- d) i) Provision of scaffolding, cranes, etc. but only in so far as it is required for the Contract Works ii) Any specialist scaffolding, cranes, etc. to be used by any Contractor for his own exclusive use shall be paid for by the Contractor.

1.20 Suppliers

The contractor shall submit names of any supplier for the materials to be incorporated, to the Engineer for approval. The information regarding the names of the suppliers may be submitted at different times, as may be convenient, but no sources of supply will be changed without prior approval.

Each supplier must be willing to admit the Engineer or his representative to his premises during working hours for the purpose of examining or obtaining samples of the materials in question.

1.21 Samples and Materials Generally

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

1.22 Administrative Procedure and Contractual Responsibility

The Contractor is entirely responsible to the Employer for the whole of the works including any Contract Works and shall deal direct with the Employer or Engineer.

### 1.23 Bills of Quantities

The Bills of Quantities have been prepared in accordance with the standard method of measurement of

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

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

### 1.24 Contractor's Office in Kenya

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

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

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

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

### 1.25 Builder's Work

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

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

The contractor shall also provide and install any purpose made fixing brackets.

#### 1.26 Structural Provision for the Works

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

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

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

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

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

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

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

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

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

#### 1.28 Checking of Work

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

#### 1.29 Setting to Work and Regulating System

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

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

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

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

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

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

#### 1.30 Identification of Plant Components

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

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

#### 1.31 Contract Drawings

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

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

#### 1.32 Working Drawings

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

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

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

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

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

- a) Any drawings required by the Contractor, or Engineer to enable structural provisions to be made including Builder's Working Drawings or Schedules and those for the detailing of holes, fixings, foundations, cables and paperwork ducting below or above ground or in or outside or below buildings.
- b) General Arrangement Drawings of all plant, control boards, fittings and apparatus or any part thereof and of installation layout arrangement of such plant and apparatus.
- c) Schematic Layout Drawings of services and of control equipment.
- d) Layout Drawings of all embedded and non-embedded paperwork, ducts and electrical conduits.
- e) Complete circuit drawings of the equipment, together with associated circuit description.
- f) Such other drawings as are called for in the text of the Specification or Schedules or as the Engineer may reasonably require.

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

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

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

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

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

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

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

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

- a) Working Drawings amended as necessary but titled "Record Drawings" and certified as a true record of the "As Installed" Contract Works. Subject to the approval of the Engineer such Working Drawings as may be inappropriate may be omitted.
- b) Fully dimensioned drawings of all plant and apparatus.
- c) General arrangement drawings of equipment, other areas containing plant forming part of the Contract Works and the like, indicating the accurate size and location of the plant and apparatus suitably cross-referenced to the drawings mentioned in (b) above and hereinafter.
- d) Routes, types, sizes and arrangement of all pipework and ductwork including dates of installation of underground pipework.
- e) Relay adjustment charts and manuals.
- f) Routes, types, sizes and arrangement of all electric cables, conduits, ducts and wiring including the dates of installation of buried works.
- g) System schematic and trunking diagrams showing all salient information relating to control and instrumentation.
- h) Grading Charts.
- i) Valve schedules and locations suitably cross-referenced.
- j) Wiring and piping diagrams of plant and apparatus.
- k) Schematic diagrams of individual plant, apparatus and switch and control boards. These diagrams to include those peculiar to individual plant or apparatus and also those applicable to system operation as a whole.
- l) Operating Instruction

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

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

The contractor shall supply for fixing in sub-stations, switch-rooms, boiler houses, plant rooms, pump houses, the office of the Maintenance Engineer and other places, suitable valve and instructions charts, schematic diagrams of instrumentation and of the electrical reticulation as may be requested by the

Engineer providing that the charts, diagrams, etc., relate to installations forming part of the Contract Works. All such charts and diagrams shall be of suitable plastic material on a stiff backing and must be approved by the Engineer before final printing.

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

- a) The Marked-up Drawings during the execution of the contract Works  
or
- b) The Record Drawings, etc., within one month of the Section or Practical Completion

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

1.34 Maintenance Manual

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

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

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

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

- a) System Description.
- b) Plant
- c) Valve Operation
- d) Switch Operation
- e) Procedure of Fault Finding
- f) Emergency Procedures
- g) Lubrication Requirements
- h) Maintenance and Servicing Periods and Procedures
- i) Colour Coding Legend for all Services

- j) Schematic and Writing Diagrams of Plant and Apparatus
- k) Record Drawings, true to scale, folded to International A4 size
- l) Lists of Primary and Secondary Spares.

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

#### 1.35 Hand-over

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

The procedure to be followed will be as follows:

- a) On the completion of the contract Works to the satisfaction of the Engineer and the Employer, the contractor shall request the Engineer, at site to arrange for handing over.
- b) The Engineer shall arrange a Hand-over Meeting or a series thereof, at site.
- c) The contractor shall arrange with the Engineer and Employer for a complete demonstration of each and every service to be carried out and for instruction to be given to the relevant operation staff and other representatives of the Employer.
- d) In the presence of the Employer and the Engineer, Hand-over will take place, subject to Agreement of the Hand-over Certificates and associated check lists.

#### 1.36 Painting

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



1.37 Spares

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

1.38 Testing and Inspection - Manufactured Plant

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

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

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

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

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

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

1.39 Testing and Inspection - Installation

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

1.40 Labour Camps

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

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

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

1.41 Storage of Materials

Space for storage and provision of any lock-up sheds or stores required will be provided by the contractor

Nominated Contractors are to be made liable for the cost of any storage accommodation provided specially for their use. No materials shall be stored or stacked on suspended slabs without the prior approval of the Project manager.

#### Initial Maintenance

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

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

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

#### 1.42 Maintenance and Servicing After Completion of the Initial Maintenance

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

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

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

#### 1.43 Trade Names

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

#### 1.44 Water and Electricity for the Works

These will be made available by the Contractor who shall be liable for the cost of any water or electric current used and for any installation provided for their own use.

#### 1.45 Protection

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

#### 1.46 Defects After Completion

The defects liability period will be 12 months from the date of completion of the Contract as certified by the Engineer.

1.47 Damages for Delay

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

1.48 Clear Away on Completion

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

1.49 Final Account

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

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

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

Statement C - Summarising statement A and B giving the net grand total due to the Contractor for the execution of the Contract.

1.50 Fair Wages

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

- a) The contractor shall pay rates of the wages and observe hours and conditions of labour not less favourable than those established for the trade or industry in the district where work is carried out.
- b) In the absence of any rates of wages, hours or conditions of labour so established the contractor shall pay rates and observe hours and conditions of labour are not less favorable than the general level of wages, hours and conditions observed by other employers whose general circumstances in the trade or industry in which the Contractor is engaged are similar.

1.51 Supervision

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

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

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

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

#### Test Certificates

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

#### 1.52 Labour

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

#### 1.53 Discount to the Employer

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

#### 1.54 Guarantee

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

#### 1.55 Direct Contracts

Notwithstanding the foregoing conditions, the Government 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 instance, profit relative to the P.C Sum in the priced Bills of Quantities will be adjusted as deserved for P.C Sum allowed.

#### 1.56 Attendance Upon the Tradesmen etc

The Contractor shall allow for the attendance of trade upon trade and shall afford any tradesmen or other persons employed for the execution of any work not included in this contract every facility for carrying out their work and also for the use of ordinary scaffolding. The contractor however, shall not be required to erect any special scaffolding for them.

#### 1.57 Trade Unions

The contractor shall recognize the freedom of his work people to be members of trade unions.

#### 1.58 Local and other Authorities notices and fees

The contractor shall comply with and give all notices required by any Regulations, Act or by Law of any Local Authority or of any Public Service, Company or Authority who have any jurisdiction with regard to the works or with those systems the same are or will be connected and he shall pay and indemnify the Government against any fees or charges legally demandable under any regulation or by-law in respect of the works; provided that the said fees and charges if not expressly included in the contract sum or stated by way of provisional sum shall be added to the contract sum.

The contractor before making any variation from the contract drawings or specification necessitated by such compliance shall give the Project Manager written notice specifying and giving the reason for such variation and applying for instructions in reference thereto.

If the contractor within seven days of having applied for the same does not receive such instructions, he shall proceed with the works in conforming to the provision regulation or by-law in question and any variation thereby necessitated shall be deemed to be a variation in accordance to the conditions of contract.

1.59 Assignment or subletting

The contractor shall not without the written consent of the Project Manager assign this contract or sublet any portion of the works, provided that such consent shall not be unreasonably withheld to the prejudice of the contractor.

1.60 Partial Completion

If the Government shall take over any part or parts works, apparatus, equipment etc. then within seven days from the date on which the Government shall have taken possession of the relevant part, the Project Manager shall issue a Certificate stating his estimate of the approximate total value of the works which shall be the total value of that part and practical completion of the relevant part shall be deemed to have occurred, and the Defects Liability Period in respect of the relevant part be deemed to have commenced on the date Government shall have taken possession thereof.

The contractor shall make good any defects or other faults in the relevant part that had been deemed complete.

The contractor shall reduce the value of insurance by the full value of the relevant part

The contractor shall be paid for the part of works taken possession by the Government

1.61 Temporary Works

Where temporary works shall be deemed necessary, such as Temporary lighting, the contractor shall take precaution to prevent damage to such works.

The contractor shall include for the cost of and make necessary arrangements with the Project Manager for such temporary works. For temporary lighting, electricity shall be metered and paid for by the contractor.

1.62 Patent Rights

The contractor shall fully indemnify the Government of Kenya; against any action, claim or proceeding relating to infringement of any patent or design rights, and pay any royalties which may be payable in respect of any article or any part thereof, which shall have been supplied by the contractor to the Project Manager. In like manner the Government of Kenya shall fully indemnify the contractor against any such action, claim or proceedings for infringement under the works, the design thereof of which shall have been supplied by the Project Manager to the contractor, but this indemnify shall apply to the works only, and any permission or request to manufacture to the order of the Project Manager shall not relieve the contractor from liability should he manufacture for supply to other buyers.

1.63 Mobilization and Demobilization

The contractor shall mobilize labour plant and equipment to site according to his programme and schedule of work He shall ensure optimum presence and utilization of labour, plant and equipment. He should not pay and maintain unnecessary labour force or maintain and service idle plant and equipment. Where necessary he shall demobilize and mobilize the labour, plant and equipment, as he deems fit to ensure optimum progress of the works and this shall be considered to be a continuous process as works progress. He shall make provision for this item in his tender. No claim will be entertained where the contractor has not made any provision for mobilization and demobilization of labour, plant and equipment in the preliminary bills of quantities or elsewhere in this tender.

#### 1.64 Extended Preliminaries

Where it shall be necessary to extend the contract period by the Project manager the contractor shall still ensure availability on site, optimum labour, materials, plant and equipment. The contractor shall make provision for extended preliminaries, should the contract period be extended and this shall be in a form of a percentage of the proportion of the Contract works remaining as at that time of extension. Where called upon in the Appendix to these Preliminaries the Contractor shall insert his percentage per month for extended preliminaries that shall form basis for compensation.

Lack of inserting the percentage shall mean that the contractor has provided for this requirement elsewhere in the Bills of Quantities.

#### 1.65 Supervision by Engineer and Site Meetings

A competent Project Engineer appointed by the Engineer as his representative shall supervise the Contract works. The Project Engineer shall be responsible for issuing all the site instructions in any variations to the works and these shall be delivered through the Contractor with the authority of the Project Manager. Any instructions given verbal shall be confirmed in writing.

The project engineer and (or) the Engineer shall attend management meetings arranged by the Project Manager and for which the Contractor or his representative shall also attend. For the purpose of supervising the project, provisional sums are provided to cover for transport and allowances. The Contractor shall in his tender allow for the provision of management meetings and site inspections, as instructed by the Engineer, and also profit an attendance on these funds. The funds shall be expended according to Project Manager's instructions to the contractor.

#### 1.66 Amendment to Scope of Contract Works

No amendment to scope of Contract works is expected and in case of amendment or modification to scope of work, these shall be communicated to all tenderers in sufficient time before the deadline of the tender submission. However, during the contract period and as the works progress the Project Manager may vary the works as per conditions of contract by issuing site instructions.

No claims shall be entertained on account of variation to scope of works either to increase the works (pre-financing) or reduction of works (loss of profit-see clause 1.69)

#### 1.67 Contractors Obligation and Employers Obligation

The Contractor will finance all activities as part of his obligation to this contract. The employer shall pay interim payment for materials and work completed on site as his obligation in this contract, as the works progresses. No claims will be entertained for pre-financing of the project by the Contractor, or for loss of profit (expectation loss) in case of premature termination, reduction or increase of works as the Contractor shall be deemed to have taken adequate measures in programming his works and expenditure and taken necessary financial precaution while executing the works. No interest shall be payable to the Contractor, except as relates to late payment as in the conditions of contract clause 23.3. The contractor shall where called upon, insert his price to compensate for any of the occurrence stated here (premature termination, reduction or increase of works), as a percentage of the contract sum in the Appendix to this section.

1. ADD TO CLAUSE 1.40

There is no labour  
camp.

2. MODIFY CLAUSE 1.66

Percentage of extended preliminaries shall be inserted in Bill No. 1 page H/5 section H. However, this amount of the extended preliminaries SHALL NOT exceed the Liquidated and Ascertained Damages indicated on page B-23 of Section B of this tender document

3. ADD TO CLAUSE 1.17

Prices quoted shall include 16% VAT and 3% withholding tax.

In accordance with Government policy, 3% withholding tax shall be deducted from all payments made to the sub-contractor, and the same shall subsequently be forwarded to the Kenya Revenue Authority (KRA).

4. OMIT CLAUSE 1.12

## SECTION D

### GENERAL MECHANICAL SPECIFICATIONS



## SECTION D

### GENERAL MECHANICAL SPECIFICATION

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SECTION D  
GENERAL MECHANICAL SPECIFICATION

2.01 General

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

1. 2.02 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 Subcontractor.

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

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

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

2.03 Regulations and Standards

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

- a) The Kenya Government Regulations.
- a) The United Kingdom Institution of Electrical Engineers (IEE) Regulations for the Electrical Equipment of Buildings.
- b) The United Kingdom Chartered Institute of Building Services Engineers (CIBSE) Guides.
- c) British Standard and Codes of Practice as published by the British Standards Institution (BSI)
- e) The Local Council By-laws.
- f) The Electricity Supply Authority By-laws.
- g) Local Authority By-laws.
- h) The Kenya Building Code Regulations.
- i) The Kenya Bureau of Standards

#### **2.04     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 and connections to equipment shall form part of this Sub-contract and be the responsibility of the Subcontractor.

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 (KPLC) 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 240Volts, 50Hz, 1-phase.

Any equipment that is not rated for the above voltages and frequencies shall be rejected by the Engineer.

#### **2.05     Transport and Storage**

All plant and equipment shall, during transportation be suitably packed, crated and protected to minimize 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.

#### **2.06     Site Supervision**

The Sub-contractor shall ensure that there is an English-speaking supervisor on the site at all times during normal working hours.

#### **2.07     Installation**

Installation of all special plant and 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 2.03 of this Section.

## **2.08    Testing**

### **2.08.1   General**

The Sub-contractor's attention is drawn to Part 'C' Clause 1.38 of the "Preliminaries and General Conditions".

### **2.08.2   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 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 specially manufactured for the plant and equipment specified is used, then the Subcontractor 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.

### **2.08.3   Manufactured Plant and Equipment - Work 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 weeks' notice to the Engineer of the manufacturer's intention to carry out such tests and inspections.

The Engineer or his representative shall be entitled to witness such tests and inspections. The cost 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.

#### 2.08.4 Pressure Testing

All pipework installations shall be pressure tested in accordance with the requirements of the various sections of this Specification. The installations may be tested in sections 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 pipework that is buried or concealed before witnessed pressure 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 section of the work that has been tested.

#### 2.09 Colour Coding

Unless stated otherwise in the Particular Specification all pipework shall be colour coded in accordance with the latest edition of B.S 1710 and to the approval of the Engineer or Architect.

#### 2.10 Welding

##### 2.10.1 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 imperfection due to shearing or flame cutting operation, etc., and shall be free from rust scale, grease and other foreign matter.

##### 2.10.2 Method

All welding shall be carried out by the electric arc processing 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.

##### 2.10.3 Welding Code and Construction

All welded joints shall be carried out in accordance with the following Specifications:

###### a) Pipe Welding

All pipe welds shall be carried out in accordance with the requirements of B.S.806.

###### b) General Welding

All welding of mild steel components other than pipework shall comply with the general requirements of B.S. 1856.

#### Welders Qualifications

Any welder employed on this Sub-contractor shall have passed the trade tests as laid down by the Government of Kenya.

The Engineer may require to see the appropriate 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 E:

PARTICULAR SPECIFICATIONS

FOR

MEDICAL GASES, COMPRESSED AIR,

PSA (OXYGEN GENERATOR) PLANT

AND VACUUM INSTALLATIONS

PARTICULAR SPECIFICATION

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6.	Distribution Pipework	E-19
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## 1. GENERAL \_

### Extent of Contract.

The work shall include for supplying, installing, testing, commissioning, demonstrating and leaving in proper working order a piped centralised supply system for medical gases comprising medical oxygen, Nitrous Oxide, medical air, instrument air and vacuum. Tenders shall comply in all respects with the specification but the contractor may offer alternatives provided that the differences and advantages are clearly detailed by him on the schedule of alternatives attached which shall be returned with the tender. The following are the areas which will be supplied with gases; -

- a) Minor Theatre
- b) Observation Ward
- c) 4No. Theatres
- d) Critical care areas, ICU, HDU
- e) Recovery Rooms
- f) Male and Female Surgical Wards
- g) Burns Unit wards
- h) General Ward

### Specialist Contractors.

The work shall be tendered for by approved contractors only who are specialists in the installation of medical gas systems and who have permanently employed staff experienced in this type of work. At the time of tendering the contractor shall confirm in writing that he has suitable qualified personnel who would be employed on the project.

### Contract Drawings.

The contract drawing to be read in conjunctions with this specification will be issued during the project implementation by the project engineer.

Any discrepancies between the drawings and the specification shall be clarified with the Engineer before tendering.

### As-Installed Drawings

During the course of construction, the contractor shall correct one copy of the contract drawings daily as the work proceeds, indicating any change made from the arrangement shown in the contract drawings.

This amended drawing shall remain on site, readily available for inspection, and the amendments must ultimately be transferred to a reproducible copy of the contract drawing.

## 2. CENTRALISED STORAGE CYLINDER SYSTEMS\_

### Gases to be dispensed from cylinders

The supply system for oxygen shall comprise a centralised battery of cylinders (12No. cylinders bank -duty and 12No. cylinders bank-standby, complete with support tacks, headers, automatic manifold distribution panels and all necessary controls, safety devices, alarms, pipework, valves and terminal units for distributing the gases to the required positions as listed on the schedule of terminal units.

The supply system for Nitrous oxide shall comprise a centralised battery of cylinders (6No. cylinders bank - duty and 6No. cylinders bank-standby, complete with support tacks, headers, automatic manifold distribution panels and all necessary controls, safety devices, alarms, pipework, valves and terminal units for distributing the gases to the required positions as listed on the schedule of terminal units.

The supply system for mixture of oxygen/ Nitrous oxide shall comprise a centralised battery of cylinders (6No. cylinders bank - duty and 6No. cylinders bank-standby, complete with support tacks, headers, automatic manifold distribution panels and all necessary controls, safety devices, alarms, pipework, valves and terminal units for distributing the gases to the required positions as listed on the schedule of terminal units.

The compressed air and vacuum shall be supplied from plant installations.

### Location of cylinders.

The cylinders shall be located on the medical gases manifold room as indicated on contract drawings (Ground Floor).

### Initial complement of cylinders.

The subcontractor shall be responsible for providing the full complement of cylinders for each gas as required and these will be used initially for purging and commissioning and handing over the systems in proper working order. All this will be done according to the specifications for testing and commissioning of medical gases.

### Capacity of Systems

The capacity of the storage cylinder systems shall be as follows; providing equal banks of cylinders, one for 'duty' and one for 'standby'.

For oxygen, a total of 24 cylinders arranged in two separate banks (12No. cylinders each) with each cylinder having a capacity of 25,800 litres.

For nitrous oxide, a total of 4 cylinders arranged in two separate banks (2No. cylinders each) with each cylinder having a capacity of 9000 litres.

## Cylinder support racks.

The supporting steelwork for the cylinders shall hold them in an inclined position against the wall and shall consist of mild steel bulb angle section 178mm x 76mm 'rag' bolted to the floor and a separate mild steel angle section 102mm x 76mm x 13mm thick 'rag' bolted to the wall. The steel sections to be to BS.4. The angle section shall have neatly formed semi-circular cut-outs to space and support the cylinders in banks. All securing bolts shall be provided by the specialist contractor who shall mark out the position of holes in floor and walls for drilling by the building contractor. Any grouting in shall be done by the specialist contractor, who shall also erect the steelwork.

### Automatic manifold assembly.

The manifolds for all the specified gases (and air) shall be as far as possible identical in construction and the following clauses refer to the assemblies for any of the "gases".

#### Manifold Headers

Each bank of cylinders shall be located beneath a high-pressure manifold header securely mounted control panel. The headers shall carry flexible spiral tail pipes on the underside for connecting to the cylinders and each tail pipe shall incorporate a renewable nonreturn valve on the manifold header to allow removal and replacement of the cylinder without interrupting the supply from others in the same bank.

#### 2.6.2 Non-interchange ability of cylinder connections

The screwed connections of the tail pipes to the cylinder valves shall be designed such that cross connection of the pipe for any one gas cannot be made to any cylinders for the gases, the exception being oxygen and air which to BS. 341 part 1 are identical.

#### 2.6.3 Testing of Headers.

The manifold and tail pipe assembly shall be capable of withstanding a maximum working gauge pressure of 136 bar (1980 p.s.i.) and shall be tested to twice this pressure by the manufacturer at his work and a test certificate supplied.

#### 2.6.4 De-Greasing

The assembly shall be de-greased and delivered to site in a sealed polythene bag or cover and labelled to the effect that it is degreased and shall on no account be contaminated by dirt, oil or grease during erection or afterwards.

#### 2.6.5 Manifold Control Panel

Each pair of headers shall connect to a control panel which shall automatically reduced the high pressure gas or air to a low distribution gauge pressure of 4.14 bar  $\pm$  0.14 bar (60 p.s.i.  $\pm$  2 p.s.i) for gases or 7.3bar  $\pm$  0.15 bar (105p.s.i.  $\pm$  2.5p.s.i) for air.

#### 2.6.6 Automatic Operation

The control panel shall dispense gas (or air) from each of the two cylinder banks in turn via a common distribution pipe and when the “duty” bank pressure falls to 4 bar (101 p.s.i.) on “gas” manifolds or 7 bar (101 p.s.i.) on air manifolds, the panel shall automatically switch over to the “reserve” bank without any interruption of the supply.

The panel shall incorporate a pressure regulator, a pressure switch and automatic valve to each bank in order to carry out the above operations.

It shall be possible to select either bank of cylinders as the duty bank and to change over manually to the reserve bank despite any electrical supply failure.

A reserve pressure regulator to each bank shall automatically take over if the changeover valve fails to operate or if the low-pressure regulator fails to open sufficiently. It shall be possible to carry out maintenance work on the pressure regulators and parts for one bank without affecting the supply from the other bank. Automatic panel shall be capable of passing 850 litres per minute at a gauge pressure of 4.14 bar (60 p.s.i.) for “gases” and 7.3 bar (105 p.s.i.) for air.

#### 2.6.7 Pressure Gauges

The control panel shall incorporate three pressure gauges: one high pressure gauge to each cylinder bank and one common low pressure gauge on the outgoing supply to the distribution pipework.

The gauges shall conform to BS.1780 and be graduated in bars and p.s.i.

Each gauge shall carry the name of the gas on the dial face with warning- “USE NO OIL OR GREASE” Gauge shall be degreased and maintained in this condition before and after installation.

The dials shall be marked with a blue line at the normal working pressure and a red line at the minimum allowable pressure.

#### 2.6.8 Control Panel Identification

Each panel shall carry in large letters on the front the name of the gas being controlled the letters shall be embossed engraved or otherwise marked on so as to be indelible. Painting or adhesive lettering shall not be permitted.

#### 2.6.9 Heated Manifold for Nitrous Oxide and Nitrous Oxide/Oxygen Mixture.

On the Nitrous oxide and Nitrous Oxide/oxygen mixture manifolds, electric heating elements shall be incorporated.

#### 2.6.10 Electricity supply

The manifolds shall be suitable for operating from a 240 volts, single phase and neutral, 50 Hertz, A.C. supply. Any internal wiring in the panel shall have a flame-retardant sheath to comply with I.E.E regulation B. 16.

#### 2.6.11 Precautions against Leakages.

All parts of the control panel shall be constructed of materials, which will not deteriorate during service and lead to leakages. Diaphragm gaskets of pressure regulators shall not be of fibre but brass.

#### 2.7 Service or Emergency Point.

Each gas (or air) installation shall include a service or emergency point in the manifold room on the wall near to the control panel and on the outgoing distribution pipe into which a supply can be connected manually from a standby cylinder when the control panel is to be serviced or has failed.

The service point shall be in form of a terminal unit complete with check valve and isolating valve, into which a flexible pipe with probe can be inserted. See 6.11.8 for details.

The unit shall be capable of passing 275 litres/min. minimum at a nominal gauge pressure of 4.1 bar (60 p.s.i.) with a pressure loss not exceeding 0.55 bar (8 p.s.i.).

The unit shall be rigidly piped up to the distribution main and the height of the unit above floor level shall be such that the flexible pipe probe can be inserted easily by a person of average height standing on floor level.

The service point shall be identified indelibly with the name of the gas and by colour code to B.S. 1710 (1971), schedule No. 13 of this specification.

##### 2.7.1 Standby Cylinder and Rack.

The standby cylinder shall be complete with pressure reducing set with safety relief valve, high and low pressure gauges, on/off control valve, flexible pipe and probe.

The supply of the cylinder shall be the responsibility of the hospital authority but a supporting steel work rack on the lines of those for the main banks and reducing sets, gauges and valves shall be included in this contract.

Regulators should have a working capacity of 300 litres/min. and be set to operate at a gauge pressure of 4.1 bar (60 p.s.i.) for oxygen, for nitrous oxide 4.1 bar (60 p.s.i.) and for compressed air 7.2 bar (105 p.s.i.).

The probe and the connection of the pipe to the pressure regulator shall be non-interchangeable with other gases.

##### 2.7.2 Main Stop Valve.

A main stop valve shall be fitted on the distribution main before the service point is reached in order to allow the control panel to be isolated.

The valve shall be in readily accessible position so that it can also serve as an emergency valve and being located in the manifold room. It need not be housed in a valve box.

#### 2.8 Safety Relief Valve.

A self-closing safety relief valve shall be fitted on the distribution pipe-in between the control panel and the main stop valve. The valve shall have flow capacity and head equal to the maximum flow rate of the control panel and shall be set to operate at 25% above the distribution pressure.

The valve shall be of a type which can be locked or sealed and shall be non-ferrous material.

It shall be coupled to a copper vent pipe one size larger than the distribution pipe and vented to atmosphere at a suitable level and position outside the building. The end of the vent pipe shall terminate in an inverted "U" bend with wire mesh and a suitable shield to protect against harsh weather conditions. The discharge point shall be finally agreed on site by the Engineer and Contractor to ensure that there is no danger of fire, injury to personnel, contamination or interference with air intakes or windows. The safety valve and vent pipe shall be supplied and installed in a degreased condition. Weatherproof notices shall be fixed at each discharge point stating: -

“DANGER! KEEP CLEAR. MEDICAL GAS DISCHARGE POINT”

## 2.9 Electrical Installation Work.

All electrical equipment shall be supplied and installed by the specialist contractor.

The interconnecting wiring shall be carried out to separate specification by the contractor/others.

The specialist contractor shall in all cases supply duplicate wiring diagrams and instruction within three weeks of being awarded the contract.

## 2.10 Fully Automatic Oxygen Control Panel

- a) The Oxygen Control Panel shall be of microprocessor based Digital Display Type. Pressure reduction shall be in two stages. Panel shall be integrated with pressure gauges inside panel on downstream of pressure regulator. Panel shall be fitted with standby line regulator. Line regulators shall have pressure relief mechanism for testing and servicing purpose.
- b) Panel shall be Fully Automatic and shall switch over from “Bank in Use” to ‘Reserve Bank’ without fluctuation in delivery line pressure and without the need of external electrical power. After the switch-over, the “Reserve Bank” shall become the “Bank in Use” and the “Bank in Use” shall become the “Reserve Bank”. The Control Panel will be powered by a microprocessor. The unit shall be compact and enclosed in NEMA 1 enclosure.
- c) A Microprocessor circuit board assembly shall provide a relay output to give indication when or just before the manifold switches from one bank of cylinders to another. The switch over shall be mechanically controlled, not electrically.
- d) To avoid excess pressure being supplied to the distribution system, a pneumatically relief valve for the line regulator shall be incorporated. An intermediate pressure relief valve shall be installed between the high-pressure regulators and the line delivery regulators.
- e) The control panel incorporates six coloured LED’s, three for the Left Bank and three for the Right Bank: Green for Bank in use, Amber for Bank ready and Red for Bank empty. Both the Left and Right bank pressures and the main line pressure should be displayed on the front door of the cabinet by means of LED’s. All pressure transducers, micro switches, and display LED’s shall be pre-wired to an internal microprocessor circuit board.
- f) All components inside the Control Panel like Pressure Regulators, piping and control switching equipment shall be cleaned for Oxygen Service and installed inside the cabinet to minimize tampering with the regulators or switch settings.
- g) The Control Panel should be made to provide Heavy Duty with a Flow Capacity of over 500 LPM.
- h) Panel shall be compatible for interfacing with the Information Management System.
- i) Emergency Oxygen System: It will have emergency arrangement of one set of two-cylinder configuration with Copper tail pipes, Non Return Valves & high flow regulator with pressure gauges for Cylinder & line pressure and safety valve. Pressure regulator shall be detachable from the manifold.

### 3. Medical Compressed Air Plant

#### 3.1 General requirements

The specialist contractor shall supply and install at the position shown on contract drawing a medical compressed air plant having one vertical air receiver served by two identical air compressor units and complete with all necessary controls, safety devices, alarms, oil and moisture separators and air dryers.

#### 3.2 Quality of Air

The air finally delivered to the ward, room or theatre shall be oil free, dust free and dry as specified later. (Clause 3.21)

#### 3.3 Distribution pressure

The pressure in the distribution pipe work shall be initially  $7.3 \text{ bar} \pm 0.15 \text{ bar}$  ( $105 \text{ p.s.i.} \pm 2.5 \text{ p.s.i.}$ ) gauge on leaving the plant room, with reducing valve(s) as indicated on the contract drawing(s) to give a pressure of  $4.14 \text{ bar} \pm 0.14 \text{ bar}$  ( $60 \text{ p.s.i.} \pm 2 \text{ p.s.i.}$ ) gauge. See clause 3.22 for further details.

#### 3.4 Maintenance

The plant shall be designed and arranged to facilitate easy and efficient inspection and maintenance to the satisfaction of the engineer.

#### 3.5 Precautions against vibration and noise

Flexible pipe work connections and resilient mountings shall be provided where necessary to prevent the transmission of vibration and noise to the building and distribution pipe work. The specialist contractor shall be responsible for ensuring that rigid connections are not made either by themselves or others.

#### 3.6 Builder's Work

The specialist contractor shall supply and fix all holding down bolts, anti-vibration mountings and supply details of all foundations and hole positions for the building contractor to provide. The concrete foundation block shall be of adequate mass placed on suitable resilient foundations to damp out vibrations.

#### 3.7 Air Compressor Unit

##### 3.7.1 Definition

Each air compressor unit shall comprise a compressor driven by an electric motor mounted together on a common base plate having anti-vibration mountings.

##### 3.7.2 Duty

Each compressor unit shall be identical and have a free air delivery of 1365 litres per minute and shall be capable of dealing with the normal load on its own and maintain the gauge pressure in the receiver at 7 bars ( $\pm 1 \text{ bar}$ ). The two compressors shall be arranged so that one compressor is on duty while the other is on standby.

### 3.7.3 Type

The compressors shall be of the Medplus Medical Compressed Air Plant or approved equivalent, suitable for continuous operation and having efficient oil seals of proved reliability to the lubricated parts of the machine. (See clause 3.21 for oil mist limit)

Compressors with P.T.F.E. rings or seals shall not be allowed because possible overheating would liberate offensive gases from this material.

### 3.7.4 Intercooling and After cooling

The compressors shall be of two-stage design with intercooling between stages and final after cooling so that the air leaving temperature is kept as low as possible in order to reduce condensation and ensure subsequent satisfactory air dryer performance.

### 3.7.5 Safety Valve

The intercooler shall be air cooled by means of fans integral with the compressor and if thought necessary due to warm site conditions the air supply to the fans shall be ducted from outside in order to provide air as cool as possible.

The specialist contractor shall advice on the necessary for ducted air and shall include for any ductwork in their contract.

### 3.7.6 Automatic drain traps

Both intercoolers and after cooler shall be provided with an automatic drain trap with manual by pass each leaving via copper tundishes piped to a suitable gully.

### 3.7.7 Air Cooling

The compressor shall be air cooled.

### 3.7.8 Thermometers

Thermometers of the dial type shall be provided at the inlet and outlet of points of the coolers to show compressed air temperatures.

### 3.7.9 Excessive Air Temperature Protection

In the event of a higher than normal air exit temperature a thermostat shall switch off the compressor(s) and give warnings as described later. The standby manifold shall then be automatically brought into use.

### 3.7.10. Valves on delivery pipe to receiver.

The two compressors shall supply air to the receiver either through separate delivery pipes or the pipes may join into one common delivery pipe.

An isolating non-return valve shall be fitted on the delivery pipe from each compressor prior to entering the receiver.



### 3.7.11 Air Unloading Valves

Each delivery type shall carry an automatic air unloading valve, prior to the non-return valve; and operated when the compressor stops so that the high pressure air in this portion of the pipe is released and the compressor can then re-start under no conditions. At the manufacturer's discretion, this valve may be omitted if compressor can re-start under no load conditions with less than 5.h.p. motors.

### 3.7.12 Flexible Pipework

The final connection of the delivery pipe or pipes to the receiver shall be in flexible pipe of "armour" quality, to prevent transmission of vibration from the compressors.

## 3.8 Air Intake Filter

### 3.8.1 Type and Efficiency

The air intake to each compressor shall be through a filter of the dry medium type to B.S 1701 which shall have dust retaining efficiencies of 98% minimum, grade CA, when tested in accordance with that standard.

### 3.8.2 Sitting of Intakes

The sitting of air intakes shall be outdoors in the open at the position shown on contract drawing but if considered necessary the position may be modified after a final inspection of the site and agreement between the medical officer, the engineer and the contractor, in order to ensure clean air is drawn in.

The length and cross section of the intake shall be approved by the compressor manufacturer to ensure that compressor efficiency is not reduced

### 3.8.3 Weather Protection

The intakes shall be adequately protected by cowls or other means from the ingress of rain, snow, ice and excessive dust.

### 3.8.4 Maintenance

The filters shall be arranged for easy access for maintenance, servicing and renewal to the satisfaction of the engineer.

## 3.9 Air Silencers

The intake filters shall pass the air into silencer assemblies from which the compressors will draw air.

### 3.10 Permissible Noise Levels

The overall effect of silencers, anti-vibration mountings and compressors (both running) shall not produce sound pressures greater than I.S.O Rating of 75dB, measured 1.8m away from sides and above the plant.

The contractor shall state the sound pressure levels of the plant being tendered, and this shall be checked and proved on completion of the installation to the satisfaction of the engineer.

### 3.11 Compressor Electric Motor

Each electric motor shall be continuously rated for the maximum duty to be performed and shall be of T.E.F.C. type for 415 volts, 3phase, 50 hertz A.C. supply and conform to B.S. 2613 and B.S 3979 (metric dimensions) with Class E insulation.

The motor shall drive the compressor either by vee belts or a flexible coupling, which in either case shall be efficiently guarded to satisfy the requirements of the Factories Act.

### 3.12 Motor starters

Each motor shall have a starter which shall be rated for frequent duty in accordance with B.S 587 and have thermal overload protection.

The starters shall be of the automatic type so that once switched on the motor will be capable of re-starting automatically should the supply be interrupted. This feature shall be indicated by a suitable warning notice displayed on or near the motors. A time delay shall be incorporated to ensure that the two compressors do not start together. Three phase motors shall have single phasing preventors. Each star delta starter shall be electrically and mechanically interlocked to prevent simultaneous star and delta connection.

### 3.13 Ammeter

An industrial grade ammeter to B.S 89 shall be connected in the yellow phase connection to each motor; the dial will be 75mm diameter.

### 3.14 Compressor Controls

#### 3.14.1 Duty Selection switch

The two compressors shall run alternately so that one is on duty while the other is on stand-by and a changeover duty switch shall be provided so that manual selection can be made.

#### 3.14.2 Hour Counter

An "Hour Counter" shall be provided on each compressor to record its total running time and assist in the running time and assist in even running of compressors.

#### 3.14.3 Switches

Each compressor shall have a "on - off-auto" switch to allow choice of either automatic or manual hand control.

#### 3.14.4 Pressure switches

The compressors shall be controlled by two pressure switches connected to and sensing the air pressure in the receiver.

The "high" pressure switch shall be set to operate the duty motor starter, when the receiver gauge pressure falls to 6.5 bars and to stop the motor when the gauging pressure rises to 7.5 bars. When the compressors are on "hand/manual" control, the high pressure switch shall over-ride "hand/manual" control and cut off the motor when maximum pressure is reached.

### **3.15      Control Cabinet**

#### **3.15.1      Compartment Arrangement**

The compressor controls shall be arranged together in one metal cabinet with three separate fireproof compartments. The centre compartment shall contain the duty selector switch, wiring and accessories common to both compressors, while the outer compartments each contain the controls for one compressor and its associated equipment.

A drawing of the panel shall be submitted to the engineer before commencing manufacture.

#### **3.15.2      Isolating Switch**

The cabinet shall house a load breaking isolating switch interlocked with the cover and the circuits and apparatus shall be protected by H.R.C. fuses.

#### **3.15.3      Regulations**

Warning notices shall be incorporated for each compartment to warn the presence of medium voltage.

#### **3.15.4      Manufacture**

The cabinet shall be manufactured from sheet steel, rust proofed (zintec) or electro-coated rust inhibited and not less than 2.0 mm (14s.w.g) thick and adequately braced.

The cabinet shall have an external finish of semi-gloss stoved or cellulose enamel to B.S colour. Untreated parts shall have a rust inhibitor coat and an undercoat applied before manufacture. The internal finish shall be white.

### **3.16.      Air Receiver**

#### **3.16.1      Type**

Each air receiver shall be of the vertical type and have a capacity of 1.16m<sup>3</sup> of "water" and be designed to conform B.S 487 Part 1, Class III D. (Fusion welded steel air receivers).

#### **3.16.2      Safety Requirements**

Each receiver shall be complete with safety valve and fusible plug to B.S 1123 and the safety valve shall be arranged to discharge to a safe position.

#### **3.16.3      Inspection, Cleaning and Draining**

Each receiver shall have an inspection cover and cleaning outlet, an automatic condensate drain trap with isolating valve and a manual drain valve, both of which shall discharge via a copper tundish piped to a suitable gully.

#### **3.16.4      Pressure Gauge**

A pressure gauge to B.S 1780 shall be fitted on each receiver, the dial to be 150mm (6") diameter graduated in bars and p.s.i. to 1½ times working pressure. The gauge shall be complete with isolating valve or cock.

#### **3.16.5      Pressure Switch Connections**

Provision shall be made on the receiver for tapings to suit the pressure switch connections for compressor control and for standby manifold control.

#### **3.16.6      Tests Certificates**

The receiver(s) shall have been pressure tested and at the manufacturers works in accordance with B.S 487, part 1 and certificates provided.

### 3.17 Separators and Filters

#### 3.17.1 Duty

The air from the receiver shall pass through a separator and filter assembly installed in duplicate, each assembly to be rated for continuous use of the full free air delivery of the compressor, with the air super saturated with water (100% R.H) at the compressor exit air and temperature.

The assembly shall be suitably valved to allow manual selection of either assembly as required.

#### 3.17.2 Automatic Drain Trap

Each separator shall be complete with an automatic drain trap, with manual bypass valve, draining via a copper tundish piped to a suitable gully.

The traps shall be capable of dealing with moisture and oil droplets and mist carried over the compressors.

#### 3.17.3 Filter Type and Efficiency

When oil free compressors are used, the filters shall be of the oil free dry medium type and have an efficiency of not less than 95% when tested with Test Dust No.2 in accordance with B.S 2831 at the design flow.

When lubricated compressors are used the filters shall have a penetration not exceeding 0.5% when tested by the sodium flame test in accordance with B.S 3928, at the design flow.

### 3.18 Air Dryers

#### 3.18.1 Type and duty

The air from the separator and filter assemblies shall pass through a desiccant type air dryer assembly, installed in duplicate and of twin column design, each column being capable of dealing with the maximum flow of air (as 4.17.1) while the other is being dried out.

#### 3.18.2 Design

The columns shall be constructed to comply with appropriate requirements for pressure vessels to B.S 487, Part 1, class III D.

The columns shall be designed to facilitate filling with or emptying of desiccant material without the need to disturb pipework connections.

#### 3.18.3 Safety Relief Valve. pressure gauge

Each pair of columns shall be provided with a safety valve to B.S 1780 with dial 100mm (4") diameter, arranged to discharge to a safe position and a pressure gauge to B.S 1780 with a dial 100mm (4") diameter, graduated in bars and psi to 1½ times working pressure. The safety valve and gauge to be fitted beyond the final filters.

The gauges shall be complete with isolating valve or cock. The dials shall be marked with a blue sector showing the working pressure range of the column.

#### 3.18.4 Regeneration Process

The regeneration process to drive off the moisture from the saturated column shall be effected by through electric heating.

If the electric heating method is preferred, the heating elements shall be designed to give long life and have thermostatic control to prevent overheating.

The heating or drying medium shall be of adequate rating so that the time required to dry out a column shall be less than that taken to saturate a column working at full load.

The drying out process shall be controlled so that the heating medium is not used continuously once the column is dry. Heating elements and thermostat elements, if fitted shall be easily removable without disturbing desiccant bed or pipe work connections.

#### 3.18.5 Automatic Air Release on Columns

An automatic operated bleed air valve on each column shall allow the column requiring regeneration to release the high pressure via a silencer discharging into copper tundish piped to a suitable gully, one tundish being provided to each pair of columns.

#### 3.18.6 Automatic Re-Pressurization of Columns

When the column has been dried out, automatic re-pressurization of it shall follow to prevent shock when change over from the saturated column takes place.

#### 3.18.7 Controls

The air dryer assemblies shall be complete with an automatic electric control panel to operate and sequence the valves and change over from one column to the other in a pair.

Change over from one dryer assembly to the other shall be effected by a hand change over switch operating automatic valves to allow either of the assemblies to be selected for duty.

#### 3.18.8 Desiccant Material

The dryer columns shall contain activated alumina desiccant of the non-dusty type in pellet, spherical or tablet form. The grade of desiccant shall be such that pre-filters to the final filter on the outgoing side of the dryers are not necessary.

#### 3.18.9 Desiccant Bed Life

Each dryer assembly, with two columns, shall be designed to provide a desiccant bed life of not less than two years on continuous full load so that the installation comprising of two dryer assemblies shall give a total life of two years when operated on a "duty" and "standby" basis.

### 3.19 Dryness of Air

The dew point of air leaving the dryer shall be minus 40° C (minus 40°F) at atmospheric pressure, equivalent to minus 18°C (0°F) at gauge pressure of 7.3 bars (105 psi)

### 3.20 Final Filter

A filter of the oil free dry medium type shall be fitted on the outgoing side of each dryer assembly. The filters shall have a penetration not exceeding 0.5% when tested by the sodium flame test in accordance with B.S 3928, at the design flow.

### 3.21 Final Condition of Air at Terminal Units

The air delivered to the terminal units shall be free from deleterious, toxic, flammable, objectionable, products, vapours or odours.

A sample of air at standard temperature and pressure shall not contain more than the following substances in accordance with

B.S 4275:-

0.5 mg / m<sup>3</sup> of oil mist particulate.

5.5 mg/ m<sup>3</sup> of carbon monoxide (5 parts per million) 900mg/ m<sup>3</sup> of carbon dioxide (500 parts per million) dew points as paragraph 3.19

Where sterile air and fine air control is required at the point of use, this is beyond the performance of the plant specified above and will call for additional fine pressure regulators and sterilizable type filters beyond the terminal unit and mounted within the room or theatre. Ensure that the Medical Officers are aware of this.

This equipment is not included in this contract and shall be the subject of a separate contract by the Hospital Authority and thus should be made aware of the same.

### **3.22 Pressure Regulation on Distribution Main**

Pressure regulators shall be fitted on the outgoing main, in duplicate for standby purposes, to control the pressure of the air as it leaves the plant room.

The pressure shall be maintained at a gauge pressure of 7.3 bar (105 p.s.i.)  $\pm$  0.15 bar ( $\pm$ 2.5.p.s.i.)

The pressure shall be reduced along the system at the positions indicated on the contract drawing(s) to gauge pressure of 4.14 bar (60 p.s.i.)  $\pm$ 0.14 bar ( $\pm$  2 p.s.i.).

### **3.23 Pressure Gauge and Safety Valve on Distribution Main.**

One the pressure gauge and one safety relief valve shall be fitted on the outgoing main following the pressure regulating valves. They shall be of the type and size as described for the receiver vessel. The relief valve shall be vented via copper pipework to a safe position.

### **3.24 Standby Air Cylinder Manifold**

#### **3.24.1 Location**

The specialist contractor shall supply and install in the plant room as shown in Contract Drawing. A Standby Medical Quality Air Cylinder Manifold which shall come into operation automatically should the compressed air plant fail.

The ordering of the initial full complement of cylinders and any future replacement cylinders shall be the responsibility of the Hospital Authority.

#### **3.24.2 Capacity**

The cylinder supports and headers shall comprise of two banks each with 2No. Cylinders of 5000 litres capacity. A standby supply of one day is recommended.

One bank shall be on duty while the other is on standby

#### 3.24.3 Standby Operation

The standby manifold shall come into operation for any of the following reasons: -  
Compressors faulty - not maintaining pressure- air temperature too high. Dryer faulty-  
dew point high. Line pressure 15% below normal.

#### 3.24.4 Manifold Assembly

The requirements of the Standby Manifold shall be as described for medical gas manifolds  
covering: - Manifold headers  
Non-interchangeability of cylinder connectors  
Testing of headers Degreasing

Control Panel with:-

Both Automatic Operation for “changeover” or Manual Operation for  
“changeover” Pressure gauges Identification

#### 3.24.5 Electricity Supply

The standby manifold shall be suitable for operating from 240 volts, single phase and neutral, 50 hertz, A.C. supply.

#### 3.24.6 Connection Point into Distribution System

The air, which will be of the correct quality and dryness, will not require further filtering or drying and the standby supply shall be permanently connected into the distribution main in the plant room at a point beyond the pressure gauge and safety valve at the plant room wall.

A non-return valve shall be fitted prior to the above gauge and relief valve to prevent back pressure to the dryers, etc. from the cylinder supply.

A stop valve shall be provided to allow the standby connection to be isolated.

#### 3.24.7 Electrical Installation Work

All electrical equipment shall be supplied and installed by the Specialist Contractor.

The interconnecting wiring shall be carried out to separate specification by the Specialist Contractors.

The specialist Contractor shall in all cases supply duplicate wiring diagrams and instructions within 3 weeks of being awarded the contract.

### 4.0 MEDICAL VACUUM PLANT

#### 4.1 General Requirements

The Specialist Contractor shall supply and install at the position shown on the Contract Drawing a Medical Vacuum Plant having one horizontal reservoir vessel served by two identical vacuum plant units and complete with all necessary controls, drainage traps and bacterial filters. Discharge into an aerobics septic chamber is not permissible due to potential health hazards.

#### 4.2 Degree of Vacuum

The overall design of the system shall be such that the degree of vacuum in the distribution pipework at the back of the remotest terminal unit is not less than 400mm Hg below a standard atmospheric pressure of 760 mm Hg (360 Hg absolute).

#### 4.3 Total Design Flow

The total design flow of the system shall be 950 litres of free air per minute minimum.

#### 4.4 Maintenance

The plant shall be designed and arranged to facilitate easy and efficient inspection and maintenance, to the satisfaction of the engineer

#### 4.5 Precautions against Vibrations and Noise

Flexible pipework connections and resilient mountings shall be provided where necessary to prevent the transmission of vibration and the noise to the building and distribution pipe work.

The specialist contractor shall be responsible for ensuring that rigid connections are not made either by themselves or others.

#### 4.6 Builder's Work

The specialist contractor shall supply and fix all holding down bolts, anti-vibration mountings and supply details of foundations and hole positions for the building contractor to provide. The concrete foundation block shall be of adequate mass placed on suitable resilient foundations to damp out vibrations.

#### 4.7 Vacuum Pump Unit

##### 4.7.1 Definition

Each vacuum plant unit shall comprise a vacuum pump driven by an electric motor mounted together on a common base plate having anti vibration mountings.

##### 4.7.2 Duty

Each vacuum plant unit shall be identical and have a capacity of 950 litres per minute of free air at a vacuum of minus 450mm Hg.

The two vacuum pumps shall be arranged so that one pump is on duty while the other is on standby and each shall be capable of dealing with 75% of the total design flow and running continuously at this load.

#### 4.8 lubricated Type Pumps- Air Cooled

The vacuum pumps shall be of the air cooled type, oil flooded rotary vane type driven by electric motor, having oil lubricated cylinders which shall be designed so that the lubricating oil consumption is kept to a minimum.

#### 4.9 Vacuum Pump Exhaust System

##### 4.9.1 Silencers

The discharge from the vacuum pumps shall pass through silencers in order to keep the noise level down to a minimum. (See also 4.10.5)

##### 4.9.2 Location of discharge pipes

The discharge pipes shall terminate outdoors at high level at the position shown on the Contract Drawing but if considered necessary the position may be modified after a final inspection of the site and agreement between the Medical Officer, the Engineer and the Contractor in order to ensure that the discharge cannot constitute a health hazard.

##### 4.9.3 Weather protection

The discharge of pipes shall be adequately protected by cowls or other means from the ingress of rain, snow, ice and wind pressure and sited away from windows and air intakes.

##### 4.10.4 Back Pressure

The exhaust system shall be designed so that the back pressure does not exceed 50 mm Hg (1.0 p.s.i) at the peak demand and this figure shall be taken into account when sizing the pumps.

##### 4.10.5 Permissible Noise Levels

The overall effect of silencers, anti-vibration mountings and pumps (both running) shall not produce sound pressure greater than I.S.O rating of 75dB, measured 1.8 m (6 feet) away from sides above the plant.



The Contractor shall state the sound pressure levels of the plant being tendered and this shall be checked and proved on completion of the installation to the satisfaction of the Engineer.

#### **4.10 Vacuum Pump Electric Motor**

Each electric motor shall be continuously rated for the maximum duty to be performed and shall be of T.E.F.C type for 415 volts, 3 phase, 50-hertz a.c. supply and conform to B.S 2613 and B.S 3979 (metric dimensions) with class E insulation.

The motor shall drive the pump either by vee belts or flexible coupling, which in either case shall be efficiently guarded to satisfy the requirements of the Factories Act.

#### **4.11 Motor Starters**

Each motor shall have a starter which shall be rated for frequency in accordance with B.S. 587 and have a thermal overload protection.

The starters shall be of the automatic type so that once switched on the motor will be capable of re-starting automatically should the supply have been interrupted. This feature shall be indicated by a suitable warning notice displayed on or near the motors. A time delay shall be incorporated to ensure that the two pumps do not start together. 3 phase motors shall have single phasing preventors. Each star delta starter shall be electrically and mechanically interlocked to prevent simultaneous star and delta connection.

#### **4.12 Ammeter**

An industrial grade ammeter to B.S 89 shall be connected in the yellow phase connection to each motor, the dial to be 75mm diameter.

#### **4.13 Vacuum Pump Controls**

##### **4.13.1 Duty Selection Switch**

The two pumps shall be run alternately so that one is on duty while the other is on standby and a change-over duty switch shall be provided so that manual selection can be made.

##### **4.13.2 Hour Counter**

An hour counter shall be provided on each pump to record its total running time and assist in even running of the pumps.

##### **4.13.3 Switches**

Each pump shall have a “hand/manual-off-auto” switch to allow choice of either automatic or hand/manual control.

##### **4.13.4 Pressure Switches**

The pumps shall be controlled by two pressure switches connected to and sensing the vacuum in the reservoir. The “high” pressure switch shall be set to operate the duty motor starter when the reservoir gauge pressure falls to 400mm Hg and to stop the motor when the gauge pressure rises to 500mm Hg.

The “low” pressure switch shall be set to operate the standby motor starter when the reservoir gauge pressure falls to 400mm Hg and to stop the motor when the gauge pressure rises to 500mm Hg.

When the pumps are on hand control and cut-off the motor when maximum working vacuum is reached.

##### **4.13.5 Audible and Visual Alarm**

Provide audible and visual local alarm (complete with indicating lights and individual sets of auxiliary contacts wired to the terminal strip for remote alarm indication) for the following: vacuum pump thermal malfunction and reserve vacuum pump in use. Provide manual reset for thermal malfunction shut-down. All control and alarm functions shall remain energized while any vacuum pump in the system remains electrically on-line. The lag vacuum pump shall be able to start automatically if the lead vacuum pump fails to operate.

#### 4.14 Control Cabinet

##### 4.14.1 Compartment Arrangement

The vacuum plant controls shall be arranged together in one metal cabinet with three separate fireproof compartments, centre compartment shall contain the duty selector switch, wiring and accessories common to both pumps, while the other compartments each contain the controls for one pump and its associated equipment.

A drawing of the panel shall be submitted to the Engineer before commencing manufacture.

##### 4.14.2 Isolating Switch

The cabinet shall house a load breaking isolating switch interlocked with the cover and the circuits and apparatus shall be protected by H.R.C fuses.

#### 5.14.3 Regulations

Warning notices shall be incorporated from each compartment to warn the presence of medium voltage, to conform to I.E.E regulations A.17 and A.19.

##### 5.14.5 Manufacture

The cabinet shall be manufactured from iron sheet, rust proofed (zintec) or electro-coated rust inhibited and not less than 2.0 mm (14 S.W.G ) thick and adequately braced.

The cabinet shall have an external finish of semi-gloss stoved or cellulose enamel to B.S standard, untreated parts shall have a rust inhibitor coat and an undercoat applied before manufacture. The internal finish shall be white.

#### 4.15 Vacuum Reservoir Vessel

##### 4.15.1 Type Design

Each Vacuum Reservoir Vessel shall be of the horizontal type and be designed to conform to B.S 487, Part 1, Class III D (Fusion Welded Steel Air Receivers).

##### 4.15.2 Capacity

The capacity of the vessel shall be 785 litres “water capacity”.

The capacity is intended to be such that the number of start/ stop cycles of the pump on duty does not exceed 30 times per hour.

##### 4.15.3 Safety Requirements

Where inadvertent reversal of the pump motor could occur on 3 phase supply, a pressure switch on the inlet pipe between reservoir and pump shall switch off the motor on sensing a positive pressure. A non-return valve shall also be fitted as a further safeguard.

##### 4.15.4 Inspection, Cleaning, Draining

The reservoir(s) shall have an inspection cover, a cleaning outlet and a manual drain valve which shall discharge via copper tundish piped to a suitable gully.

##### 4.15.5 Vacuum Gauge

A vacuum gauge to B.S 1780 shall be fitted on each reservoir, the dial to be 150 mm (6”) diameter, calibrated 0760 mm HG and reading Zero (0) at atmospheric pressure.

The gauge shall be complete with isolating valve or cock. The dial shall be marked with a blue line at the normal working vacuum and a red line at the minimum allowable vacuum.

##### 4.15.6 Pressure Switch Connections

Provision shall be made on the reservoirs for tapings to suit the pressure switch connections for vacuum pump control.

#### 4.15.7 Tests Certificates

The reservoir(s) shall have been pressure tested at the manufacturer's works in accordance with BS 487 Part I to 10.3 bar (150 p.s.i.) gauge.

#### 4.16 Drainage Traps

##### 5.16.1 Duty

The intake to the vacuum vessel from the distribution pipeline shall first pass through a drainage trap, installed in duplicate, each trap being sized to deal with the total maximum flow.

##### Sterilizing

The bowls of the traps shall be sterilizable by the following methods: -

- a) By means of moist steam at 2.2 bar gauge (32 p.s.i.) and 138°C (280°F) in a porous load sterilizer to B.S 3970.
- b) By means of dry heat at 160°C (320°F) for at least 60 minutes. The trap bowls shall either be transparent or have transparent

##### 5.16.2 Spare Trap Bowls

Two sets of spare trap bowls shall be included initially to cater for frequency of sterilizing required and to ensure that a sterilized set is available always for change-over purposes.

#### 4.17 Bacterial Filters

##### 5.17.1 Duty

A bacterial filter shall be fitted between each drainage trap and vessel, each filter being capable of dealing with the total maximum flow.

The filter housing shall be distinctly marked with the words "BIO-HAZARD".

##### 5.17.2 Efficiency

The penetration of the filters when tested by the sodium flame test in accordance with B.S 3928 shall not exceed 0.05% at the design flow.

#### 4.18 Operations of Traps and Filters

The traps and filters shall be operated on a duty and standby basis and manually operated valves shall be provided so that either of the sets can be selected and to allow for isolation for maintenance and changing of trap bowls and filters.

#### 4.19 Standby Vacuum Facilities

Standby Emergency Vacuum Facilities are not covered under this contract. An emergency service from portable electric suction apparatus to BS 4199 should be arranged by the Hospital Authority.

#### 4.20 Electrical Installation

All electrical equipment shall be supplied and installed by the Specialist Contractor. The interconnecting wiring shall be carried out to separate specification by the Specialist contractor.

The specialist contractor shall in all cases supply duplicate wiring diagrams and instructions, within 3 weeks of being awarded the contract.

## 5. Oxygen Concentrator Plant

### 5.1 General requirements

The specialist contractor shall supply and install at the position shown on contract drawing a complete packaged containerised oxygen generator plant which can be housed outdoors as O2-GENERATOR-400 with oxygen Tank capacity of 1000L and all accessories to conform to EN ISO 7396-1 and HTM 02-01. The accessories are as explained below;

### 5.2 Quality of Air

The air finally delivered to the ward, room or theatre shall be oil free, dust free and dry as specified later. (Clause 5.3.5)

### 5.3 Plant Accessories

The complete plants include a feed air compressor, feed air dryer, filter arrangements, Air Receiver and an oxygen generator (PSA)

#### 5.3.1 Feed Air Compressor

The compressors shall be oil lubricated, rotary screw type suitable for both continuous and frequent stop/start operation at a nominal outlet pressure of 1000kPa (10 bar) 1300kPa (13 bar) compressors are available on request. The compressors are air cooled, air end directly driven by a 380-420V, 3 phase, 50/60Hz TEFC electric motor coupled to an air blast after-cooler with auto drains. Multistage oil separators capable of limiting oil carry over to a maximum of 2 ppm are fitted to minimise contamination and maintenance. The compressors are provided with intake valves to enable compressors to be run unloaded. A temperature switch is fitted to give indication if the temperature after the after-cooler exceeds 115°C. A pressure switch is included to provide indication that the compressor is delivering air after it has been called for.

#### 5.3.2 Feed Air Dryer

Dryer to be as CompAir, refrigerant dryers as quality and efficiency is just as important for compressed air treatment as it is for compressed air generation. Just like CompAir compressors. The dryers to provide a consistently high performance with optimum efficiency and to be carefully selected depending on working conditions with continuous dew-point monitoring enabling reliable operation with the lowest possible pressure losses and running costs. The dryer to be of F-Series as F95HS.

Dryer to be equipped with digital controller featuring dew point level indication, free voltage alarm contact, maintenance reminder and integral timed drain control. When equipped with the Energy Save feature, which is optionally available from model F026S, the dryers will save additional energy at partial load by cycling the fridge compressor activity while cooling the inlet air using the cold reserve stored in the heat exchanger mass.

#### 5.3.3 Filters

Air-inlet filters should be fitted either to the compressor inlet or at a suitable point in any ductwork. The filters should comply with BS ISO 5011:2000 and be either dry medium filters or grade CA paper element filters

#### 5.3.3 Vertical Air Receiver

The vertical air receiver shall be vertically mounted and constructed to BS EN 286-1 and is manufactured from heavy gauge fusion weld steel. The vertical air receiver shall be internally galvanised, double coat primer and epoxy coated white RAL 9010, fitted with automatic and manual drain valves and be protected by a pressure relief valve, fusible plug and include a pressure gauge. The Air receiver to be of capacity 1500 litres.

#### 5.3.4 Vertical Oxygen Receiver

The vertical Oxygen receiver shall be vertically mounted. The vertical oxygen receiver shall be internally galvanised, double coat primer and epoxy coated white RAL 9010, fitted with automatic and manual drain valves and be protected by a pressure relief valve, fusible plug and include a pressure gauge. The Oxygen receiver to be of capacity 1000 litres.

#### 5.3.5 Oxygen Generator PSA (Pressure Swing Adsorption)-Working Principle

CPX PSA Oxygen units separate oxygen from compressed air through a unique Pressure Swing Adsorption (PSA) process. The compressed air flows through a filter assembly before the air enters the absorber vessels. A particulate filter removes condensed water, oil, dirt, scale, etc. from the feed air, and then, a separate coalescing filter (mounted on most of the models) removes additional oil and water vapour. The oxygen generator uses, in its absorber vessels, Zeolites as a molecular sieve to separate compressed air into oxygen and the other gases. The unique properties of molecular sieve allow it to attract, or adsorb, nitrogen physically from air under pressure. This allows oxygen to exit the absorber's as a product gas. The process valves on the oxygen generator then direct the oxygen to the oxygen receiver for storage until needed by your application. While one absorber produces oxygen, the other depressurises to exhaust the waste gases it adsorbed (collected) during the oxygen production cycle. The entire oxygen generating process is completely regenerative, which makes it both reliable and virtually maintenance free. The molecular sieve does not normally require replacement.

Zeolites are three dimensional microporous crystalline solids with well-defined structures that contain aluminium, silicon and oxygen. The zeolite structure attracts and holds nitrogen particles from the compressed air whilst allowing the oxygen particles to flow through. When the zeolite is saturated with nitrogen the zeolite bed is depressurised and purged with a small amount of the production gas. While the first absorber bed is depressurising and purging the second absorber bed is pressurised and the production process starts in the second absorber bed.

This process allows for continuous production of up to 95% pure oxygen.

#### 5.3.5 Oxygen Monitoring System/Control Panel

The plant to include a calibrated paramagnetic oxygen monitoring system comprising oxygen analyser, oxygen concentration indicator, oxygen flow monitor and oxygen concentration/flow recorder. Connections for calibration cylinders should also be provided. In the event of the concentration falling below 94%, the monitoring system should isolate the PSA system from the pipeline distribution system so that the emergency/reserve manifold operates. Additionally, an independent monitoring system should be provided to isolate the plant when the concentration falls below 94%.

### 6. DISTRIBUTION PIPEWORK SYSTEM

#### 6.1 Extent of Pipework

The Specialist contractor shall supply, install, connect up and test all the pipework and valves required from the supply source to the distribution terminals for each gas, air and vacuum.

The pipe sizes and valve positions shall be as given on the Contract Drawings and test procedure as described in testing and commissioning of medical gases document.

#### 6.2 Spare Pipeline

The Specialist Contractor shall include for one spare pipeline with valves from the supply source to the following departments (to be determined during project implementation). The pipeline will be used in the future for other medical gases not considered and the pipe sizes and valve position will be as directed by the project engineer and medical officers.

The pipeline shall be tested as specified later and left ready in a capped condition for future connection in the manifold room, the terminal end as to be specified later.

### 6.3 Pipe Installation

#### 6.3.1 Fixing

All pipework shall be fixed without any springing or forcing. A clearance of 150mm (6") shall be maintained between the pipework and other services. Where pipework crosses other services a clearance of 25mm (1") minimum shall be maintained.

#### 6.3.2 Gradients

Gradients will be as specified in the contract drawings.

#### 6.3.3 Drainage

A full way drain lock is to be provided at the bottom of each main vertical run on the air and vacuum pipework.

Branches on horizontal air pipe work shall be taken from the topside of mains to avoid pockets of moisture.

#### 6.3.4 Diversion Sets

The use of fittings for the diversion sets shall not be permitted and the sets shall be formed from a long length in one piece and cold drawn or hot drawn in a neat manner without bucking or thinning.

#### 6.3.5 Routing to avoid Fire Risk Areas

The routes of the pipework shall avoid fire risk areas including laundries, boiler houses, generator rooms, incinerator rooms, storage rooms for combustible materials (unless the pipes are to be cased), lift shafts and kitchens.

### 6.3 .6 Pipework Supports

Pipework shall be supported at not greater than the intervals shown in the table in the next page:

SPACING OF SUPPORTS FOR COPPER PIPES

Nominal Pipe outside diameter mm BS 2871 Part 1 Table X	Maximum Intervals For Vertical Runs	Maximum Intervals For Horizontal Runs
	Metres	Metres
10	1.2	-
12	1.2	1
15	1.8	1.2
18	2	1.5
22	2.4	1.8
28	2.4	1.8
35	3	2.4
42	3	2.4
54	3	2.7
76	3.6	3

Where valves are fitted the pipe shall be supported at both sides of the valve to facilitate valve operation without valve movement.

Fixing brackets or supports shall be of a suitable non-ferrous material or suitability treated to minimize corrosion and prevent electrolytic action.

The specialist contractor shall drill and plug walls and ceilings as required to fasten the supports. Where roof decking is encountered the specialist contractor shall provide cavity fixing devices to fasten the supports.

#### 6.3.7 Pipework in Floors, Walls, Ceilings

Pipework in rooms and corridors shall be concealed either behind ceiling panels, or in walls, ducts or trunking. Removable covers or panels shall be provided to allow access to pipework.

Pipework shall not be buried solidly in floors, walls or ceiling except with the approval of the Engineer. Approval will normally be given only for tail pipes in one piece from Terminal unit to service duct or ceiling void and for unjointed pipes from control valve to void. The route of the buried pipe should be clearly and continuously marked by chalk, coloured adhesive tape or otherwise, during construction, to discourage the driving of nails into or near the pipe. Where pipes are to be installed in partition walls the tail pipes of terminal unit shall be in one piece (without joint) from the terminal unit to the service duct ceiling void.

Service ducts or voids should have adequate ventilation to prevent gas concentration in the event of a leak.

Where pipes pass through floors, walls or partitions, copper sleeves pipes, one size larger shall be used and shall project between 1.5 and 3mm (1/16" and 1/18") beyond finished surfaces and plates shall be fitted. All joints shall be accessible and no joint shall be made so that it's inside the pipe sleeve. Where pipework is to be concealed it shall not be covered over until it has satisfactorily passed all pressure tests.

Pipework in service ducts, or voids or in rooms or in corridors where the pipework is not required to be concealed shall be surface run.

#### 6.3.8 Special Precautions against Corrosion.

Where pipework is supported by or is liable to come into contact with timber that has been treated with compounds likely to cause corrosion of copper, the pipe shall be protected locally by impermeable materials such as p.v.c. tape or spacers.

#### 6.3.9 Cleanliness during installation

Great care shall be taken during installation to ensure that no extraneous materials are allowed to enter the pipework. Where any section of the pipework is left incomplete during erection the open end of the pipe shall be sealed immediately with plastic cap.

#### 6.3.10 Bonding and Earthing

Wherever possible, pipeline shall be physically separated from the metal sheath and armour of electric cables and from metal conduits, trunking and bare earth continuity conductors associated with any cables which operate at low voltage or above.

Where physical separation is impossible or when pipeline are in metal trunking and bed head units the pipeline shall be bonded to the I.E.E Regulations B. 53 and D.10

The above work shall be carried out by specialist contractor.

#### 6.4 Pipework Material and Size

##### 6.4.1 Material

Pipework material for gases, air and vacuum shall be phosphorous de-oxidized non-arsenical copper to B.S 1172

##### 6.4.2 Sizes

Pipework sizes shall be to metric outside diameters in accordance with B.S. 2871, Part 1, Table X.

#### 6.5 Fittings and Joints

##### 6.5.1 Capillary Fittings

All fittings shall be “high Duty” Capillary Type suitable for a “steam” working pressure of 17bar (250p.s.i.) gauge. The fittings shall have integral rings of silver brazing alloy complying with composition to B.S 1845 (1966) Table 2, Type AG.11 Brazing by the end-feed method shall not be permitted.

The fitting shall be non-ferrous and capable of withstanding corrosion and dezincification.

##### 6.5.2 Flux

Because of the high temperatures required for their effective use borax or borax based fluxes shall NOT be used.

The flux shall be provided by the Fitting Manufacture to suit the work. Fluxes shall be free from grease and agents which promote corrosion or deposits of chlorides. Care shall be taken to avoid any excess of flux which might enter the pipe bore and when the joint is cool excess flux shall be washed and wire brushed off. A visual inspection of each brazed joint shall be made to confirm that the hardened flux has not formed a temporary seal which holds test pressure.

##### 6.5.3 Fittings

Fittings on moisture eliminators and trap sets for vacuum and compressed air shall be brass competition type fittings, or flanged fittings as appropriate.

##### 6.5.4 Valve Joints - Screwed

Joining of valves to the pipelines shall preferably be made with a capillary joint similar to 5.5.1 but the end feed method may have to be used in this case. If however, the valve connection is screwed a capillary to screwed adaptor shall be used but in this case the joint shall be made by tinning the male thread with soft solder. Litharge and Glycerine or an approved oxygen luting or scaling compound are also acceptable. See also 5.7.1.

The screwed joint shall be factory made using silver alloy as specified for capillary fittings and the adaptor screwed up while the “tinning” is molten. This shall be done with valves dismantled to avoid damage to internal parts and the same care shall be taken when making the capillary to the damage diaphragms, seating e.t.c.



The parts of the valves shall be maintained in a degreased condition. Screw threads shall be tampered either to B.S. 3643 or BS. 21. Parallel threads shall not be used.

## 6.6 Degreasing of Pipes and Fittings

### 6.6.1 Extended Protection Labelling

All pipework and fittings for medical Gas, air and vacuum shall be degreased at the manufacturer's works, the pipes to be individually fitted with purpose made tightly fitting plastic caps or plugs to protect the bores before dispatch to site. Pipes shall be delivered in bundles in protective wrappings and fittings in sealed polythene bags, no capping required.

The bundles and bags shall be securely and clearly labelled: - "Degreased Materials". For use on Medical Gas Installations. Do not allow to come into contact with oil or grease".

The specialist Contractor shall take great care in storing these materials and any materials contaminated while on site shall be returned to the manufacturer for degreasing, all at the expense of the Specialist Contractor.

### 6.6.2 Degreasing Processes

The pipes shall be degreased internally by steam, then dried, shot blasted and blown through with medical quality bottled air. After a visual inspection each pipe shall be capped individually at both ends.

If steam cleaning is not economical, pipes above 54mm outside diameter may be alternatively cleaned using an approved solvent such as methyl chloride, which will leave no poisonous or explosive residues and the fittings shall be dried out, inspected and capped or sealed as specified in 7.6.1.

While the degreasing process is primarily concerned with the bore of pipes care shall be taken to avoid oil or grease on the outside, as being a possible source for bore contamination to occur from.

Degreasing of valves is dealt with under 6.7.4.

## 6.7. Valves on Distribution Pipework

The Specialist Contractor Shall supply and fit valves at the positions shown on the Contract Drawings and any deviations from these positions shall be agreed in writing by the Engineer.

The height of valves is to be stated under "Valve Boxes", (5.8.3.) but in plant or manifold rooms valves may be arranged differently provided they are easily accessible for emergency or maintenance use.

### 6.7.1 Valve Materials and Types

All valves shall be of non-ferrous material and of the non-lubricated type, to the following details. If screwed, threads shall be tampered either to BS.3643 or BS.21 (see 6.5.4.) Parallel threads shall not be allowed.

#### a) Medical Gas Valves

Type - medical ball line valves (lever operated)

Bores - full bores equal to pipe sizes

End Connections - separate flanges bored out to provide socket capillary ends for silver brazing Manufacture: Mediac or equal and approved

#### b) Compressed Air valves

Type: as specified in contract drawings

Bores: as specified in contract drawings

End Connections: as per medical gases valves

Manufacture: Mediac or equal and approved

c) Vacuum Valves

Type: Diaphragm type  
Bores: as specified in contract drawings  
End connections: as specified in contract drawings  
Manufacture: Mediac or equal and approved

6.7.2 Direction of Valve Closure

Wheel screw valves shall close in a clockwise direction. Lever Ball Valves shall have the direction of closing indelibly cast or engraved on the wheel by means of an arrow and the word "CLOSE".

Lever ball valves shall have "ON" / "OFF" cast or engraved on to show when the valve is open or closed.

6.7.3 Maker's Identification

Each valve shall carry the manufacturer's serial numbers or identification and valve size.

6.7.4 Pressure Testing and Degreasing

All valves shall be pneumatically tested by the manufacturers twice the working pressure and afterwards de-greased for medical gas services using a suitable method as given as at 5.6.2 before being individually sealed in polythene bags, capping not required.

The valves shall be securely and clearly labelled:-

"Degreased Valve. For use on Medical Gas installations. Do not allow to come into contact with oil or grease".

6.7.5 Certificates

A certificate shall be supplied by the manufacturer for each valve or batch stating that pressure tests and degreasing has been carried out and that any solvents have been completely removed.

6.7.6 Valves for System Testing Purposes

The Specialist Contractor shall Supply and fit at the position(s) shown on the Contract Drawings (s), a three-valve arrangement to facilitate providing and testing of the installation(s).

The Principle of the method is shown on schedule No.6 and the procedure laid down under Testing and Commissioning Requirements. The valves shall be of non-ferrous material, de-greased and comply with relevant requirements, as previously specified and to be to following details:-

Type: as specified in contract drawings  
Bores: as specified in contract drawings  
End Connections: as specified in contract drawings  
The

valves shall be suitably labelled as described under 6.10

5.7.7. Extended, Phased, Modified, Installations

New work during installation shall be physically separated from the existing system and final joining  
up left to the last after completing all tests in section 10.

## 6.8 Valve Boxes

### 6.8.1 Location

The Specialist Contractor shall supply and install lockable valve boxes for all the medical gas, air and vacuum valves located outside manifold and plant rooms and not contained in ducts or cupboards e.t.c.

### 6.8.2 Purpose

The boxes shall render the valves tamper proof and shall have a transparent breakable panel to facilitate emergency operation of the valve.

### 6.8.3 Mounting Height

The valves shall serve for the both emergency and maintenance purposes and because of the former requirement the box and valve shall be mounted at the centre height of 1.22metres (4 feet) above floor level in a position not obstructed in a anyway by other equipment. Boxes for the different gases grouped together may be fixed one above another in which case the mean height is to be 1.22m.

### 6.8.4 Mounting Depth

The boxes shall be set into the wall with any projection being kept to a minimum and surface mounted boxes shall be avoided if at all possible. The Specialist Contractor shall ascertain from the Architect or Site the nature of the wall into which the boxes will fit.

### 6.8.5 Standardised Type Boxes

The design of box offered shall be of a standardized pattern throughout the installation and have the following features:

- a) Ease of access for fitting valve and maintenance
- b) Designed so that the pipework can be fitted easily, either by having a split box or other suitable means
- c) Ventilation to obviate a possible buildup of gas in case of a leak,
- d) Non-interchangeable keys so that a maintained permit - to - work system can be operated e) Keys in duplicate
- f) Keys and locks with numbers engraved on
- g) Breakable transparent panel
- h) Non-interchangeability box covers if this could wrongly identify - covers to be hinged on.
- i) Boxes shall accommodate one valve only, ganging not permitted.

### 6.8.6. Box Material

The boxes shall not be of wooden construction but of robust plastic or metallic material and capable of withstanding hazards from blows, abrasions and fire.

The finished appearance of the boxes shall be such that they match the décor of the rooms and are not unsightly.

#### 6.9. Valves in Ducts or Cupboards

The valves shown on the contract drawings in ducts or cupboards are intended for maintenance purpose only and are not required to be in valve boxes, providing the valves are lockable in the open and closed position. Suitable locking arrangements and duplicate noninterchangeable keys shall be provided so that such valves can be included in any permit to work scheme. (See 5.8.5.d.).

Care shall be taken not to install valves in cupboards or ducts which are poorly ventilated or in cupboards used for other materials which could be affected by leakages. Any pipe runs so situated shall be drawn to the attention of the Engineer before proceeding onsite.

#### 6.10 Identification of Valves

An engraved label of white “Traffolyte” or similar material shall be permanently fixed adjacent to each valve box to indicate the service and give the following information:

- | a) | <u>In Red Letter</u>   | Engraving Required |
|----|--|--------------------|
| 1. | Service e.g. “OXYGEN”  |                    |
| 2. | Area Served e.g. ‘WARD 1”  |                    |
| 3. | Emergency Instruction e.g. “IN EMERGENCY BREAK<br>PANEL AND CLOSE VALVE” |                    |

#### b) In Black letters:

- |    |              |                |
|----|--------------|----------------|
| 1. | Valve number | e.g. “VALVE 6” |
|----|--------------|----------------|

This number is for maintenance purpose and is to be agreed later on site.

Valves in ducts or cupboards shall be similarly identified except for emergency instructions.

The titles of areas served shall be finally agreed on site and the labels shall be installed before the systems are tested and commissioned in order to prove their correctness.

#### 6.11 Terminal Units

##### 6.11.1 Extent of Works

The Specialist Contractor shall supply, install and connect to the distribution pipework all the terminal units required at the positions shown approximately on the Contract Drawings and as listed on the Schedule of Terminal Units.

#### 6.11.2 Definition

A terminal unit shall be defined as a single outlet point for a specific gas.

#### 6.11.3 Fascia Plate

Terminal Units for different gases at one location may be housed under a common fascia plate but it shall not be possible to mount the fascia plate incorrectly and reverse or alter the identification of the services. The Units should be mounted on a common back plate to ensure accurate centering of the units and allow precise fitting of the fascia plate so that the probes enter freely.

#### 6.11.4 Mounting Order

The Terminal Unit when viewed facing the units shall be mounted in the following order horizontally from left to right:-

Oxygen, Nitrous Oxide, Nitrous Oxide/Oxygen Mixture, Carbon Dioxide, Compressed Air and Vacuum.

#### 6.11.5 Type

The terminal units shall be of the flush mounted type set into the wall unless in some areas where the terminal units shall be of the raised surface mounted type with probe connection made vertically underneath as directed by the project engineer.

#### 6.11.6 Mounting Height

The mounting height of the terminal units above floor level shall be as follows:-

- a) for Flush Mounted Units 1.3m (4' - 4") to centre of Unit
- b) For Raised Surface Mounted Units 1.6m (5' - 2") to centre of unit
- c) For "Rail" Systems areas 1.5m (5' - 0") to centre of unit.

#### 6.11.7 Exact Positioning of Terminal Unit

The exact position of the terminal units relative to the beds, operating tables, etc. shall be finally agreed between the Medical Officers and Architect/Engineer, and the Architect/Engineer shall provide the Specialist contractor with suitable drawings.

Due regard shall be given to ensure that nursing staff can couple up equipment easily, that short routes for flexible pipes to apparatus can be achieved without obstructing movement of staff or equipment round the patient and that access to the units for maintenance is easy without disruption to patients or other services.

#### 6.11.8 Essential Design Features of Units

Terminal Units shall be designed to incorporate the following features: -

- a. The ability to accept, retain and release the inserted probe by means of a quick release mechanism designed for single handed operation.
- b. A secondary locking mechanism to prevent accidental ejection of the probe which is to be finally removed by hand.
- c. Two Valves:-
  - i. A valve on the inlet to the unit which can be closed to isolate the unit only, without the need to isolate a complete section when maintenance is carried out.
  - ii. A self sealing check valve which is opened by the probe and or withdrawal closes before secondary lock engages.
- d. Non-swivel type terminal socket to probe connection so that secondary equipment such as a flow meter is not tilted during use.
- e. The terminal socket and check valve shall only accept the correct probe for the specified "gas" and not allow inter-changeability with or partial operation by probes for any other service.
- f. It shall not be possible to interchange the parts of a unit for one gas with those for a different gas and so enable a probe to be connected to the wrong position.
- g. Fascia plates which is such that inter-changeability of fascia plates between the different gas terminal units is impossible.
- h. The front face around the terminal socket to be exposed and to carry "gas" name and colour identification, unless incorporated as at 5.11.8(7).
- i. Identification by shape incorporated on the problem is not an essential feature but if adopted by a manufacturer the following shapes shall be used:-

#### Service

Oxygen  
Nitrous Oxide  
Nitrous Oxide /Oxygen Mixture  
Carbon Dioxide  
Medical Air  
Medical Vacuum

#### Shape

Hexagonal  
Round  
Round with two opposing flats  
Triangular with radius corners  
Round with one flat  
Square

#### 6.11.9 Identification Colours and Wording on Units

The following names and colours shall apply:

<u>Service</u>	<u>Colour</u>	<u>Wording</u>
Oxygen	White	Oxygen
Nitrous Oxide	French Blue	Nitrous Oxide
Nitrous Oxide/Oxygen Mixture	French Blue and white quarters	N <sub>2</sub> O+O <sub>2</sub> (50/50)
Carbon dioxide	French Grey	Carbon dioxide
Medical Air	White and Black quarters	Medical Air
Medical Vacuum	Prim Rose	Vacuum

The name and colour shall be permanent and it shall not be possible to transfer either to a different terminal. Painting on of colour or wording is not permissible.

#### 6.11.10 Pressure Loss Across Terminal Units

The terminal units shall be capable of passing the following flow rates without exceeding the stated pressure losses across the terminal units.

Service	Nominal Pressure Terminal	Gauge at back of Unit	Maximum Rate of flow required at this pressure	Maximum permissible loss across terminal unit	
	Bar	p.s.i.	Litre/min.at STP	Bars	p.s.i.
Medical Gases	3.93	57	40	0.034	0.5
Nitrous Oxide/ Oxygen Mixture	3.93	57	275	0.55	8
Medical Air	6.9	100	250	0.34	5
Medical Vacuum	Minus 400mm Hg (360 mmHg absolute)		40	100mm Hg	

The figures relate to the performance required of the terminal units.

The actual design flow rates for purposes of sizing the installation and determining pipeline diameters should be taken from Section V of HTM 22.

### 7. SPECIAL FITTINGS FOR OPERATING THEATRES

#### 7.1. Location and Type

The Specialist Contractors shall supply, install and connect to the distribution pipework in the/each operating Theatre, minor theatre and anaesthesia room the special fittings as described in the bill of quantities. These fittings are in addition to the wall mounted terminal units specified earlier.

#### 7.2. Gases to be dispensed

The fittings(s) shall supply the following “gases”:-  
All medical gases, compressed air and vacuum.

#### 7.3. Design of fittings

##### 7.3.1. Boom Assembly, Open Type A

The boom shall be designed to carry flexible pipes connected into standard type flush fitting terminal units mounted at a height of 1.8M (5'-11”) above floor level.

##### 7.3.2. Boom Assembly, Enclosed Type B

The boom shall be designed to carry concealed pipes of nylon connected to the distribution pipework in a suitable wall unit. The length of the boom shall be 3m and the height shall fit in the room height as given later.

#### 7.3.3. Ceiling Pendant, Multipoint, Type C.

The pendant shall comprise a heavily chromed or stainless steel removable ceiling rose through which flexible hoses with terminal end connections are suspended.

The connections to the distribution pipework shall be within the ceiling rose space and the design shall be such that all strain is taken off the hose connections

The hose to distribution pipe connections shall not be interchangeable between the different services.

#### 7.3.4. Ceiling Pendant, Single Point, Type D

The Pedant shall comprise a heavily chromed or stainless steel removable ceiling rose through which a flexible hose with terminal end connection is suspended.

The connection to the distribution pipe shall be within the ceiling rose space and the design shall be such be that all strain is taken off the hose connection.

#### 7.3.5. Ceiling Columns, Type E, F and G Rigid or Telescopic

The fittings shall comprise a ceiling mounted column, either rigid or telescopic pattern; carrying concealed pipes connected to the distributions shall not be interchangeable between the different services.  
The column shall be supported on an overhead track running above the operating table.

#### 7.3.6. Terminal Connections

The terminal connection on all fittings shall only accept standard type probes and shall incorporate all the necessary features of the wall mounted terminal units as regards non-inter-changeability, self sealing check valves, isolating valves, identification, etc.

#### 7.3.7. Valves

Where the design of the terminal connection on the fitting or hose does not include an isolating valve, this shall be provided elsewhere whether within or near to the fittings on the incoming distribution pipe work, in any easily assessable position for maintenance purposes.

#### 7.3.8. Special Precautions

The design of all special fittings and hoses shall ensure that during use and movement of the fitting the pipework or hose cannot be twisted, kinked, uncoupled at either end, overstrained or otherwise damaged.

#### 7.3.9. Anti-static Precautions

All fittings and hoses shall be of anti-static construction.



7.3.10. Cleanliness

All fittings shall be designed to present minimum lodgement of dirt, dust. etc. and be easy to keep clean . The materials of construction shall have complete freedom from rusting, scaling or deterioration and may be enamelled finish, stainless steel, or heavily chromed finish.

7.3.11. Order of Arrangement of Terminal Connections

On multi-point fittings the order arrangement of the terminal connections shall be as follows:- Oxygen, Nitrous Oxide, Nitrous Oxide/ Oxy: Mixture, Carbon Dioxide, Compressed Air and Vacuum. For pendants and columns the above order clockwise nearest to the hinge.

7.3.12. Headroom Clearance

All fittings shall provide a minimum clearance of 1.8m (5'-11") above floor level and on telescopic fittings when in the retracted position.

7.3.13. Dimensions of Fittings

The terminal outlet connections of fittings shall not be more than 1.9m (6'-3") above floor level on booms, pedant hoses and columns.

The depth of fittings and pendant hose length shall suit the height of the room(s) which is/are as follows:- Room No.

	<u>Room Name</u>	<u>Floor to ceiling height</u>
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....

The height of all the rooms is 3m. These dimensions shall be verified on site by the specialist Contractor.

7.3.14. Structural Requirements for fittings

The specialist contractor shall state in his tender the requirements for structural strength of walls or ceilings to which the special fittings are to be fastened.

7.3.15. Positioning of Special Fittings

The exact positioning of special fittings shall be agreed between the Medical Officers and Architect, and the Architect shall provide layout drawings for the Specialist Contractor.

7.3.16 Electrical Services in Fittings

The fitting shall carry electrical services which shall be in solid drawn rust-proof conduit separate from the medical service pipes.

The electrical fittings shall be arranged in a neat manner to fit in with the medical terminal outlets and shall afford easy access for coupling up equipment.

Any associated switching need not be of spark-proof type. The electric supply to the fitting will be 240 volts, 50Hz of electricity supply and the fittings shall be wired up by the Specialist Contractor from a suitable distribution point supplied by others.

#### 7.4 IDENTIFICATION OF PIPELINES

##### 7.4.1 Permanent Identification

The Specialist Contract shall carry out identification of the installations(s) by colour coding in accordance with Data Sheet EE 10.11/12 and B.S. 1710 (1971).

The identification shall comprise:-

- a) Colour handing applied at valves, junctions; either side of walls, floors and at intervals of about 2m (6 feet) on short runs up to 4m (13 feet) on long straight runs.
- b) The name of the service printed on the colour hand in a contrasting colour.
- c) An arrow at each colour band showing direction of flow.

Letters to be a minimum of 6mm (¼") high.

Self-adhesive plastic labels or tapes of approved manufacture may be used as an alternative to painting. Where valves are in a valve boxes and identified by "Traffolyte" labels, colour handing is not required.

##### 7.4.2 Temporary identification

During installation of piping, individual pipes, valves junctions and ends shall be identified as the work progresses. This identification shall be at intervals similar to final identification requirements and may be made with removable labels. These temporary identification labels must be subsequently replaced by the permanent ones at an appropriate stage.

#### 7.5.0 Warning and Alarm Systems

##### 7.5.1 Extent of Works

The specialist Contractor shall supply, install and commission the following warning and Alarm systems comprising a combination of flashing lights and audible alarms, for the appropriate services.

##### 7.5.2 Master and Slave indicating Units

A Master indicating Units shall be installed in control room to monitor all the services in one combined unit.

The Master Unit shall relay to slave Units installed in the nurse stations

##### 7.5.3 Electrical Power

The systems shall work on low voltage D.C. current stepped down from a 250-volt single phase supply via a double earth screened transformer. The power pack may be incorporated in the Master Unit.

## 7.6 Essential Features of Flashing Light Units

The Master Unit and Slave Units shall be of similar construction and embody the following features:-

1. On the Master Unit, solid state flasher unit to operate the lamps throughout the system.
2. On Master and slave Units, translucent coloured panels for each service engraved with the “fault” conditions.
3. Two under-run low voltage white lamps in parallel behind each panel.
4. A green panel to indicate that the unit is operational.
5. A Standardized size and type of lamp throughout the system.
6. Lamps suitable for rapid on/off flashing operation with long life (LED type).
7. Lamp test button on each unit to test all lamps on the unit simultaneously.
8. Audible alarms as indicated in Schedule No. 4
9. On the Master Unit, A Key operated muting switch :-
  - a) Make flashing lights steady on Master Unit and Slave Units
  - b) Mute Audible alarms on Master Unit only.
10. One each Slave Unit, a key operated muting switch to mute audible alarms.
11. The muting switches to deal with only one alarm signal at a time and to re-set automatically.
12. On the Master Unit a System Alarm Circuit run from a dry battery to indicate:-
  - a) Failure of flasher unit.
  - b) Failure to low voltage supply.

These faults to be indicated by a coloured orange engraved panel with steady twin lights and audible alarm with key operated muting switch and automatic re-set.

A test button shall be provided to simulate “a” and “b” to test the above circuit.

## 7.7 Working of Master and Slave Units - “Flashing” System

The units shall indicate the condition of all the monitored services simultaneously and for each service more than one panel may be indicating at a time as outlined in Schedule No. 4.

The audible alarm on each unit shall be common to all the services and be arranged to re-set automatically after being muted, or if muting is not carried out, after the fault is rectified.

## 7.8 Arrangement of Panels on Units

The order in which the services shall be arranged on the Master and Slave Units shall be that adopted for terminal unit: - When facing the panels, the service shall be in the following order reading left to right: -

Oxygen, Nitrous Oxide, Nitrous Oxide/Oxygen Mixture, Carbon Dioxide, Compressed Air and Vacuum

## 7.9 Engraving of Fascia Panels of Units

The fascia panels of the Units shall be engraved with the name of the service, either at the top or bottom of each column of translucent panels.

The function of the various press buttons and switches shall also be engraved on the fascia panels. All engraving shall be picked out in contrasting indelible colour.

### 7.10 Monitoring Equipment

The Specialist Contractor shall include for supply and fixing all necessary sensing Devices, Operating switches and Relays on the plant for the initiation of the Warning and Alarms signals. The Sensing devices, etc. on the Liquid Oxygen Plant and Standby manifold shall be supplied and installed by the Specialist Oxygen Supplier. Absolute reliability and long life of contracts in relay units shall be as essential feature of the equipment.

The relays shall be energized under normal operating conditions and the alarm contacts shall “break” under “fault” conditions.

The alarm terminal block shall be remote from the electrically isolated from all other terminals and energized from a separate source.

The monitored unit alarm contacts shall be rated at 240 volts 3Amp, 50 Hz and the alarm system contacts at 50 volts, 0.5 Amp, D.C.

On a “Flashing” system the alarm circuit conductors to the slave units shall be suitable so that when the green, white and orange panels on every slave unit are illuminated simultaneously, the pressure loss does not exceed 5% of the rated operating voltage.

### 7.11 Setting of Sensing Devices

The sensing devices shall be set so that the conditions are indicated as soon as the following limits are reached:-

Conditions on Schedule

#### Manual manifolds

1. When duty bank falls to approximately: -
  - (a) 10% of full capacity on oxygen systems
  - (b) 8% of full capacity on N<sub>2</sub>O/O<sub>2</sub> systems
  - (c) 6% of full capacity on N<sub>2</sub>O systems

#### Automatic Manifold

2. When duty bank becomes “exhausted” and change-over to reserve bank made.
3. When with one bank empty, duty bank falls to approximately: -
  - (a) 10% of full capacity on oxygen systems
  - (b) 8% of full capacity on N<sub>2</sub>O/O<sub>2</sub> systems
  - (c) 6% of full capacity on N<sub>2</sub>O systems

#### Liquid Oxygen Installations

4. When change-over to standby manifold made.
5. When one standby bank becomes exhausted and changeover to reserve bank made.

### Medical Compressed Air Plant

6. When “standby compressor cuts in to back up “duty” compressor.
7. When change-over to standby air manifold made (denoting fault on compressors or air temperature too high).
8. When dew point of air from dryers is rising above 0°C (32°F) at 7.3 bar (105 p.s.i.) gauge.

### Medical Vacuum Plant

9. When “standby” vacuum pump cuts in to back up “duty” vacuum pump.

### All PMG & V Plant Installations

10. When either one or both pumps fail to operate
11. When pressure in distribution pipe work falls to: -
  - a. 10% below normal on medical gas lines
  - b. 15% below normal on air and vacuum lines

## 7.12 Electrical Wiring

The interconnecting wiring shall be carried out by others but the specialist Contractor shall supply all necessary wiring diagrams, in duplicate, within 3 weeks of being awarded the contract.

The electrical power will be supplied up to a local isolator by others. The specialist contractor will do the wiring from the local isolator to the equipment.

### 7.13 Hospital Information System

- a) Hospital Information system should be microprocessor based medical device polling network. It shall continuously scan all connected medical devices in the hospital and display the topology and clone images of end devices on a central PC.
- b) Should support Master Alarm, Area Alarm, Manifolds, Medical Compressed Air system, Medical Vacuum System. Any alarm condition shall be displayed on PC as they occur.
- c) Basic system should consist of the following: -
  - i. One network interface card in each device
  - ii. One computer of reputed make. The computer shall be a Pentium 4 Duo core with 1024mb RAM, 160GB hard disk, 3.2GHZ processor, DVD writer, Fully Multimedia with Windows XP Professional operating system and MS Office
  - iii. One computer card and HIS Software.
  - iv. Computer should be accessible to Hospital LAN network. System should be able to accommodate max of 256 devices. Each device should be connected in series.
- d) User should have ability to input information in to PC in order to customize display for particular application.

### 7.14 Testing and Commissioning

Testing and commissioning the complete installation in accordance with commissioning manual No. 15 - “medical Gases and Suction Systems” published by HMSO revised edition. The specialist contractor shall satisfy himself that the installation is in all respects fit for use and conforms to the specifications before inviting the commissioning Engineer to witness the commissioning tests. He shall do this by carrying out any pressure, flow rate and anti-confusion tests necessary for that purpose.

**SECTION F:**

**BILLS OF QUANTITIES AND  
SCHEDULE OF UNIT RATES**

BILLS OF QUANTITIES AND SCHEDULE OF UNIT RATES

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5. SCHEDULE OF UNIT RATES.....	F-13

### SPECIAL NOTES

1. The Bills of Quantities form part of the contract documents and are to be read in conjunction with the contract drawings and general specifications of materials and works.
2. The prices quoted shall be deemed to include for all obligations under the sub-contract including but not limited to supply of materials, labour, delivery to site, storage on site, installation, testing, commissioning and all taxes (including 16% VAT).  
In accordance with Government policy, the 16% VAT and 3% Withholding Tax shall be deducted from all payments made to the Tenderer, and the same shall be forwarded to the Kenya Revenue Authority (KRA).
- 3 All prices omitted from any item, section or part of the Bills of Quantities shall be deemed to have been included to another item, section or part thereof.
4. The brief description of the items given in the Bills of Quantities are for the purpose of establishing a standard to which the sub-contractor shall adhere. Otherwise alternative brands of equal and approved quality will be accepted.  
  
Should the sub-contractor install any material not specified here in before receiving written approval from the Project Manager, the sub-contractor shall remove the material in question and, at his own cost, install the proper material.
5. The grand total of prices in the price summary page must be carried forward to the Form of Tender for the tender to be deemed valid.
6. Tenderers must enclose, together with their submitted tenders, detailed manufacturer's Brochures detailing Technical Literature and specifications on all the equipment they intend to offer.



1. Statement of Compliance

- a) I confirm compliance of all clauses of the General Conditions, General Specifications and Particular Specifications in this tender.
- b) I confirm I have not made and will not make any payment to any person, which can be perceived as an inducement to win this tender.

Signed .....for and on behalf of the Tenderer

Date: .....

Official Rubber Stamp: .....

**A) PRICING OF PRELIMINARIES ITEMS.**

Prices will be inserted against item of preliminaries in the sub-contractor's Bills of Quantities and specification. These Bills are designated as Bill 1 in this Section. Where the sub-contractor fails to insert his price in any item he shall be deemed to have made adequate provision for this on various items in the Bills of Quantities. The preliminaries form part of this contract and together with other Bills of Quantities covers for the costs involved in complying with all the requirements for the proper execution of the whole of the works in the contract.

The Bills of Quantities are divided generally into three sections: -

**a. Preliminaries - Bill 1**

Sub-contractors preliminaries are as per those described in section C - sub-contractor preliminaries and conditions of contract. The sub-contractor shall study the conditions and make provision to cover their cost in this Bill.

The number of preliminary items to be priced by the Tenderer has been limited to tangible items such as site office, temporary works and others. However, the Tenderer is free to include and price any other items he deems necessary taking into consideration conditions he is likely to encounter on site.

**b. Installation Items - Other Bills**

- i. The brief description of the items in these Bills of Quantities should in no way modify or supersede the detailed descriptions in the contract Drawings, conditions of contract and specifications.
- ii. The unit of measurements and observations are as per those described in clause 3.05 of the section

**c. Summary**

The summary contains tabulation of the separate parts of the Bills of Quantities carried forward with provisional sum, contingencies and any prime cost sums included. The sub-contractor shall insert his totals and enter his grand total tender sum in the space provided below the summary.

This grand total tender sum shall be entered in the Form of Tender provided elsewhere in this document

BILL No. 1 PRELIMINARIES

ITEM	DESCRIPTION	QTY	UNIT	RATE	KSHS	CTS
1	Discrepancies clause 1.02					
2	Conditions of sub-contract Agreement clause 1.03					
3	Payments clause 1.04					
4	Site location clause 1.06					
5	Scope of Contract Works clause 1.08					
6	Extent of the Contractor's Duties clause 1.09 Firm price contract clause 1.12					
7	Variation clause 1.13					
8						
9	Prime cost and provisional sum clause 1.14 (insert profit and attendance which is a percentage of expended PC or provisional sum.)					
10	Bond clause 1.15					
11	Government Legislation and Regulations clause 1.16					
12	Import Duty and Value Added Tax clause 1.17 (Note this clause applies for materials supplied only. VAT will also be paid by the sub-contractor as allowed in the summary page)					
13	Insurance company Fees clause 1.18					
14	Provision of services by the Main contractor clause 1.19					
15	Samples and Materials Generally clause 1.21					
	SUB-TOTAL CARRIED TO PAGE F -6					

ITEM	DESCRIPTION	QTY	UNIT	RATE	KSHS	CTS
16	Supplies clause 1.20					
17	Bills of Quantities clause 1.23					
18	Contractor's Office in Kenya clause 1.24					
19	Builder's Work clause 1.25					
20	Setting to work and Regulating system clause 1.29					
21	Identification of plant components clause 1.30					
22	Working Drawings clause 1.32					
23	Record Drawings (As Installed) and Instructions clause 1.33					
24	Maintenance Manual clause 1.34					
25	Hand over clause 1.35					
26	Painting clause 1.36					
27	Testing and Inspection - manufactured plant clause 1.38					
28	Testing and Inspection - Installation clause 1.39					
29	Storage of Materials clause 1.41					
30	Initial Maintenance clause 1.42					
	SUB-TOTAL CARRIED TO PAGE F -6					

ITEM	DESCRIPTION	QTY	UNIT	RATE	KSHS	CT S
31	Attendance Upon Tradesmen, etc. (Insert percentage only) clause 1.58					
32	Local and other Authorities notices and fees clause 1.60					
33	Temporary Works clause 1.63					
34	Patent Rights clause 1.64					
35	Mobilization and Demobilization Clause 1.65					
36	Extended Preliminaries Clause 1.66(see appendix on page C- 24)	1	Item	400,000	400,000	00
37	Supervision by Engineer and Site Meetings Clause 1.67					
38	Allow for profit and Attendance for the above					
39	Amendment to Scope of Sub-contract Works Clause 1.68					
40	Contractor Obligation and Employers Obligation clause 1.69(see appendix page C- 24)					
41	Any other preliminaries;					
	Subtotal above					
	Subtotal brought forward from page F-4					
	Subtotal brought forward from page F-5					
	TOTAL FOR BILL NO. 1- PRELIMINARIES CARRIED FORWARD TO PRICE MAIN SUMMARY					

KERUGOYA LEVEL V COMPLEX MEDICAL GASES					
Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
A	<u>CENTRAL MEDICAL VACUUM SYSTEM</u>				
	<u>Primary/Secondary Supplies</u>				
	Triplex Medical Vacuum System conforming HTM 02-01 capable of 1700 l/min and suitable for 415V, 50				
	Hz, 3 Phase power supply, motor 4.0kw, . Two number receiver vessels each of volume shall be 790 litres.	1	No		
B	<u>ANAESTHETIC GAS SCAVENGING SYSTEM (AGSS)</u>				
	Anaesthetic gas disposal plant conforming to HTM 02-01				
	and either EN ISO 7396-2 or BS 6834 capable of 1050 l/min				
	flow, and suitable for 415V, 3 Phase, 50 Hz power supply. Also				
	to include AGSS Remote Control Indicator, and condensate drain flask for exhaust pipe.	1	No		
D	AGSS Receiving system including 5 m disposal hose and 2.4 m transfer hose complete with pressure relief valve.				
	<u>OXYGEN PLANT</u>	4	No		
	Prewired packaged containerised oxygen generator plant as O2				
	GENERATOR-400 with oxygen Tank capacity of 1000L and				
E	all accessories to conform to EN ISO 7396-1 and HTM 02-01	1	No		
	<u>COMBINED MEDICAL AIR PLANT</u>				
	Duplex medical air plant to conform to EN ISO 7396-1 and				
	HTM 02-01 and to deliver medical quality air at pressures 4				
F	bar, 7 bar or 10 bar gauge for supply to the hospital medical or surgical air systems. Plant to be as MA-2250-D and have 1 no.				
	receiver vessel of volume 1200 litres, duplex filter dryer, compressor starter panels and starter units				
	together with				
	plant control panel and all other necessary accessories	1	No		

	<p>for proper operation.</p> <p>Medical air pressure reducing station - 7 bar to 4 bar complete with pressure gauges &amp; control valves. <u>NITROUS OXIDE SYSTEMS</u></p> <p>Fully automatic manifold control system conforming to</p>	1	No		
	<p>HTM</p> <p>02-01 complete with control panel and modular header manifolds to provide connection points for flexible cupronickel tailpipes. The manifold shall incorporate electric heating element. Manifold header size - 2x2 = 4 cylinders. (2 Bank manifold ,each bank is 2 cylinders))</p>	1	No		
	Sub-Total C/F to the next page				

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	Sub-Total B/F from the previous page				0.00
	<u>CEILING PENDANT</u>				
A	Retractable pendant in octagonal body section capable of accommodating up to 9 gases and a minimum of 4 duplex power sockets. The pendant shall comply with the requirements of HTM 02-01, B.S. 5682, and EN737 and 739.	4	No		
	<u>Terminal Units (First, Second Fixes and all accessories)</u>				
B	Medical gas terminal units shall conform to BS EN ISO 91701:2008 and accept probes to BS 5682:1998. Terminal units shall be capable of single-handed insertion and removal of medical gas probe. The AGSS terminal unit shall conform to BS 6834:1987.	440	No		
C		440	No		
D		4	No		
E	Oxygen terminal units	440	No		
F	Medical vacuum terminal	4	No		
G	units Medical nitrous	4	No		
	terminal units Medical air-				
	4bar terminal units Medical				
H	air 7 bar terminal units	20	No		
	AGSS Terminal units				
I	<u>Medical Gas Accessories complying with HTM 02-01</u>	20	No		
J	Medical oxygen flow meter (0-15 lpm) with BS MK				
K	1V PROBES & Humidifier for critical areas	440	No		
L	Medical Vacuum regulator Unit (0-760mmHg)	440	No		
M	With BS MK1V Direct PROBES ,complete with 2.0	4	No		
	Litre suction (complete with wall bracket) for	4	No		
	critical areas				
N	Oxygen probes (BS MK 1V )				
	Medical air 4 bar probes(BS MK				
O	1V) Medical air 7 bar probes(BS				
	MK 1V)				
P	Medical nitrous oxide probes(BS MK 1V)				
	<u>MONITORING EQUIPMENT</u>				
Q	Local area alarm complete with cabling. The area alarm shall be as				
	<u>BeaconMedæ's Medipoint 26 Medical Gas Area Alarms</u> or	14	No.		
	approved equivalent.				



R S	Central main alarm in the plant room complete with cabling and all necessary accessories	1	No.		
	Repeater alarm with cabling	6	No.		
	Allow for leasing/hiring of filled with medical gas cylinders from BOC, Noble Gases etc to be used by the hospital to connect to the gasmanifolds.	26	No		
	Cylinder Trolleys Conforming to BS2718:1979 suitable fro transporting				
	the following:				
	2x40 -50 Litre J-size BOC cylinders	2	No		
	2x33 Litre G-size BOC cylinders	2	No		
	Sub-Total C/F to the next page				

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	Sub-Total B/F from the previous page				
	<u>DISTRIBUTION SYSTEM</u>				
A	Copper pipes manufactured from phosphorous de-oxidised non-arsenical copper to BS EN 1412:1996 grade CW024A (CuDHP) conforming to HTM 02-01. Pipework rates to include necessary accessories for proper coupling and brancing off.				
B					
C					
D	15 mm diameter Ditobut				
E	for 22mm diameter Ditto	1300	LM		
F	but for 28mm diameter	1,380	LM		
G	Ditto but for 35mm	540	LM		
H	diameter Ditto but for	984	LM		
I	42mm diameter Ditto but	636	LM		
J	for 54mm diameter Ditto	240	LM		
K	but for 65mm diameter	50	LM		
L	Pipe Brackets and sandles				
M	15 mm Hospital	867	No		
N	brackets/sandles Dito but for	690	No		
O	22mm diameter Ditto but for	270	No		
P	28mm diameter Ditto but for	394	No		
Q	35mm diameter Ditto but for	254	No		
R	42mm diameter Ditto but for 54mm	96	No		
S	diameter Ditto but for	17	No		
T	65mm diameter				
U	<u>Adaptors/Connectors</u>	120	No		
V	22 x 15mm adaptors/connectors	217	No		
	Coupling /sockets	230	No		
	15mm degreased socket/coupling	90	No		
	22mm -degrease sockets/coupling	164	No		
	28mm degreased socket/coupling	106	No		
	35mm -degrease sockets/coupling	40	No		
	42mm degreased socket/coupling	8	No		
	54mm -degrease sockets/coupling				
	65mm degreased socket/coupling				
	Sub-Total C/F to the next page				

Item	Description	Qty	Unit	Rate (Kshs)	Amount( Kshs)
	Sub-Total B/F from the previous page				
	Equal Tees				
A	15mm diameter tee	66	No		
B	22mm diameter tee	42	No		
C	28mm diameter tee	32	No		
D	35mm diameter tee	24	No		
E F	42mm diameter tee	16	No		
G	54mm diameter tee	4	No		
	65mm diameter tee	10	No		
H	Bends/Elbows				
	15 mm diameter bend/elbow	36	No		
	VALVES				
I	15mm diameter line ball valves fitted with copper stub pipes				
J	such as Medaes or approved equivalent. The valve to be complete with valve box, flow meter and identification marks.	15	No		
K					
L	Ditto but for 20mm diameter				
M	Ditto but for 25mm diameter	14	No		
N	Ditto but for 32mm diameter	16	No		
O	Ditto but for 42mm diameter	18	No		
	Ditto but for 54mm diameter	18	No		
P	Ditto but for 65mm diameter	14	No		
	<u>Training of Maintenance Staff and Operators</u>	14	No		
	Allow for training of Five (5 No.) personnel, Two (2 No.) from SDPW and Three (3 No.) from MOH, on MGPS in accordance with HTM 02-01.				
Q	<u>Copper Sleeves</u>	1	Item		
	Allow for copper sleeves for all pipes passing in floors, walls and partitions.				
R	<u>Identification of Pipelines</u>				
	Allow for permanent and temporary identification of pipelines, valves and ends in accordance to particular specifications described.	1	Item		
S	<u>Painting and Marking</u>				
	Allow for painting and marking of all pipes and fittings in accordance to particular specifications described.	1	Item		
T	<u>Purging</u>				
	Allow for flushing the whole system with the medical gases in accordance with HTM 02-01 and to the satisfaction of the Engineer.	1	Item		
U	<u>Testing and Commissioning</u>				
	Allow for testing and commissioning of the entire medical gas	1	Item		

	pipeline system in accordance with the Particular Specifications ( Form E-1 to E-17) and to the satisfaction of the Project Engineer.	1	Item		
	Sub-Total C/F to the next page				

kerugoya-mgps

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	Sub-Total B/F from the previous page				
	<u>As- Installed Drawings</u>				
A	Printed catalogues, technical data sheet, manuals and asbuilt drawings both in hard copy and soft copy. The soft copy to be delivered in compact disc and 8GB flash disk.	1	Item		
	<u>PROJECT MANAGER'S STATIONERY.</u>				
	The tenderer shall price for the following requirements. These shall then be delivered, upon their first demand to the office of the Chief Engineer Mechanical (BS) immediately after the award to the successful bidder				
B	Ream white photocopying paper A/4 80g/m2				
C	Letter head quality paper, size A4, 80g/cm <sup>3</sup> , Green, 500 sheets	20	Ream		
D	Letter head quality paper, Blue, 500 Sheets as Classic or Conqueror or approved equivalent.	5	Ream		
E	HP Leserjet Print Cartridge serial 53A No. Q7553A	5	Ream		
F	8 Giga Bit Storage Flash disk as Transcend or approved equivalent	5	No.		
G	1 Terabit External portable harddrive as seagate or approved equivalent	4	No		
		4	No.		
	Allow for a provisional sum of Kshs.1,000,000 as CPD training Levy for the state department of Public works Engineers	1	Item		
	Sub-Total C/F to summary page				

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	SUMMARY PAGE	
Item	Description	Total
1	Allow for Contract Preliminaries	
2	Sub-Total for Medical Gases Equipment & Pipeline System Installations	
3	Contingency to be used at the discretion of the Engineer	4,500,000. 00
	Total for Medical Gases Pipeline System Installations carried to form of Tender	

Amount in Words: .....

.....

Tenderer's Name and Stamp: .....

Sub contract period ..... Weeks

Signature ..... Date: .....

PIN NO. .... VAT CERTIFICATE No. ....

(Provide copy)

(Provide copy)

Witness Address: .....

Signature..... Date: .....

# SCHEDULE OF UNIT RATES

ITEM	DESCRIPTION	UNIT	RATE (Kshs)
1.	2700 litres per minute Vacuum Plant	No.	
2.	2350 litres per minute Medical Compressed Air Plant	No.	
3.	8,500 litres oxygen cylinder	No.	
4.	1,560 litres nitrous oxide cylinder	No.	
5.	7900 litres nitrogen cylinder	No.	

## SECTION G:

### TECHNICAL SCHEDULE OF ITEMS TO BE SUPPLIED

## CONTENTS

<u>CLAUSE No.</u>	<u>PAGE</u>
1. GENERAL NOTES TO THE TENDERER.....	G-1
2. TECHNICAL SCHEDULE.....	G-2



## TECHNICAL SCHEDULE

### 1. General Notes to the Tenderer

- 1.1 The tenderer shall submit technical schedules for all materials and equipment upon which he has based his tender sum.
- 1.2 The tenderer shall also submit separate comprehensive descriptive and performance details for all plant apparatus and fittings described in the technical schedules. Manufacturer's literature shall be accepted. Failure to comply with this may have his tender disqualified.
- 1.3 Completion of the technical schedule shall not relieve the Contractor from complying with the requirements of the specifications except as may be approved by the Engineer.

## TECHNICAL SCHEDULE

The tenderer must complete in full the technical schedule. Apart from the information required in the technical schedule, the tenderer **MUST SUBMIT** comprehensive manufacturer's technical brochures and performance details for all items listed in this schedule (fill forms attached).

ITEM No.	Description	Manufacturer	Country of origin	Particulars
1	Vacuum Plant			
2	Medical Compressed			
3	Air Plant			
4	Oxygen cylinders			
5	Nitrous Oxide cylinders			
6	Oxygen/Nitrous Oxide			
7	cylinders			
8	Nitrogen cylinders			
9	Theatre Pendants			
10	Terminal Units			
11	Copper Pipes			
12	Valves			
13	PSA Plant			

**SECTION H:**

**DRAWING SCHEDULE**

## CONTENTS

CLAUSE No.

PAGE

1.	DRAWING SCHEDULE .....	H-1
----	------------------------	-----

DRAWING SCHEDULE:

**As shall be provided during project implementation.**

## SECTION I:

### STANDARD FORMS

#### NOTE:

ALL FORMS IN THIS SECTION MUST BE FILLED AS THEY SHALL BE PART OF THE EVALUATION CRITERIA

### STANDARD FORMS

#### CONTENTS

<u>FORM</u>	<u>PAGE</u>
1. PERFORMANCE BANK GUARANTEE.....	I-1
2. TENDER QUESTIONNAIRE.....	I-2
3. CONFIDENTIAL BUSINESS QUESTIONNAIRE.....	I-3 to I-4
4. KEY PERSONNEL.....	I-5
5. CONTRACTS COMPLETED IN THE LAST FIVE (5) YEARS..	I-6
6 SCHEDULE OF ON-GOING PROJECTS.....	I-7
7 FINANCIAL REPORTS FOR THE LAST FIVE YEARS ....	I-8
8 EVIDENCE OF FINANCIAL RESOURCES... ..	I-9
9 NAME OF THE BANKERS.....	I-10
10 DETAILS OF LITIGATIONS OR ARBITRATION PROCEEDINGS.....	I-11
11 SCHEDULE OF MAJOR ITEMS OF CONTRACTOR'S EQUIPMENT PROPOSED FOR CARRYING OUT THE WORKS .....	I-12

PERFORMANCE BANK GUARANTEE

To  
The Chief Officer  
Ministry of Medical Services, Public Health & Sanitation  
P.O. Box  
24  
Kerugoya

Dear Sir,

WHEREAS ..... (hereinafter called "the Contractor") has undertaken, in pursuance of Contract No. .... dated ..... to execute ..... (hereinafter called "the Works");

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee:

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of:

Kshs ..... (amount of Guarantee in figures)

Kenya                      Shillings                      .....

..... (amount of Guarantee in words),

and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of Kenya Shillings .....

(amount of Guarantee in words) as a foresaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change, addition or other modification of the terms of the Contract or of the Works to be performed there under or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this Guarantee, and we hereby waive notice of any change, addition, or modification.

This guarantee shall be valid until the date of issue of the Certificate of Completion.

SIGNATURE AND SEAL OF THE GUARANTOR .....

Name of Bank .....

Address .....

Date .....

## TENDER QUESTIONNAIRE

Please fill in block letters.

1. Full names of Tenderer:

.....

2. Full address of Tenderer to which tender correspondence is to be sent (unless an agent has been appointed below):

.....

3. Telephone number (s) of Tenderer:

.....

4. Telex/Fax Address of Tenderer:

.....

5. Name of Tenderer's representative to be contacted on matters of the tender during the tender period:

.....

6. Details of Tenderer's nominated agent (if any) to receive tender notices. This is essential if the Tenderer does not have his registered address in Kenya (name, address, telephone, telex):

.....

.....

\_\_\_\_\_  
Signature of Tenderer



## CONFIDENTIAL BUSINESS QUESTIONNAIRE

You are requested to give the particulars indicated in Part 1 and either Part 2 (a), 2 (b) or 2(c) and (2d) whichever applies to your type of business.

You are advised that it is a serious offence to give false information on this Form.

### Part 1 - General

Business Name .....

Location of business premises:      Country/Town.....

Plot No..... Street/Road .....

Postal Address..... Tel No.....

Nature of Business.....

Current Trade Licence No..... Expiring date.....

Maximum value of business which you can handle at any time:

Kenya Shillings.....

Name of your bankers.....

Branch.....

### Part 2 (a) - SoleProprietor

Your name in full..... Age.....

Nationality..... Country of Origin .....

Citizenship details ... ..

### Part 2 (b) - Partnership

Give details of partners as follows:

	Name in full	Nationality	Citizenship Details	Shares
1.	.....	.....	.....	.....
2.	.....	.....	.....	.....
3.	.....	.....	.....	.....
4.	.....	.....	.....	.....

Part 2(c) - Registered Company

Private or Public .....

State the nominal and issued capita of the company:

Nominal KShs. ....

Issued KShs. ....

Give details of all directors as follows:

	Name in full	Nationality	Citizenship Details*	Shares
1.	.....	.....	.....	.....
2.	.....	.....	.....	.....
3.	.....	.....	.....	.....
4.	.....	.....	.....	.....

Part 2(d) Interest in the Firm:

Is there any person/persons in the employment of the Government of Kenya WHO has interest in this firm? Yes/No (Delete as necessary)

I certify that the above information is correct.

.....

.....

.....

Title

Signature

Date

\* Attach proof of citizenship

KEY PERSONNEL

Qualifications and experience of key personnel proposed for administration and execution of the Contract.

POSITION	NAME	YEARS OF EXPERIENC E (GENERAL)	YEARS OF EXPERIENCE IN PROPOSED POSITION
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

I certify that the above information is correct.

.....

Title

.....

Signature

.....

Date

CONTRACTS COMPLETED IN THE LAST FIVE (5) YEARS

Work performed on works of a similar nature and volume over the last five years.

<u>PROJECT NAME</u>	<u>NAME OF CLIENT</u>	TYPE OF WORK AND YEAR OF COMPLETION	VALUE OF CONTRACT (Kshs.)

I certify that the above works were successfully carried out and completed by ourselves.

.....

.....

.....

Title

Signature

Date

SCHEDULE OF ON-GOING PROJECTS

Details of on-going or committed projects, including expected completion date.

<u>PROJECT NAME</u>	<u>NAME OF CLIENT</u>	CONTRACT SUM	% COMPLET E	COMPLETI ON DATE

I certify that the above works are currently being carried out by ourselves.

..... Title Signature Date

# FINANCIAL REPORTS FOR THE LAST FIVE YEARS

(Balance sheets, Profits and Loss Statements, Auditor's reports, etc. List below and attach copies)

1. .\_\_\_\_\_.

2. .\_\_\_\_\_.

3. .\_\_\_\_\_.

4. .\_\_\_\_\_.

6. .\_\_\_\_\_.

7. .\_\_\_\_\_.

8. .\_\_\_\_\_.

9. .\_\_\_\_\_.

10. .\_-

**EVIDENCE OF FINANCIAL RESOURCES TO MEET QUALIFICATION REQUIREMENTS**  
(Cash in Hand, Lines of credit, e.t.c. List below and attach copies of supportive documents.)

1.     .\_\_\_\_\_.
2.     .\_\_\_\_\_.
3.     .\_\_\_\_\_.
4.     .\_\_\_\_\_.
5.     .\_\_\_\_\_.
6.     .\_\_\_\_\_.
7.     .\_\_\_\_\_.
8.     .\_\_\_\_\_.
- 9     .\_\_\_\_\_.

NAME, ADDRESS AND TELEPHONE, TELEX AND FACSIMILE OF BANKS

(This should be for banks that may provide reference if contacted by the employer)

NAME	ADDRESS	TELEPHONE	TELEX	FACSIMILE



DETAILS OF LITIGATIONS OR ARBITRATION PROCEEDINGS IN WHICH THE TENDERER IS INVOLVED AS ONE OF THE PARTIES

1..\_\_\_\_

2..\_\_\_\_

3..\_\_\_\_.

4. .\_\_\_\_.

5. .\_\_\_\_.

6. .\_\_\_\_.

7. .\_\_\_\_.

8. .\_\_\_\_.

9. .\_\_\_\_.

10 .\_\_\_\_\_.

SCHEDULE OF MAJOR ITEMS OF CONTRACTOR’S EQUIPMENT PROPOSED FOR CARRYING OUT THEWORKS

ITEM OF EQUIPMENT	DESCRIPTION, MAKE AND AGE (Years)	CONDITION (New, good, poor) and number available	OWNED, LEASED (From whom?), or to be purchased (From whom?)