JARAMOGI OGINGA ODINGA UNIVERSITY

OF SCIENCE AND TECHNOLOGY

TENDER DOCUMENT

FOR

TENDER NUMBER JOOUST/ONT/A2/28/2019-2020: Plumbing Drainage and Fire Fighting Administration Block at the Main Campus - Bondo, Siaya County

CLOSING DATE 22nd JULY 2020

OPENING DATE 4TH AUGUST 2020

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INTRODUCTION

1.1 This standard tender document for procurement of works has been prepared for use by procuring entities in Kenya in the procurement of works (i.e Electrical and Mechanical Works – Including Erection on Site)

1.2 The following guidelines should be observed when using the document:-

(a) Specific details should be furnished in the tender notice and in the special conditions of contract (where applicable). The tender document issued to tenderers should not have blank spaces or options.

(b) The instructions to tenderers and the General Conditions of Contract should remain unchanged. Any necessary amendments to these parts should be made through Appendix to instructions to tenderers and special conditions of contract respectively.

1.3 (a) Information contained in the invitation to tender shall conform to the data and information in the tender documents to enable prospective tenderers to decide whether or not to participate in the tender and shall indicate any important tender requirements

(b) The invitation to tender shall be as an advertisement in accordance with the regulations or a letter of invitation addressed to tenderers who have been prequalified following a request for prequalification.

1.4 This document is based on PART 1 of the third Edition of the International Federation of Consulting Engineers (Federation Internationale des Ingenieurs Con Seils – FIDIC) Conditions of Contract for Electrical and Mechanical Works, 1987 (reprinted May 1988 with Editorial Amendments).

1.5 The cover of the tender document should be modified to include:-

i. Tender number.
ii. Tender name.
iii. Name of procuring entity.
iv. Delete name and address of PPOA

SECTION 1

SECTION I INVITATION TO TENDER

TENDER REF NO: JOOUST/ONT/A2/28/2019-2020

TENDER NAME: PLUMBING DRAINAGE AND FIRE FIGHTING FOR THE ADMINISTRATION BLOCK AT MAIN CAMPUS - BONDO, SIAYA COUNTY

1.1 Jaramogi Oginga Odinga University of Science and Technology invites sealed bids from eligible candidates for Tender for Plumbing Drainage and Fire Fighting, Administration Block at Main Campus - Bondo, Siaya County.

1.2 Tender documents with detailed specifications shall be downloaded free of charge at the University website **www.jooust.ac.ke** and Public Procurement Information Portal **www.tenders.go.ke.**Tenderers who download the tender document and intend to submit a bid are required to submit their particulars to the University through email: **proc@jooust.ac.ke** for the purpose of receiving any further clarification and\or addendum.

1.3 **THERE SHALL BE MANDATORY SITE VISIT TO BE HELD ON 8TH JULY 2020 FROM 10 AM AT THE ADMINISTRATION BLOCK SITE IN THE MAIN CAMPUS**

1.4 Dully filled tender documents are to be enclosed in plain sealed envelopes, marked with the tender number, tender description **and bearing no indication of the applicant**, clearly /marking each "**ORIGINAL TENDER**" and "**COPY OF TENDER**" should be deposited in the tender box at Jaramogi Oginga Odinga University of Science and Technology or be addressed to:-

The Vice Chancellor,
Jaramogi Oginga Odinga University of Science and Technology,
P.O. Box 210-40601
BONDO.

1.5 The tender document should reach on or before **22nd JULY 2020**

1.6 Due to COVID-19, the application documents will be open on **4TH AUGUST 2020** at the Assembly Hall, Main Campus in the presence of the candidates or their representatives who choose to attend.

NB: Due to ministry of health instructions on social distancing, the number of bidders/representatives will be limited

1.7 **BIDDERS MUST SERIALIZE THE BID DOCUMENT. THE UNIVERSITY SHALL NOT BEAR RESPONSIBILITY FOR THE LOSS OF ANY DOCUMENT.**

SECTION II:

INSTRUCTIONS TO TENDERERS

TABLE OF CLAUSES

INSTRUCTION TO TENDERERS

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

GENERAL

1. Definitions

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

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

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

(d) **"Employer"** means a Central Government Ministry, Local Authority, State Corporation or any other Public Institution.

2. Eligibility and Qualification Requirements

2.1 This invitation to tender is open to all tenderers who are eligible as stated in the appendix.

2.2 The procuring entity's employees, committee members, board members and their relative (spouse and children) are not eligible to participate in the tender.

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

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

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

(c) Major items of construction plant and equipment proposed for use in carrying out the Contract. Only reliable plant in good working order and suitable for the work required of it shall be shown on this schedule. The tenderer will also indicate on this schedule when each item will be available on the Works. Included also should be a schedule of plant, equipment and material to be

imported for the purpose of the Contract, giving details of make, type, origin and CIF value as appropriate.

(d) Details of subcontractors to whom it is proposed to sublet any portion of the Contract and for whom authority will be requested for such subletting in accordance with clause 4 of the Conditions of Contract.

(e) A draft Program of Works in the form of a bar chart and Schedule of Payment which shall form part of the Contract if the tender is accepted. Any change in the Program or Schedule shall be subjected to the approval of the Engineer.

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

2.4 Joint Ventures

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

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

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

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

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

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

2.5 To quality for contract awards, the tenderer shall have the following:

(a) Necessary qualifications, capability experience, services, equipment and facilities to provide what is being procured.

(b) Legal capacity to enter into a contract for procurement

(c) Shall not be insolvent, in receivership, bankrupt or in the process of being wound up and is not the subject of legal proceedings relating o the foregoing.

(d) Shall not be debarred from participating in public procurement.

3. Cost of Tendering

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

3.2 The price to be charged for the tender document shall not exceed Kshs.5,000/=

3.3 The procuring entity shall allow the tenderer to view the tender document free of charge before purchase.

4. Site Visit

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

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

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

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

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

TENDER DOCUMENTS

5. Tender Documents

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

a. Form of Invitation for Tenders
b. Instructions to Tenderers
c. Form of Tender
d. Appendix to Form of Tender
e. Form of Tender Surety
f. Statement of Foreign Currency Requirements
g. Form of Performance Security
h. Form of Agreement
i. Form of Advance payment Bank Guarantee
j. Schedules of Supplementary Information
k. General Conditions of Contract – Part I

l. Conditions of Particular Application – Part II
m. Specifications
n. Bills of Quantities
o. Drawings
p. Declaration Form

5.2 The tenderer is expected to examine carefully all instructions, conditions, forms, terms, specifications and drawings in the tender documents. Failure to comply with the requirements for tender submission will be at the tenderer's own risk. Pursuant to clause 22 of Instructions to Tenderers, tenders which are not substantially responsive to the requirements of the tender documents will be rejected.

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

6. Inquiries by tenderers

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

6.2 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.

6.3 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.

7. Amendment of Tender Documents

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

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

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

PREPARATION OF TENDERS

8. Language of Tender

8.1 The tender and all correspondence and documents relating to the tender exchanged between the tenderer and the Employer shall be written in the English language. Supporting documents and printed literature furnished by the tenderer with the tender

may be in another language provided they are accompanied by an appropriate translation of pertinent passages in the above stated language. For the purpose of interpretation of the tender, the English language shall prevail.

9. Documents Comprising the Tender

9.1 The tender to be prepared by the tenderer shall comprise:-

i. The form of tender and appendix thereto.
ii. A tender security.
iii. The priced Bill of Quantity and Schedule.
iv. The information on eligibility and qualification.
v. Any other materials required to be completed and submitted in accordance with the instructions to tenderers.

The Forms, Bills of Quantities and Schedules provided in the tender documents shall be used without exception (subject to extensions of the schedules in the same format and to the provisions of clause 13.2 regarding the alternative forms of Tender Surety].

10. Tender Prices

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

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

The prices and unit rates in the Bills of Quantities are to be the full [all-inclusive] value of the work described under the items, including all costs and expenses which may be necessary and all general risks, liabilities and obligations set forth or implied in the documents on which the tender is based. All duties and taxes and other levies payable by the Contractor under the Contract or for any other cause prior to the deadline for the submission of tenders, shall be included in the rates and prices and the total tender prices submitted by the Tenderer.

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

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

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

10.4 The tenderer shall furnish with his tender written confirmation from his suppliers or manufacturers of unit rates for the supply of items listed in the Conditions of Contract clause 47 where appropriate.

10.5 The rates and prices quoted by the tenderer are subject to adjustment during the performance of the Contract only in accordance with the provisions of the Conditions of Contract. The tenderer shall complete the schedule of basic rates and shall submit with his tender such other supporting information as required under clause 47 of the Conditions of Contract Part II.

11. Currencies of Tender and Payment

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

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

11.3 The rate or rates of exchange used for pricing the tender shall be selling rate or rates of the Central Bank ruling on the date thirty (30) days before the final date for the submission of tenders.

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

12. Tender Validity

12.1 The tender shall remain valid and open for acceptance for a period of ninety (90) days from the specified date of tender opening or from the extended date of tender opening (in accordance with clause 7.4 here above) whichever is the later.

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

13. Tender Security

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

13.2 The tender security shall be 2 percent of the total tender price.

13.3 The tender security shall be valid for at least thirty (30) days beyond the tender validity period.

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

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

13.5 The Tender Sureties of unsuccessful tenderers will be returned as promptly as possible but not later than fourteen (14) days after concluding the Contract execution and after a Performance Security has been furnished by the successful tenderer. The Tender Surety of the successful tenderer will be returned upon the tenderer executing the Contract and furnishing the required Performance Security.

13.6 The Tender Surety may be forfeited:

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

(b) in the case of a successful tenderer, if he fails

(i) to sign the Agreement, or
(ii) to furnish the necessary Performance Security

(c) if a tenderer does not accept the correction of his tender price pursuant to clause 23.

14. No Alternative Offers

14.1 The tenderer shall submit an offer which complies fully with the requirements of the tender documents unless otherwise provided for in the appendix.

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

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

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

15. Pre-Tender Meeting

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

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

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

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

16. Format and Signing of Tenders

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

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

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

SUBMISSION OF TENDERS

17. Sealing and Marking of Tenders

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

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

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

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

18 Deadline for Submission of Tenders

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

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

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

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

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

19 Modification and Withdrawal of Tenders

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

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

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

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

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

TENDER OPENING AND EVALUATION

20 Tender Opening

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

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

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

20.4 The Employer shall prepare a tender opening register and minutes of the tender opening including the information disclosed to those present.

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

21 Process to be Confidential

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

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

22 Clarification Tenders

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

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

23 Determination of Responsiveness

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

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

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

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

24 Correction of Errors

Tenders determined to be substantially responsive shall be checked by the Employer for any arithmetic errors in the computations and summations. **Errors will NOT be corrected by the Employer.**

25 Conversion to Single Currency

25.1 For compensation of tenders, the tender price shall first be broken down into the respective amounts payable in various currencies by using the selling rate or rates of the Central Bank of Kenya ruling on the date twenty one (21) days before the final date for the submission of tenders.

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

26 Evaluation and Comparison of Tenders

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

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

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

26.4 If the lowest evaluated tender is seriously unbalanced or front loaded in relation to the Employer's estimate of the items of work to be performed under the Contract, the

Employer may require the tenderer to produce detailed price analyses for any or all items of the Bills of Quantities, to demonstrate the relationship between those prices, proposed construction methods and schedules. After evaluation of the price analyses, the Employer may require that the amount of the Performance Security set forth in clause 29 be increased at the expense of the successful tenderer to a level sufficient to protect the Employer against financial loss in the event of subsequent default of the successful tenderer under the Contract.

26.5 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 a non-indigenous sub-contractor.

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

26.7 Persons not officially involved in the evaluation of tender shall not attempt in any way to influence the evaluation.

27. Preference where allowed in the evaluation of tenders shall not exceed 15%

AWARD OF CONTRACT

28 Award criteria

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

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

29. Notification of Award and signing of contract

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

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

29.3 At the same time the employer notifies the successful tenderer that his tender has been accepted, the employer shall notify the other tenderers that their tender s have been unsuccessful.

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

29.5 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.

29.6 A tenderer who gives false information in the tender document about is 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.

30. Performance Guarantee

30.1 Within twenty eight [28] days of receipt of the notification of award from the Employer, the successful tenderer shall furnish the Employer with a Performance Security in an amount stated in the Appendix to Instructions to Tenderers.

30.2 The Performance Security to be provided by the successful tenderer shall be an unconditional Bank Guarantee issued at the tenderer's option by an established and a reputable Bank approved by the Employer and located in the Republic of Kenya and shall be divided into two elements namely, a performance security payable in foreign currencies (based upon the exchange rates determined in accordance with clause 35.4 of the Conditions of Contract) and a performance security payable in Kenya Shillings. The value of the two securities shall be in the same proportions of foreign and local currencies as requested in the form of foreign currency requirements.

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

31. Advance Payment

An advance payment, if approved by the Employer, shall be made under the Contract, if requested by the Contractor, in accordance with clause 33.1 of the Conditions of Contract. The Advance Payment Guarantee shall be denominated in the proportion and currencies named in the form of foreign currency requirements. For each currency, a separate guarantee shall be issued. The guarantee shall be issued by a bank located in the Republic of Kenya, or a foreign bank through a correspondent bank located in the Republic of Kenya, in either case subject to the approval of the Employer.

31. Corrupt and fraudulent practices.

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

SECTION III

APPENDIX TO INSTRUCTIONS TO TENDERERS

INSTRUCTIONS TO TENDERERS	PARTICULARS OF APPENDIX TO INSTRUCTIONS TO TENDERERS
1.1	The employer is the **Vice Chancellor**, Jaramogi Oginga Odinga University of Science and Technology.
1.7	Qualification criteria as set out in the tender evaluation criteria
1.8	N/A
1.9	Joint venture or individual tenderers only.
1.13	N/A
2.3	Or through email address: proc@jooust.ac.ke
3.2.(e)	N/A
3.4	N/A
3.6	Validity period of 90 days
3.8	Tender surety shall be valid for 30 days beyond the validity of tender from the date of tender opening.
3.12 (b)	N/A
3.14	One original and a copy of the original
3.18	Bid security of 2% OF THE TENDER SUM from a reputable bank recognized by the Central Bank of Kenya
5.2	Alternative bids not allowed
5.7	N/A: PPAD 2015 Applies
5.9	N/A
5.12	N/A
6.5	Successful tenderer to provide performance security of 10% of the Sub-Contract sum from reputable bank recognized by Central Bank of Kenya prior to Sub-Contract signing.
6.8	N/A
6.12	-The word "valuation" should read "variation" -Variation shall apply as prescribed by the Public Procurement and Asset Disposal Act, 2015
6.13	Shall be 60 days from the date of receipt of the request
8.0	Due diligence shall be conducted before award in accordance with the Public Procurement and Asset Disposal Act, 2015
9.0	Tenderer shall be required to provide litigation history which may be subjected to due diligence to ascertain the possibility of negatively affecting performance.

SECTION IV

CONDITIONS OF CONTRACT (Including erection on site)
PART I – GENERAL CONDITIONS

PART I – General Conditions, shall be those forming Part I of the "Conditions of Contract for Electrical and Mechanical Works – Including Erection on Site, Thirth Edition 1987, re-printed 1988 with Editorial Amendments" prepared by the Federation Internationale des Ingenieurs – conseils (FIDIC). The Conditions are subject to variations and additions set out in Part II hereof entitled "Special Conditions".

Note

i. The standard text of the General Conditions of Contract must be retained intact to facilitate its reading and interpretation by tenderers. Any amendments and additions to the General Conditions, specific to a given Contract, should be introduced in the Special Conditions or in the Appendix to Form of Tender.

ii. The Special Conditions take precedence over the General Conditions of Contract.

iii. Copies of the FIDIC Conditions of Contract can be obtained from:

FIDIC Secretariat
P.O.Box 86
1000 Lausanne 12
Switzerland
Fax: 41 21 653 5432
Telephone 41 21 653 5003

PREABLE TO GENERAL CONDITIONS

Commencement Date (Sub-clause 1.1.1.(I))

The date for commencement of the Works is _____**SEPTEMBER 2020**_____

The Employer (Sub-clause 1.1.12.)

The Employer is **JARAMOGI OGINGA ODINGA UNIVERSITY OF SCHIENCE AND TECHNOLOGY**

The Engineer (Sub-clause 1.1.15)

The Engineer is _____

Time for Completion (Sub-clause 1.1.35.)

The Time for Completion is __**12 months**_____ from the commencement Date.

Contractor's Profit (Sub-clause 1.6.)

The percentage to cover profit entitlement, where appropriate, is _**N/A**_____%.

Ruling Language (Sub-clause 5.1.)

The version in **ENGLISH** language (ruling language) shall prevail.

Day to Day Communications (Sub-clause 5.2.)

The language for day to day communications is ENGLISH_____

Programme to be Furnished (Sub-clause 12.1.)

The Programme must be submitted in the form of ____MICROSOFT PROJECT_____

Electricity, Water, Gas and Other Services (Sub-clause 14.3.)

Supplies on the Site are:

a. Electricity**:_____KENYA POWER_____**

b. Water: _____**SIAYA BONDO WATER AND SANITATION**____

Employer's Equipment (Sub-clause 14.4.)

The following Employer's equipment is available for use by the Contractor under the Employer's operation: _____N/A_____

_____

_____

Working Hours (Sub-clause 18.3.)

The normal working hours are **_____8.00AM-5.00PM AS PER NEMA GUIDLINES_____**
_____

Delay in Completion (Sub-clause 27.1.)

Failure to meet the Time for Completion entitles the Employer to reduction in Contract Price as follows:

Amount per day _____N/A_____

Maximum _____N/A_____

Prolonged delay (Sub-clause 27.2.)

Maximum amount recoverable from the Contractor by the Employer:
_____N/A_____

Terms of Payment (Sub-clause 33.1.)

In addition to the provisions under Clause 33, the terms of payment shall be:
_____
_____

Payment in Foreign Currencies (Sub-clause 35.1.)

Payment in foreign currencies shall be arranged as follows:
_____N/A_____
_____
____

Rates of Exchange (Sub-clause 53.3.)

The rates of exchange for the purpose of the Contract are:
_____N/A_____
_____
____

Payment against Provisional Sums (Sub-clause 36.4. (b))

The percentage to be applied to Provisional Sums shall be _____%.

Maximum Liability (Sub-clause 42.2.)

The maximum liability of the Contractor to the Employer shall be _____N/A_____

Insurance of Works (Sub-clause 43.1)

The deductible limits in the insurance cover of the Works shall not exceed
_____

Sub-clause 43.1. (a)
The additional risks to be insured are:

_____
_____

Third Party Liability (Sub-clause 43.3)

The amount of insurance against third party liability taken out by the Contractor shall not be less than:

_____

Payment on Termination for Employer's Default (Sub-clause 46.3)

The additional amount payable by the Employer on termination shall not exceed:

_____

Labour, Materials and Transport (Sub-clause 47.1.)

The method of calculating adjustments for changes in costs shall be:

_____
_____

Notices to Employer and Engineer (Sub-clause 49.2.)

The address of the Employer for notices is:

_____
_____

The address of the Engineer for notices is:

_____
_____

Applicable Law (Sub-clause 51.1.)

The applicable law is _____ law.

Procedural Law for Arbitration (Sub-clause 51.2)

The procedural law for arbitration is _____

Language and Place of Arbitration (Sub-clause 51.3)

The language of arbitration is _____ language.

The place of arbitration is _____

PART II – SPECIAL CONDITIONS

(The Clauses referred to in Part II – Section A are those where the provision in the General Conditions (Part I) refer to an alternative solution to be stated in Part II. The provisions in the General Conditions will apply unless an alternative solution is given in Part II – Section A. The clauses in this section need therefore not be completed, but must be completed if alternative solutions to the relevant Part I provisions are necessary.)

1.0 Conditions Precedent to Commencement (Sub-clause 1.1.1.)

The following financial and administrative requirements are conditions precedent to commencement.

_____

_____

2.0 Defects Liability Period (Sub-clause 1.1.11.)

The Defects Liability Period is _____ days.

3.0 Engineer's Duties (Sub-clause 2.1.)

The Engineer requires the consent of the Employer before exercising the following duties:

_____

_____

4.0 Operation and Maintenance Manuals (Sub-clause 6.6.)

Operation and Maintenance Manuals shall be in English language.

5.0 Manufacturing Drawings (Sub-clause 6.9.)

The Contractor is required to disclose to the Engineer or the Employer confidential information as follows:

_____

_____

6.0 General Obligations (Sub-clause 8.1.)

6.1 The following facilities will be provided by the Employer:

_____

_____

6.2 The facilities will be provided at the following rates:

_____

_____

7.0 Performance Security (Sub-clause 10.1)

The Contractor shall obtain a Performance Security of an amount Kshs.

8.0 Contractor Equipment (Sub-clause 14.1)

The following items of Contractor's Equipment will be provided free of charge by the Employer for the Contractor's use:

_____

_____

9.0 Price Variation

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

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

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

10.0 Extension of Defects Liability Period (Sub-clause 30.4)

In the event of suspension the Defects Liability Period shall not last more than ____ days after the date the works would have been delivered but for the suspension.

11.0 Method of Application (Sub-clause 33.2)

Application for payment shall be made as follows:

_____

_____

12.0 Payment (Sub-clause 33.5.)

11.1 The period for payment shall be:

_____

11.2 The place for payment shall be:

_____

13.0 Delayed Payment (Sub-clause 33.6.)

The interest rate for delayed payment is simple interest 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 over due.

14.0 Payment by measurement (Sub-clause 33.8)

The provisions for measurement are:

_____

_____

15.0 Customs and Import Duties (Sub-clause 48.1.)

The Contractor shall pay and be reimbursed by the Employer for the following customs, import duties and taxes in consequence of the importation of the Plant:

_____

_____

16.0 Arbitration (Sub-clause 50.2)

The rules of arbitration shall be those contained in the Arbitration Act of the Laws of Kenya

SECTION V:

SPECIFICATIONS

Notes for preparing Specifications

1.0 Specifications must be drafted to present a clear and precise statement of the required standards of materials, and workmanship for tenderers to respond realistically and competitively to the requirements of the employer and ensure responsiveness of tenders. The Specifications should require that all materials, plant, and other supplies to be incorporated in the Works be new, unused, of the most recent or current models, and incorporating all recent improvements in design and materials unless provided otherwise in the Contract. Where the Contractor is responsible for the design of any part of the permanent Works, the extent of his obligations must be stated.

2.0 Specifications from previous similar projects are useful and it may not be necessary to re-write specifications for every works contract for universal application.

3.0 There are considerable advantages in standardizing **General Specifications** for repetitive Works in recognized public sectors, such as highways urban housing, irrigation and water supply. The General Specifications should cover all classes of workmanship, materials and equipment commonly involved in constructions, although not necessarily to be used in a particular works contract. Deletions or addenda should then adapt the General Specifications to the particular Works.

4.0 Care must be taken in drafting Specifications to ensure they are not restrictive. In the specifications of standards for materials, plant and workmanship, existing Kenya Standards should be used as much as possible, otherwise recognized international standards be used.

5.0 The Employer should decide whether technical solutions to specified parts of the Works are to be permitted. Alternatives are appropriate in cases where obvious (and potentially less costly) alternatives are possible to the technical solutions indicated in tender documents for certain elements of the Works, taking into consideration the comparative specialized advantage of potential tenderers.

The Employer should provide a description of the selected parts of the works with appropriate reference to Drawings, Specifications, Bills of Quantities, and Design or Performance criteria, stating that the alternative solutions shall be at least structurally and functionally equivalent to the basic design parameters and specifications.

Such alternative solutions shall be accompanied by all information necessary for a complete evaluation by the Employer, including drawings, design calculations, technical specifications, breakdown of prices, proposed construction methodology, and other relevant details. Technical alternatives permitted in this manner shall be considered by the Employer each on its own merits and independently of whether the tenderer has priced the item as described in the Employer's design included with the tender documents.

PART A: GENERAL MECHANICAL SPECIFICATION

1 General

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

2 Quality of Materials

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

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

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

Materials and apparatus supplied by others for installation and 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.

3 Regulations and Standards

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

a) The Kenya Government Regulations.

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

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

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

e) The Local Council By-laws.

f) The Electricity Supply Authority By-laws.

g) Local Authority By-laws.

h) The Kenya Building Code Regulations.

i) The Kenya Bureau of Standards

4 Electrical Requirements

Plant and equipment supplied under this Sub-contract shall be complete with all necessary motor starters, control boards, and other control apparatus. Where control panels incorporating several starters are supplied they shall be complete with a main isolator.

The supply power up to and including local isolators shall be provided and installed by the Electrical Sub-contractor. All other wiring and connections to equipment shall form part of this Sub-contract and be the responsibility of the Sub-contractor.

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.

5 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.

6 Site Supervision

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

7 Installation

Installation of all special plant 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 3 of this Section.

8 Testing

8.1 General

The Sub-contractor's attention is drawn to part 'A' Clause 38 of the "Preliminaries and General Conditions".

8.2 Material Tests

All material for plant and equipment to be installed under this Sub-contract shall be tested, unless otherwise directed, in accordance with the relevant BS Specification concerned.

For materials where no BS 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 Sub-contractor shall submit satisfactory evidence to the Engineer that such materials conform to the requirements stated herein in which case tests of material may be partially or completely waived.

Certified mill test reports of plates, piping and other materials shall be deemed acceptable.

8.3 Manufactured Plant and Equipment – 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 week's 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.

8.4 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.

9 Colour Coding

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

10.0 Welding

10.1 Preparation

Joints to be made by welding shall be accurately cut to size with edges sheared, flame cut or machined to suit the required type of joint. The prepared surface shall be free from all visible defects such as lamination, surface imperfection due to shearing or flame cutting operation, etc., and shall be free from rust scale, grease and other foreign matter.

10.2 Method

All welding shall be carried out by the electric arc processing using covered electrodes in accordance with BS 639.

Gas welding may be employed in certain circumstances provided that prior approval is obtained from the Engineer.

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 BS 806.

b) **General Welding**

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

10.4 Welder's Qualifications

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

The Engineer may require to see the 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 B: GENERAL SPECIFICATIONS FOR PLUMBING AND DRAINAGE

1.0 MATERIALS AND STANDARDS

2.0 General

This section specifies the general requirements for plumbing and drainage forming part of the Sub-Contract Works and shall apply except where specifically stated elsewhere in the specification or on the contract Drawings.

3 Pipework and Fittings

Pipework materials to be used are as follows: -

3.1 Cold Water Mains

Unplasticised PVC or galvanized steel medium or heavy grade, as specified on the drawings.

3.2 Black Steel Pipework

All black steel pipework up to 65mm nominal bore shall be manufactured in accordance with BS 1387 Medium Grade, with tempered place threads in accordance with BS 21. All fittings shall be malleable iron and manufactured in accordance with BS 143.

Pipe joints shall be screwed and socketed and sufficient coupling unions shall be allowed so that fittings can be disconnected without cutting the pipe. Running nipples and long screws shall not be permitted unless exceptionally approved by the Engineer

All black steel pipeworks, 80mm nominal bore up to 150mm nominal bore, shall be manufactured to comply in all respects with the specification for 65mm pipe, except that screwed and bolted flanges shall replace union and coupling for the joint of pipes to valves other items of plant.

All flanges shall comply with the requirements of BS 10 to the relevant classification contained hereinafter under section C of the Specification.

3.3 Galvanized Steel Pipework

Galvanized Steel pipework shall be manufactured to comply in all respects with the standards described for black Steel pipework in paragraph 3.2 above.
Galvanizing shall be carried out in accordance with the requirements of BS 1387 and BS 143 respectively.

3.4 Copper Tubing

All copper tubing shall be manufactured in accordance with BS 2871 from C.160 ‘Phosphorous De-oxidized Non-Arsenical Copper’ in accordance with BS 1172.

Pipe joints shall be made with soldered capillary fittings and connections to equipment shall be with compression fittings manufactured in accordance with BS 864.

Short copper connection tubes between galvanized pipework and sanitary fitments shall not be used because of the risk of galvanic action.

If, as may occur in certain circumstances, it is not possible to make the connection in any way than the use of copper tubing, then a brass straight connector shall be positioned between the galvanized pipe and the copper tube in order to prevent direct contact.

3.5 Cast Iron Pipework

a) **Internal Services**

Cast Iron pipework and fittings for use above ground in connection with internal building services, shall be manufactured with spigot and socket joints of the weight required by the local authority and shall fully comply with the

requirements of BS 416.

All joints on Cast Iron spigot and socket pipes shall be made with an approved cold caulking compound and so installed as to allow for any expansion or contraction, which may take place.

All Cast Iron pipe work, branches, tees bends and other fittings shall be supplied complete with inspection covers for cleaning purposes. These inspection covers shall be included as parts of the fittings and shall comply with requirements of BS 416.

b) **External Services**

Cast iron pipe work, which is used in connection with buried external services, shall be manufactured, coated and tested in accordance with the requirements of BS 1211

All buried cast iron bends, elbows swept tees and other fittings, shall comply with the requirements of BS 1130.

Joining on external cast iron pipes shall be carried out in accordance with one of the methods described in BS Code of Practice 301, Clause 505C (v), to the approval of the Engineer.

3.6 Pitch fibre Pipework

Pitch Fibre Pipework and fittings for use in connection with external drainage services shall be manufactured in accordance with the requirements of BS 2760. Pipes shall be connected by means of purpose tapered joints manufactured in accordance with the requirements of the notes contained under Appendix C of BS 2760.

Until such a time as the use of pitch impregnated fibre is covered by a code of practice, the jointing, laying and cutting of these pipes shall be carried out in accordance with the requirements of the notes contained under appendix C of BS 2760.

3.7 Concrete Pipe

Where concrete pipe and fittings are used in connection with the conveyance surface water of sewage under atmospheric pressure, they shall be manufactured in accordance with the requirements of BS 556,Class 1, except where otherwise stated.

The joints of concrete pipe and fittings may be one of the following depending application and conditions: -

1) Flexible rebated type (storm water drainage only)
2) Ordinary spigot and socket type
3) Flexible spigot and socket type.
4) Ordinary related type (Storm water drainage only)

Joints (1) and (2) shall be sealed with suitable rubber gaskets manufactured in accordance with BS 2494 except where they are likely to be contained by oil products, in which case the gasket be manufactured in accordance with BS 3514.

Joints (3) and (4) shall be made with approved cement mortar mix.

3.8 Asbestos Cement Pressure Pipe

Where asbestos cement pressure pipes and fittings are used in connection with external, above ground or buried water services, they shall be manufactured in accordance with the requirement of BS 486.

The classification of these pipes fall into classes:
A, B, C and D, respectively, and the class to be used shall depend upon the pressure conditions pertaining to site.
Where Cast iron detachable joints are used for connecting pipes, the material shall comply with the BS specification, then the materials used shall be of quality not less than that required by this standard.

Rubber jointing rings shall be used for sealing purposes and shall comply with requirements of BS 2494, except where they are likely to be contaminated by oil products, in which case the gasket shall be manufactured in accordance with BS 3514.

3.9 PVC (Hard) Pressure Pipes and Fittings

All PVC pipes and fittings shall be manufactured in accordance with BS 3505: 1968 or the relevant Kenya Standard.

Jointing

The method of jointing to be employed shall be that of solvent welding, using the pipe and manufacturer's approved cement. Seal ring joint shall be introduced where it is necessary to accommodate thermal expansion.

Anchoring

The bends, valves and hydrant tees etc., in the line of the water main shall be adequately anchored to resist thrust due to internal water pressure. A concrete block shall be cast under and around the pipe and between it and sides of the trench. Well-rammed material shall be used to support the pipe and either side of the concrete.

Pipe Bed

Pipes shall be uniformly laid on a 75mm thick bed, (sand or red soil) and must not be allowed to rest on the joint or on stones etc.

Backfilling

For the protection of the pipe, initial backfilling shall be carried out as soon as possible after laying. The initial backfill shall be fine grained material thoroughly compacted around the pipe and consolidated to a depth of 6" above the crown of the pipe and at no time shall heavy rocks, stones or other objects be included in the balance of the backfill that might protrude the initial backfill layer and come into contact with the pipe.

Testing

Pipelines shall be tested in sections under an internal water pressure normally one and a half times the maximum allowable working pressure of the class of pipe used. Testing shall be carried out as soon as practical after laying and when the pipeline is adequately anchored. Precautions shall be taken to eliminate all air from the test section and to fill the pipe slowly to avoid risk of damage due to surge.

3.10 MuPVC Waste Systems

All pipes and fittings shall be manufactured in accordance with BS 5255: 1968 or the relevant Kenya Standard. Pipe shall be supplied in plain-ended lengths.

Thickness

The Minimum acceptable wall thickness of pipe and fittings shall be as follows:

size(in)	Size (mm)	Pipe and Fittings Wall Thickness (mm)
1¼	32	1.8
1½	40	1.9
2	50	2.0

Jointing

The method of joining to be employed shall be that of solvent welding, using the pipe and manufacturer's approved cement. Seal rings joints shall be introduced where it is necessary to accommodate thermal expansion.

Anchoring

All bends, valves and hydrant tees etc, in the line of water main shall be adequately anchored to resist thrust due to internal water pressure. A concrete block shall be cast under and around the pipe and between it and sides of the trench. Well-rammed material shall be used to support the pipe and either side of the concrete.

Workmanship

The installation method of jointing shall be solvent welding; and both jointing and fixing shall comply in all respect to the manufacturer's site-work instructions. The maximum intervals between pipe supports at 200c shall be as follows: -

Nominal size (in)	Nominal size (mm)	Horizontal (mm)	Vertical (mm)
1¼	32	500	1200
1½	40	500	1200
2	50	900	2000
3	80	900	2000
4	100	1000	2000
6	150	1000	2000

Pipes shall be fixed in straight runs and horizontal runs and shall be laid to gradients in conformity with BS 5572 of Practice for Sanitary and in any event not less than 18mm/m unless otherwise specified.

Pipes passing through wall or floor shall be sleeved to allow unrestricted movements.

The works shall be inspected and tested during installation at any stage in accordance with BS 5572. All work, which will be concealed, shall be tested before it is finally enclosed and verified by the Clerk of Works.

Pipe Bed

Pipes shall uniformly be laid on a 75mm thick bed, (Sand or red soil) and not be allowed to rest on the joint or on stones etc.

Supports to Fittings

In underground installation care shall be taken to ensure that heavy components such as valves are fully supported so that the pipeline carries no weight.

Backfilling

For the protection of the pipe initial Backfilling shall be carried out as soon as possible after laying. The initial backfill shall be fine-grained material thoroughly compacted around the pipe and consolidated to depth of 6" above the crown of the pipe. At no time shall heavy rocks, stones or other object be included in the balance of the backfill that might protrude the initial backfill and come into contact with the pipe.

Testing

Pipelines shall be tested in section under an internal water pressure normally one and a half times the maximum allowable working pressure of the class pipe used. Testing shall be carried out as soon as practicable after laying and when the pipeline is anchored precautions shall be taken to eliminate all air from the test section and the pipe slowly to avoid risk of damage due to surge.

3.11 A.B.S. Waste System

Where indicated on the Drawings and Schedules, the Sub-contractor shall supply and fix A.B.S. waste pipes and fittings.

The pipes, traps and fittings shall be in accordance with the relevant British Standards, including BS 3943, and fixed generally in accordance with manufacturer's instructions and BS 5572: 1978.

Jointing of pipes shall be carried out by means of solvent welding, the manufacturer's instructions and BS 5572: 1978.

Jointing of pipes shall be carried out by means of solvent welding. The manufacturer's recommended method

of joint preparation and fixing shall be followed.

Standard brackets, as supplied for use with this system, shall be used wherever possible. Where the building structure renders this impracticable the Sub-contractor shall provide purpose made supports, centres of which shall not exceed one metre.

Expansion joints shall be provided as indicated. Supporting brackets and pipe clips shall be fixed on each side of these joints.

3.12 PVC Soil System

The Sub-contractor shall supply and fix PVC soil pipes and fittings as indicated on the Drawings and Schedules.

Pipes and fittings shall be in accordance with relevant British Standards, including BS 4514 and fixed to the manufacturer's instructions and BS 5572.

The soil system shall incorporate synthetic rubber gaskets as provided by the manufacturer whose fixing instructions shall be strictly adhered to.

Connections to WC pans shall be effected by the use of a WC connector, gasket and cover, fixed to suit pan outlet.
Suitable supporting brackets and pipe clips shall be at maximum of meter centers
The Sub- contractor shall be responsible for the joint into the Gully Trap on Drain Trap as indicated on the drawings.

3.13 UPVC Square Rainwater System pipe and Gutter

Gutter shall be a rectilinear section 116mm or 137mm wide.

Gutters shall be supplied in plain-ended lengths

The minimum acceptable wall thickness of gutter shall be 2.20mm

Rainwater pipes shall be supplied in plain-ended lengths.

The minimum acceptable wall thickness of rainwater pipes shall be 1.80mm
Pipe support brackets must be adequate to screen expansion gaps.

The grade of UPVC used for gutter and pipe shall have a minimum softening point of 75^0C when tested by the vicat method as described in BS 2782.

The pipe and gutter shall be colour Grey, to BS 5252, 10.A. 07, black white or rustic

3.14 uP.V.C. Rainwater Fittings

All fittings shall be injection mounted and shall be compatible with pipe and gutters and shall conform to BS 456 or the appropriate Kenya Standard.

All gutters pipe and fittings shall be Colour Grey to British Standard 5252, 12.A. 07 0r black, white or rustic.

Gutter connecting fittings shall have integrally moulded seal retaining cavities housing a rubber seal of hollow section.

The fitting shall incorporate a gutter-retaining clip.

Gutter shall be supplied in plain-ended lengths.

The minimum acceptable wall thickness of gutter shall be 2.20mm

Rain water pipes shall be circular in section, 65mm nominal diameter complying in al respects to British Standard 4576 or the relevant Kenya Standard.

Rainwater pipes shall be supplied in plain-ended lengths. The minimum acceptable wall thickness of rainwater

pipes shall be 1.80mm

Pipe support brackets must be adequate to screen expansion gaps.

The grade of UPVC used for gutter and pipe shall have a minimum softening point of 75^0 C when tested by the Vicat method as described in BS 2782.

The pipe and gutter shall be Colour Grey, to BS 5252, 10.A.07. black, white or rustic.

3.15 UPVC Underground Drainage System

(a) Pipes and fitting

The pipes and fittings shall comply in all respects to British Standard 46600 & 581 or the relevant Kenya Standards.
Pipes shall be supplied in plain-ended lengths.

The minimum acceptable wall thickness of pipe and fittings will be as follows:

110mm pipe	3.0mm	
160mm pipe	3.9mm	
110mm junction only	3.50mm socket	3.80mm body
All other fittings	3.20mm socket	3.40mm body
160mm all fittings	4.30mm socket	4.70mm body

The method of jointing to be employed shall be by lip seal socketted fittings. Jointing to other materials shall be made in the manner specified by the manufacturer.

The grade of UPVC used for the pipes shall have a minimum softening point of 82^0 C when tested by the 'Vicat' method 102D as described in British Standard 2494: 1976.

Holderbats shall be made of Mild Steel protected from corrosion by galvanizing or such coating for optimum fit. To fit pipe supports a special purpose made PVC packing piece may be used.

The base of soil and vent stack connection to the below ground drain shall be made with a bend of minimum centre lines radius of 250mm.

Minor changes of direction where permitted shall be made with a variable bend that has a constant effective length.

(b) Excavation of Trenches

The installation, method of joining shall confirm in all respects to the manufacturer's site work instruction.

Trenches shall be excavated to a sufficient depth to allow a 50mm minimum bed below the underside of the pipe. Trenches width shall be not less than the outlet diameter of the plus 300mm and not wider than necessary.

(c) Trench Invert

The base of the trench shall be such that even support is given to the pipe for it's full length. Soft spots shall be removed and replaced with compacted granular material as described below. High spots and rock shall be removed to allow full 50mm-bed depth.

(d) Pipe bed

The bed shall be composed of granular material to the specification called for below and shall cover the full trench width and length and boned to gradient.

(e) Laying and jointing

Pipes and fitting shall be laid true to gradient in straight lines and joined in accordance with manufacturer's instructions. All pegs used for alignment and other purposes must be removed after use and before side filling. All joints shall be watertight complying with CP 301, Clauses 5:3

Pipe barrels shall be in continuos contact with the trench bed when laid.

(f) Side Filling

The side filling of pipes shall be composed of hard granular material, which shall be to the requirements below.

Side fillings must be placed equally on both sides of the pipe and compacted, so as to buttress the pipes against the trench walls. Side filling shall continue up to pipe crown level as a minimum and above this level if required by the Engineer.

(g) Back Filling

The first 300mm of backfill above crown level shall be taken from selected trench spoil all passing 25mm sieve. It shall be placed in two 150mm layers each firmly tramped. Above the 300mm level mechanical fillings and compaction may be used.

Where cover is less than 450mm the pipe shall be covered with 75mm of selected material laid to support a concrete tile or slab indicating the presence of a service.

(h) Granular Material for Bed and Side Fill

The material may be composed of crushed stone, clinker, quarry scalping, ballast, gravel, shingle or all-in aggregate to British Standard 882.
All material for bed and site fill shall be hard and granular passing 20mm sieve and shall contain not more than 5 per cent fines passing 3mm sieve.

The material shall have a compaction factor of 0.3 or less.

4 Valves

a) **Draw-off Taps and Stop Valves (Up to 50mm Nominal Bore)**

Draw-off taps and valves up to 50mm nominal bore, unless otherwise stated or specified for attachment or connection to sanitary fitment shall be manufactured in accordance with the requirements of BS 1010.

b) Gate Valves

All gate valves 80mm nominal bore and above, other than those required for fitting to buried water mains shall be of Cast Iron construction, in accordance with the requirements of BS 3464. All gate valves required for fitting to buried water mains shall be of Cast Iron construction in accordance with the requirements of BS 1218.

All gate valves up to and including 65mm nominal bore shall be of Bronze construction in accordance with the requirements of BS 1952.
The pressure classification of all valves shall depend upon the pressure conditions pertaining to the site of works.

c) Globe Valves

All globe valves up to and including 65mm nominal bore shall be of Bronze construction in accordance with the requirements of BS 3061.
The pressure classification of all globe valves shall depend upon the pressure conditions pertaining to the site of works.

d) Check or Non-Return Valves

All check or non-return valves 80mm nominal bore and above shall be of the swing check type of Cast Iron construction in accordance with the requirement of B.S.4090.
The pressure classification of all globe valves shall depend upon the pressure conditions pertaining to the Site of works.

e) Ball Valves

All ball valves for use in connection with hot and cold water services shall be of the Portsmouth type in accordance with the requirements of B.S.1212, constructed from Bronze or other corrosion resistant materials. These valves fall into three pressure classifications as follows: -

(i)	Low pressure	-	3.58 b maximum
(ii)	Medium pressure	-	7.72 b maximum
(iii)	High pressure	-	12.62 b maximum

The pressure classification required for each ball valve will be designated in the description of its associated equipment contained in section C of the Specification.

(f) Manually Operated Mixing Valves

Mixing valves for shower fittings and other appliances being provided under the sub-contractor Works shall be manufactured in accordance with the requirements of BS 1415 from Bronze or other corrosion resistant materials.

5 Waste Fitment Traps

a) Standard and Deep Seal P & S Traps

Where standard or deep seal traps are specified they shall be manufactured in suitable non-ferrous materials in accordance with the full requirements of BS 1184.

In certain circumstances, Cast Iron traps may be required for cast iron baths and in these instances bath traps shall be provided which are manufactured in accordance with the full requirements of BS 1291.

b) Anti-Syphon Traps

Where anti-syphon traps are specified, these shall be similar or equal to the range of traps manufactured by Greenwood and Hughes Limited, Deacon Works Littleshampton, Sussex, England.

The trade name for traps manufactured by this company is ‘Grevak’.

6 Pipe Supports

a) General

This sub-clause deals with pipe supports securing pipes to the structure of buildings for above ground application.

The variety and type of support shall be kept to a minimum and their design shall be such as to facilitate quick and secure fixings to metal, concrete, masonry or wood.

Consideration shall be given, when designing supports, to the maintenance of desired pipe falls and the restraining of pipe movements to a longitudinal axial direction only.

The Sub-contractor shall supply and install all steelwork forming part of the pipe support assemblies and shall be responsible for making good damage to builders work associated with the pipe support installation.

The Sub-contractor shall submit all his proposals for pipe supports to the Engineer for approval before any erection works commence.

b) Steel and Copper Pipes and Tubes

Pipe runs shall be secured by clips connected to pipe hangers, wall brackets, or trapeze type supports. 'U' bolts shall not be used as a substitute for pipe clips without the prior approval of the Engineer.

An approximate guide to the maximum permissible supports spacing in metres for Steel and Copper pipe and tube is given in the following table for horizontal runs.

Size Nominal s Bore	**Copper Tube To BS 659**	**Steel Tube To BS 1387**
15mm	1.25m	2.0m
20mm	2.0m	2.5m
25mm	2.0m	2.5m
32mm	2.5m	3.0m
40mm	2.5m	3.0m
50mm	2.5m	3.0m
65mm	3.0m	3.5m
80mm	3.0m	3.5m
100mm	3.0m	4.0m
125mm	3.0m	4.5m
150mm	3.5m	4.5m

The support spacing for vertical runs shall not exceed one and a half times the distances given for horizontal runs.

c) **Cast Iron and Asbestos Cement Spigot and Socket Jointed Pipes**

Cast Iron and asbestos cement socketed pipes shall generally be supported at every socket joint by means of either Holderbats secured rigidly to the structure, or purpose made scrapes for attachments to rigid steel support brackets.

When Holderbats are used, they shall conform to the requirements of BS 416. Suitable anchors shall be provided at all changes of pipe directions, junctions and tees to counteract the effect of end thrust loads.

(d) **Asbestos Cement Pressure Pipe**

Asbestos Cements pressure pipe with either cast iron detached joints or asbestos cement screw joints shall be supported and anchored on either side of the joints. The joints shall remain free.

Pipe hangers and trapeze type supports shall not be suitable for the suspension of asbestos pressure pipes unless they are designated with suitable restrictions to prevent swinging at the same time providing the necessary support requirements.

Within building, asbestos pressure pipes shall be carried either on concrete support on rigidly fixed steel wall brackets.
Suitable anchors shall be provided at all changes of pipe directions junctions and tees to counteract the effect of end thrust loads.

(e) **Concrete and Pitch Pipes**

These pipes shall not be used for above ground application.

f) **Expansion Joints and Anchors**

Where practicable, cold pipework systems shall be arranged with sufficient bends and changes of direction to absorb pipe expansion providing that the pipe stresses are contained within the working limits prescribed in the relevant BS specification.

Where piping anchors are supplied, they shall be fixed to the main structure only.
Details of all anchor design proposals shall be submitted to the Engineer for approval before erection commences.

The Sub-contractor when arranging his piping shall ensure that no expansion movements are transmitted directly to connections and flanges on pumps or other items of plant.
The Sub-contractor shall supply flexible joints to prevent vibrations and other movements being transmitted from pumps to piping systems or vice versa.

7 Sanitary Appliances

All sanitary appliances supplied and installed as part of the Sub-contract works shall comply with the general requirements of BS Code of Practice 305 and the particular requirements of the latest BS Specifications.

8 Pipe Sleeves

Main runs of pipework are to be fitted with sleeves where they pass through walls and floors. Generally the sleeves shall be of PVC except where they pass through the structure, where they shall be of mild steel. The sleeves shall have 6mm – 12mm clearances all around the pipe or for insulated pipework all around the installation. The sleeve will then be packed with slag wool or similar material.

9 Installation

9.1 General

Installation of all pipework, valves, fittings and equipment shall be carried out under adequate supervision from skilled staff to the relevant codes and standards as specified herein. The Sub-contractor shall be responsible to the Main Contractor for ensuring that all builders' work associated with his piping installation is carried out in a satisfactory manner to the approval of the Engineer.

9.2 Above Ground Installation

a) Water Services

Before any joint is made, the pipes shall be hung in their supports and adjusted to ensure that the joining faces are parallel and any falls which shall be required are achieved without springing the pipe.
Where falls are not shown on the Contract Drawings or stated elsewhere in the Specification, pipework shall be installed parallel to the lines of the buildings and as close to the walls, ceilings, columns, etc., as is practicable.

All water systems shall be provided with sufficient drain points and automatic air vents to enable them to function correctly. Valves and other user equipment shall be installed with adequate access for operation and maintenance. Where valves and other operational equipment are unavoidably installed beyond normal reach or in such position as to be difficult to reach from a small stepladder, extension spindles with floor or wall pedestals shall be provided.

Screwed piping shall be installed with sufficient number of unions to facilitate easy removal of valves and fittings, and to enable alterations of pipework to be carried out without the need to cut the pipe.

Full allowances shall be made for the expansion and contraction of pipework, precautions being taken to ensure that any force produced by the pipe movements are not transmitted to valves, equipment or plant.

All screwed joints to piping and fittings shall be made with P.T.F.E. tape.
The test pressure shall be maintained by the pump for about one hour and if there is any leakage, it shall be measured by the quantity of water pumped into the main in that time. A general leakage of 4.5 litres per 25mm of diameter, per 1.6 kilometre per 24 hours per 30 metres head, may be considered reasonable but any visible individual leak shall be repaired.

b) Sanitary Services

Soil, waste and vent pipe system shall be installed in accordance with the best standard of modern practice as described in BS 5572 to the approval of the Engineer.

The Sub-contractor shall be responsible for ensuring that all ground waste fittings are discharged to a gully trap before passing to the sewer via a manhole.

The Sub-contractor shall provide all necessary rodding and inspection facilities within the draining system in positions where easy accessibility is available.

Where a branch requires rodding facilities in a position to which normal access is unobtainable, then that branch shall be extended so as to provide a suitable purpose made rodding eye in the nearest adjacent wall or floor to which easy access is available.
The vent stacks shall terminate above roof level and where stack passes through roof, a weather skirt shall be provided. The Sub-contractor shall be responsible for sealing the roof after installation of the stacks.

The open end of each stack shall be fitted with a plastic coated or galvanized steel wire guard.
Access for rodding and testing shall be provided at the foot of each stack.

c) Sanitary Appliances

All sanitary appliances associated with the Sub-contract works shall be installed in accordance with the best standard of modern practice as described in C.P. 305 to the approval of the Engineer.

9.3 <u>Underground Installation</u>

a) General

All underground water and drainage service installations shall be carried out in accordance with the best standard of modern practice as described in C.P. 301 and C.P. 310 respectively and the following clause.

b) Sequence of Operation for Underground Service Installation

(i) Setting Out

As described in BS code of practice 301 Clause 502

(ii) Breaking Up Surface (If in Roads)

As described in BS code of practice 301 Clause 503

(iii) Excavation and Timbering

As described in BS code of practice 301 and 503 and the following:-

Excavation shall be made to such depths and dimensions as may be required by the Engineer to obtain prior falls and firm foundations. No permanent constructions shall be commenced on any bottom until the excavation has been examined and approved by the Engineer.
Should the Sub-Contractor in error or without the instructions of the Engineer make any excavation below the required level of the pipe or bed, as the case may be, then he shall be required to refill such excavation to the correct levels with concrete 1: 4 : 8 to 38mm maximum aggregate size.

The Sub-Contractor's prices shall have included for excavating in all materials met with, for trimming bottoms to the necessary falls and for any extra excavation required for planking, strutting and working space.

The Sub-Contractor shall keep the whole of the trenches or other excavations free from water and shall execute such works and install such pumps as may be necessary to keep the excavation dry at all times.

No sub-soil water shall discharge into the sewage system without written permission of the Engineer.

(iv) Laying of Concrete Beds or other Supports for Pipes

As described in BS code of practise 301 Clause 504 and the following:-

All drains below buildings and roads shall be encased in concrete 150mm thick.

Concrete beds and supports shall be concrete 1:3:6 to 25mm maximum aggregate size.

(v) Pipe Laying and Jointing

Drain pipes shall be laid and jointed as described under BS code of practise 301 clause 505.
Water pipes shall be laid and jointed as described under BS code of practice 310, Clause 401, 402, 403 and 404

(vi) Manholes

(a) General

All manholes provided under the Sub-Contract works shall be constructed of approved materials and in an approved manner, by the Main Contractor.

All manholes shall be watertight and if constructed of brickwork, solid block work or stone work, they shall be rendered internally with a cement mortar of at least 12mm thickness and finished with a smooth surface.

The sides of all channels in every manhole shall be ought up vertically to a height of not less than the diameter of the drain and shall be benched in good concrete from the top of the channels at an surface with a coat of 1:1 cement mortar.

In all other respects, manhole shall be constructed in accordance with BS code of practice 301

(b) Rectangular and Square Manholes

Rectangular and square straight through manholes shall be constructed from brickwork, solid blockwork, stone and concrete to comply with the following minimum internal dimensions (millimetres)

Depth below internal Ground of Access Outgoing shaft Invert	Size of Main Shaft Diameter	Internal Chamber Dimension SLXW	Height of Chamber above Benching	wall Thickness
Dimension SLXW				
Up to 740	100 to 150	610x460		150
Up to 740	230 to 460	760x760		150
Up to 1200	100 to 150	760x760		150
160 to 1200	230 to 460	910x910		150
1220 to 1800	100 to 150	910x910		150
1220 to 1800	230 to 460	1070x910		150
1830 to 4550 760x760	100 to 150	1370x910	1370	230
1830 to 4550 760x760	230 to 460	1370x1070	1370	230
4570 & Over 760x760	100 to 150	1370x1140	1680	230
4570 &Over 760x760	230 to 460	1370x1140	1680	230

When branches are connected into the manhole, the length and width dimension of the chamber shall be increased as follows:-

c) Length

Branch Diameter

100mm 300mm/branch on the side with most branches

150mm 380mm/branch on the side with most branches

230and 300mm 460mm/branch on the side with most branches

460mm 610mm/branch on the side with most branches

Width

Branch Diameter

100mm to 300mm for each side with branches plug

160mm 460mm or the diameter of the main drain which ever is the greater

(c) Precast Concrete Circular Manholes

Where specified straight through precast concrete manholes shall be manufactured and constructed to comply with BS 556 and the following dimensional requirements, (Dimension: Millimetres)

Depth Ground of Outgoing Invert	**Internal Access Shaft Diameter**	**Size Main Channel Diameter**	**Chamber Diameter**	**Height Chamber Above Benching**
Up to 740	-	100 to 460	910	-
760 to 2410	-	100 to 460	1070	-
2440 to 4550	-	100 to 460	1220	1370
4570 & over	760	100 to 460	1370	2680

When branches are connected into manhole the internal diameter of the chamber shall be increased as necessary up to maximum chamber diameter 1830.

(d) Steps Iron and Covers

Access shaft to manhole of depth greater than 760mm shall be provided with approved steps iron at suitable intervals. Every manhole or manhole access shaft shall be fitted with a removable airtight cast iron cover to adequate size and strength, fixed in a manner that prevents surface water gaining into the system.

Cast manhole covers and frames shall be manufactured in accordance with the requirements of BS 497 and shall generally be classified into the following categories:

Heavy Duty : For Carriageway
Medium Duty : For Footpaths
Light Duty : For domestic premises or other places where they do not have to carry wheeled Traffic.

(e) Back Drop Connections

Where the level of the branch drain entering the manhole is higher than can be suitably accommodated by the normal type benching, then the branch drain shall be connected to the manhole by means of a back drop Connection.

(f) Channels

Where the branch channel connects to the main channel in the manhole, the invert of the branch channel shall be a minimum of 38mm higher than the main channel.

(g) Testing of Pipelines

After pipelines are connected up and joints have been sealed, the pipeline shall be tested before pipes are, if

required haunched or surrounded in concrete

Methods of testing and inspection shall be in accordance with Clause 4 of the Specification.

(h) Concrete Bedding Hunching and Surround

Concrete 3 bedding, hunching and surrounding shall be provided as necessary o where called for by the Engineer in accordance with the requirements laid down in BS code of practice 301, Clause 310

(i) Backfilling

Backfilling of trenches, headings and around manholes shall be carried out in accordance with the methods described in BS code of practice 301, clause 508.

(j) Reinstatement of Surface

Following the final Backfilling of all trenches, headings and manhole surrounds, the surface of the excavated areas shall be fully reinstated to the approval of the Engineer.

Where excavation have been carried out in public highways or other areas are not forming part of the site, the sub-contractor shall be deemed to have allowed in his price for all charges associated with the temporary and final reinstatement requirements of the local of highway Authority concerned.

No Claims for extra in this respect will be accepted.

(k) Sewer Connection

Sewer Sub-contractor shall pay all charges associated with the connection by the local Authority of the drainage to the main sewer, including necessary reinstatements

10 Testing and Inspection

10.1 Site Tests – Pipework Systems

a) Above Ground Internal Water Services Installation

All water service pipe system installed above ground shall be tested hydraulically for a period of one hour to not less than one and half times to design working pressure.

If preferred, the Sub-contractor may test the pipelines in sections. Any such section found to be satisfactory need not be the subject of a further test when system has been completed, unless specifically requested by the Engineer.

During the test, each branch and joint shall be examined carefully for leaks and any defects revealed shall be made good by the Sub-contractor and the section re-tested.

The Sub-contractor shall take all necessary precautions to prevent damage occurring to special valves and fittings during the tests. Any item damaged shall be repaired or replaced at the Sub-contractor's expenses.

b) Underground Water Mains

After laying, jointing and anchoring, the main shall be slowly and carefully charged with water, so that all air is expelled and allowed to stand full for three days before testing under pressure.

A long main shall be tested in sections as the work of laying proceeds and all joints shall be exposed for inspection during the testing.

The open end of the main may be temporarily used for testing under moderate pressure by fitting a water pipe expanding plug, of which several types are available. The end of the main and the plug should be secured by struts or otherwise, to resist the end thrust of the water pressure in the main.

If the section of main terminates with a sluice valve, the wedge of the valve shall not be used to retain the water, instead the valve shall be fitted temporarily with a blank flange, or if a socket valve with a plug and the wedge shall be placed in the open position while testing . The Sub-Contractor shall provide suitable end supports to withstand the end thrust of the water pressure in the main.

c) Above Ground Soil Waste and Ventilation System

All soil, waste and ventilating pipe system forming part of the above ground installation, shall be given appropriate test procedures as described in BS 5572, 1972.

Smoke tests on above ground soil, waste and ventilating pipe system shall not be permitted.

Pressure tests shall be carried out before any work which is to be concealed is finally enclosed.

In all respects, tests shall comply with the requirements of BS 5572.

d) Underground Drainage System

A site test shall be carried out on all drainage pipes before concrete hunching or surrounds are applied. These tests shall be carried out preferably from manhole to manhole.

Short branch drains connected to a main drain between manholes shall be tested as one system with the main drain. In long branches a testing junction shall be inserted next to the junction with the main drain and the branch tested separately. After the test has been passed, the testing junction shall be effectively sealed.

Water tests shall be carried out in accordance with the methods described under BS code of practice 301, Clause 601 (b) and (c) and the test pressure shall not be less than 1,520mm head at the highest point in the pipe section and not more than 10,360 head at any point it the section.

The test pressure shall be maintained for a period of one hour during which time the pipe and joints shall be inspected for sweating and leakage. Any leak discovered during the tests shall be made good by the Sub-Contractor and the section re-tested.

In addition to pressure tests, drain pipe runs shall also be tested for straightness where applicable. This test shall be carried out in accordance with one of the two methods described in BS code of practice 301, clause 601 (e).

Testing of manholes shall be carried out in accordance with the methods described under BS code of Practice 301, clause 602 (f)

(e) Above Ground Soil Waste and Ventilation System

All soil waste and ventilating pipe system forming part of the above ground installation, shall be given appropriate test procedures as described in BS 5572 1972

Smoke tests on above ground soil, waste and ventilation pipe system shall not be permitted.

Pressure tests shall be carried out before any work, which is to be concealed, is finally enclosed.

In all other respects, testes shall comply with the requirements of BS 5572.

10.2 <u>Site Test – Performance</u>

Following satisfactory pressure test on the pipework system, operational tests shall be carried out in accordance with the relevant BS Code of practice on the systems as a whole to establish that special valves, gauges, control, fittings, equipment and plant are functioning correctly to the satisfaction of the Engineer.

All hot water pipework shall be installed with pre-formed fibre glass lagging to a thickness of 25mm where the pipe runs above a false ceiling or in areas where the ambient temperature is higher than normal with the result that pipe “sweating”, due to condensation will cause nuisance.

All lagged pipes which run in a visible position after erection shall be given a canvas cover and prepared for painting as follows:

i) Apply a coating of suitable filler until the canvas weave disappears and allow to dry.

ii) Apply two coats of an approved paint and finish in suitable gloss enamel to colours approved by the Engineer.

All lagging for cold and hot water pipes erected in crawl ways, ducts and above false ceiling which, after erection are not visible from the corridors of rooms, shall be covered with a reinforced aluminium foil finish banded in colours to be approved by the Engineer.

In all respects, unless otherwise stated, the hot and cold water installation shall be carried out in accordance with the best standard of modern practice as described in C.P.342 and C.P.310 respectively to the approval of the Engineer.

The test pressure shall be applied by means of a manually operated test pump or, in the case of long main or mains of large diameter, by a power driven test pump which shall not be left unattended. In either case precautions shall be taken to ensure that the required pressure is not exceeded.

Pressure gauges should be recalibrated before the tests.
The Sub-contractor shall be deemed to have included in his price for all test pumps, and other equipment required under this specification.

The test pressure shall be one and a half times the maximum working pressure except where a pipe is manufactured from a material for which the relevant BS specification designates a maximum test pressure.

11 Sterilization of Hot and Cold Water Systems

All underground and above ground water distribution systems cisterns, tanks, pumps etc shall be thoroughly sterilized and flushed out after the completion of all tests and before being fully commissioned for handover.

The sterilization procedures shall be carried out by the Sub-contractor in accordance with the requirements of BS Code of Practice 301, Clause 409 and to the approval of the Engineer.

12 Water Mains

12.1 Piping

All piping shall be plain ended and suitable for use with flexible mechanical couplings (e.g. Viking Johnson, Dresser or Gibault). Steel pipes shall comply with BS 534-Galvanised steel pipes for distribution system shall comply with BS Galvanized steel pipes for distribution system shall comply with BS 1387-1967 medium tubes and be supplied with flanges on pipes 75mm diameter and over.
All pipes less than 75mm diameter shall be screwed and socketed, unless otherwise stated.

12.2 U.P.V.C Pipes

UPVC piping shall be in accordance with BS 3505: 1968.

The maximum sustained working pressure to which the pipes and fittings will be subjected is based on water at a temperature of 20^0 c.
The Contractor shall submit full details of the colour of the pipe he intends to supply. The Colour of the pipe shall be such as to meet the requirements of Clause 2 ‘material’ and Clause 8.5 ‘opacity’ of BS 3505.

The pipes up to and including 50mm diameter shall be of solvent weld type. The pipe shall be supplied with interchangeable sockets pre-formed at the factory and of such internal diameter that it takes the plain and of the pipe with same nominal diameter.

The joints shall sustain the end thrust to which the pipe shall be submitted. The contractor shall supply sufficient quality of the cleaner and adhesive which shall be required to make the joints with the pipes.

The pipes of 75mm diameter and over shall consist of a grooved socket at one end of the pipe. The socket shall be

designed to give a clearance fit on the outside diameter of the parent pipe. The sealing medium that shall seat in the groove shall be a rubber ring.
If the formation of the socket and groove results in the thinning of the original wall thickness of the pipe, it shall be compensated for by shrinking the outside of the socket area as by reinforcing sleeve of the same material as the pipe.

The socket and groove shall incorporate no sharp angles where the stress points are created.

The socket and groove shall incorporate no sharp angles where the stress points are created.

The joint shall take 10% deformation of the spigot at the point where the stress points where it enters the socket without leakage from the pipe when subjected to the test pressure specified for the pipe. Thermal expansion of the pipe shall be accommodated in the joint. The joint shall be capable of lined deflection up to 30^{o}.

The sealing ring shall supply be of the first grade natural rubber and the physical properties of the mix shall meet the requirement of BS 2494.

The contractor shall supply sufficient quantity of any lubricant or other material that shall be needed to make the joint, which shall be assembled by hand.

The fittings shall have the same type of joint and or the pipes to be used. The contractor shall submit full lists of the materials, dimensions and test pressures of the fittings offered.

Precautions shall be taken to avoid damage of the pipes and fittings.

In handling and storing the pipes and fittings, every care shall be taken to avoid distortion, flattening, scoring or other damage. The pipes and fittings shall not be allowed to drop or strike objects. Pipe lifting and lowering shall be carried out by approved equipment only. Special care shall be taken in transit, handling and storage to avoid any damage to the ends.

All jointing of pipes and fittings shall be carried strictly in accordance with the manufacturer's instructions.

12.3 Manufacturer's Instructions

The contractor shall be responsible for obtaining copies of any manufacturer's instructions for pipe joining and shall familiarize himself and his employees with these instructions.

All necessary tools and equipment required for laying, jointing and testing of pipes and joints shall be provided by the contractor at no extra cost.

12.4 Fittings and Specials for Galvanized Steel Pipes

All specials shall be of such dimensions as will meet with piping supplied. Screw down stop valves shall comply with BS 1010. Specials shall comply with BS 1740.

12.5 Flanged Adaptors and Flanges

Flanged adaptors shall be piece suitable for connecting a flanged sluice valve to the type of piping supplied. All flanged or special shall conform to BS 10 part 1 and shall be drill to Table 'C' and machined across the faces. The flanged adaptors shall comply with BS 78 and BS 3961. All PVC flanged shall be supplied with metal backing rings jointing of flanges shall be carried out using the joint rings, bolts and washers as necessary.

12.6 Tees

The spigot ends of all tees shall be suitable for connection to the pipework supplied using the aforementioned flexible mechanical joints and branches shall be flanges drilled to BS 10 table 'C'.

12.7 Hydrants

Hydrants shall comprise a 75mm sluice valve and a 75mm Duckfoot bend with gunmetal screw connection to detailed drawings. These specials shall comply with the requirements of BS 750: 1964.

12.8 Gate Valves

All gate valves 80mm nominal bore and above, other than those required for fitting to buried water mains shall be of cast iron construction, in accordance with the requirements of BS 3464.
All gate valves required for fitting to buried water mains shall be of cast iron construction in accordance with the requirements of BS1218.

All gate valves up to and including 65mm nominal bore shall be of bronze construction in accordance with the requirements of BS 1952.
The pressure classification of all valves shall depend upon the pressure conditions pertaining to the site of works.

12.9 Air Valves

Air valves shall be of cast iron conforming to BS 14 52 Grade 14. They shall not be suitable for working pressure nor less than that specified for the class of pipe to which they are connected.

12.10 Ball Float Valves

Ball float valves shall be to BS 1212 parts 1 and 2 shall be suitable for working pressure not less than the working pressure for the class of pipe specified for connection to the ball float valve.

12.11 Non-Return Valves

Non-return valves shall be of cast iron with flanges and shall conform to BS 4090: 1966.

12.12 Stop Cocks

Stopcock up to 50mm diameter shall be brass and shall conform to BS 1010 part 1: 1959 part 2;1973.

12.13 Rubber and Insertion Jointing

Rubber and insertion jointing for flange jointed shall comply with BS 2494 part 1 and no jointing rings shall be used in the contract, which have not been supplied by manufacturers approved by the Engineer.

12.14 Bituminous paints

All bituminous or tar paints for protection of buried steel bolts, pipes specials etc. shall be the best of their respective kinds manufactured by approved makers.

12.15 Steel Pipe and Fittings for Rising Main

All piping shall be plain ended and suitable for use with flexible mechanical couplings (e.g. Viking Johnson, dresser) The grade of steel used shall comply with the requirements of BS 3601: 1964. Pipes shall be welded or seamless and shall conform to BS 534: 1966 or an equivalent acceptable standard.

All pipes shall be externally and internally protected with bitumen in accordance with clauses 5.4 and 5.5 of BS 534: 1966.

The external protection shall be reinforced with oven glass, cloth glass , tissue wrapping or by other approved material.

The ends of all bitumen lined pipes, fittings and specials shall be closed by means of discs or other suitable covers firmly held in place.

12.16 Drain-Off Taps, Stops Valves for Water Services

Fittings for mains of size 50mm or under shall comply with BS 1010. Samples must be submitted to the Engineer for approval prior to installation of fittings.

12.17 Storage of Plants and Material

The contractor shall, at his own expenses, make arrangements for dumps along the route of the pipe line for a storage of pipes, his plant and materials to suit his own convenience, but such arrangements shall be subjected

to the Engineer's approval.

12.18 Loading, Handling and Conveying of Pipes

The contractor shall before commencing to lay the pipes, valves or other materials examine them and ascertain that they are in perfectly sound condition and he shall be responsible for any laying. The stocking of pipes and specials on site, loading and unloading etc. shall be carried out to the satisfaction of the Engineer.

12.19 Interferences with Fences, Drains, Pipes, Property etc.

The contractor shall ensure the proper reinstatement of fences, drains, telephone lines, KP&LC. Cables etc where affected by his work. All service shall be adequately protected and propped to the satisfaction of the Engineer. The contractor shall be liable for any damage caused to the service due to his failure to provide adequate protection.

12.20 Method of Excavation

a) The Contractor shall excavate the pipe trenches in the line and to the depths indicated by the Engineer. Except where otherwise indicated on the Drawings or indicated by the Engineer, it is intended that the trench shall be excavated to such a depth as will allow of a minimum cover of 5000mm over top of the barrel of the pipe when laid plus or minus a tolerance of 75mm either way. All trenches shall be excavated in open cuttings.

b) Where the trenches passes through grassland, arable land or garden, whether enclosed or otherwise, the turf, if any shall be pared off and stalked, and the productive soil shall be carefully removed for a width of 600mm greater than the nominated trench width or equal to the overall width of track of the excavating machine, whichever is greater, and laid aside to be subsequently used in reinstating the surface of the ground after the trench has been refilled.

c) The bottom of the trench shall be property trimmed off, and all low places or irregularities shall be where rock or large stones are encountered, they shall be cut down to a depth of at least 75mm below the level at which the bottoms of the barrel of the pipes are to be laid, and covered to a like depth with materials, so as to form a fine and even bed for the pipe.

d) Joints holes shall be excavated to suit minimum dimension as to allow the joints to be well and properly jointed.

e) The pipe trench shall be kept clear of water at all times.

f) The contractor shall whenever necessary by means of timbering, or otherwise support the sides of the trench so as to make them thoroughly secure, and afford adequate support to adjoining roads, lands, buildings and property during the whole time the trench remains open and shall remove such timbering or other work shall be deemed to be included in the rate for excavation. Incase the Contractor is instructed by the Engineer to leave any portion of such timber in position, he will be paid for it accordingly.

g) The cleared width inside the timbering in the case of single pipes shall be at least 320mm in excess of the external diameter of the pipe be laid, in order to allow it to be freely lowered into position, in the trench without damage to the external protection.

h) Where more than one pipe is to be laid parallel, then the clear width inside the timbering shall be at least 520mm in excesses of the combined external diameters of the pipes.

i) Should the excavations be taken out to a greater depth than is specified the bottom shall be made good to the correct level with mix 1:3:6 concrete or other materials approved by the Engineer. No payment shall be made for any other excavation carried out by the contractor and the coat of filling up to required levels.

j) If a mechanical excavator is used by the contractor, he shall indemnify the employer against all claims for damages that in the opinion of the Engineer, may be caused by the use of this plant. When a mechanical excavator is used the bottom 230mm of excavation shall be got out by hand to ensure an

even bed for the pipes.

12.21 Main Laying

Mains shall be laid in straight lines and/or smooth curves as indicated on the drawings. The vertical profile of the pipes shall be to even gradients. Any pipes not so laid shall be removed if so directed by the Engineer, and re-laid in proper manner at the contractor's expense.
In laying the pipes and specials, care shall be taken not to damage the protective linings and the pipes shall be handled with tackle as directed by the Engineer.

The pipes and specials shall be slug and sounded with hammer for flaws before they are lowered into trench. After the pipes or specials have been checked they shall be cleaned internally and carefully lowered into trench and set to proper gradient and line so that is a continuos rise from each washout to air valve.

12.22 Temporary Bench Marks and Sight Rails.

The contractor shall fix rails for use with boning rods at intervals of not more than 65 meters and temporary Bench mark related to the survey of Kenya Datum shall be provided at intervals as directed by the Engineer.

12.23 Curves and Bends

Large diameter curves of main shall wherever possible be formed by giving a set not exceeding 30 to each joint, bends being used only where large diameter curves are not possible.

12.24 Cutting of Pipes

The contractor shall, subject to approval of the Engineer, cut pipes to such lengths as directed. Pipes should be cut off clean and square while the axis cuts should be made with an approved cutter from rotary cutting machine, engineer may approve cutting by oxyacetylene cutters.

12.25 Flanged Joints

In laying pipes and specials with flanged joints, flanges shall be brought together and bolted with the faces absolutely parallel. A rubber jointing ring 3mm thick shall be used in each flange joint and one washer with each bolt. The ring shall be a strip ring lying within the bolt circle and full flange width ring.
The bolts shall be tightened up gradually and equally in customary manner in order to distribute the stress evenly over the flange.

12.26 Surface Boxes

Sluice valves, air valves and fire hydrants shall be covered with surface boxes in accordance with details as shown on the Drawings. In roads and footpaths the boxes shall be laid flush with the surface.

12.27 Fixing of Valves, Air Valves and Washouts Pipes

The contractor shall fix the sluice valves, air valves, washout pipes pipes complete with iron casing for spindles and surface boxes in accordance with and in position shown on the drawings. As far as possible the cutting of pipes for this should be avoided.

12.28 Support and Anchor Blocks

Concrete mix 1:3:6 shall be placed around and against bends and other specials in trenches.

12.29 Colour Coding

All underground pipes are to be wrapped with adhesive plastic tape at each meter in colours blue for drinking water and green for untreated water. All pipework above ground and valves in valve chambers and pits are to be painted in similar colours.

12.30 Lettering

The lettering for sluice valves, fire hydrants, air valve and washout abbreviated SV FH and WO respectively shall be in accordance with the detail shown on the Drawings colour as detailed hereafter: -

Untreated water:	White lettering on green background
Drinking water:	White on blue background
Fire Hydrant:	White lettering on yellow background

12.31 Testing

a) The test pressure shall be one and a half the maximum working pressure except where a pipe is manufactured from a material for which the relevant BS specification designates a maximum test pressure should not exceed 120,180 and 240 meters/head for clause B, C, or D pipes, respectively.

The pump shall maintain the test pressure for about one hour and if there is any leakage it shall be measured by the quantity of water pumped into the main that time.

b) When a section of the mains has been jointed, the ends shall be closed with caps, plugs or flanges, which must be strongly strutted against a solid backfilled rammed as hereinafter and as shown on the Drawing, for it's whole length so as to cover the mains to a depth of not less than 500mm, except at the joint holes which shall be kept clear of all backfiring, if necessary by the use of timbering, so that each joint is left fully exposed for inspection. No backfililng will be permitted before testing of each section.

As long a section of main as possible shall be tested at one time subject to the maximum length of open trench approved by Engineer or permitted by the Highway Authority, and the test shall be carried out within 12 working days of the completion of such sections of mains.

Where a main is laid across a road or in such a position as to interfere seriously with the normal use of the road, the contractor may, with the consent of the Engineer and at his own risk, fill in such joint holes as may be necessary.

He shall at his own expense, re-excavate any or all joint holes necessary to locate a leak and carry out repair work should the results of his hydraulic test prove unsatisfactory.

The section shall then be filled with mains water, great care being taken to drive out all air through air valves, ferrules or otherwise to the approval of the Engineer.

c) After the section to be tested has been charged and all air liberated it shall standing underrate moderate pressure for several days' final airing. The leakage from the mains and connections from each section tested shall not exceed 4 litres per 25mm diameter of main, per 2Km. Length each 24 hours, every 30 meters head of pressure, and any visible individual shall be repaired.

To determine the rate of leakage, the contractor shall furnish a suitable hydraulic test pump, pressure gauge, connection and water meter or other appliance, for measuring the amount of water pumped.
If the leakage were at a greater rate than that specified, the contractor should re-excavate the trench where necessary and shall remake the joints and replace defective work until the leakage shall be reduced to the allowable amount.

d) The employer shall charge the contractor the cost of any coupling required to join up tested lengths of main if, in the Engineer's opinion, greater lengths could reasonably have been tested or if failure under test requires the pipe to be cut, or other methods of laying should have been adopted.

The contractor shall supply water used by the contractor in testing the main.
The contractor shall carry out all work, which may be necessary for making temporary connections to the existing mains to obtain water for testing at his own expense.

e) In carrying out the test for waiter tightness only the Engineer shall authorize the operation of all valves, but the contractor shall provide all the necessary labour to assists in the opening and closing of the valves to the Engineer's instructions and he shall allow in his price for all his expenses in connection with testing on completion.
The Engineer shall be the sole judge of water tightness.

12.32 Cleansing and Sterilizing the Main

When a pipeline is complete and where applicable, has successfully passed the test it shall be thoroughly washed out using, if possible, an open end. Thereafter it shall be sterilized by being filled with a suitable solution containing not less than 20p.p.m. of free available chorine or such other Sterilizing agent as the Engineer shall approve. After standing for 24 hours the main shall again be washed out and refilled with mains water prior to the taking of Bacteriological samples.

The contractor shall provide all necessary stop-ends fittings and chemicals for this work.

Emptying and washing out of the pipes shall be done in such a manner as not to damage the trench or cause due flooding of vicinity, and the contractor shall supply and use such piping, specials and/or hose as may be necessary to facilitate the flow of water to the nearest drain or watercourse. Water used for washing out and sterilizing will be supplied by the employer.

Before any section of the mains is put into use, bacteriological samples will be taken by the Engineer's representatives and only on the receipt of a satisfactory certificate from the medical Research Laboratory of the Employer will the main or section of main be permitted to be put into supply and be considered as having been substantially completed.

Any expenditure involved in Providing facilities or materials for taking of samples shall be included in the contractor's tendered rates and Engineer will specify and shall be sole judge as to the number of sample required and points at which they are to be taken.

The cost of the Bacteriological Examination will be borne by the employer but if the sample and samples are not satisfactory the cost of any subsequent analyses will be borne by the contractor.

12.33 Clearance of Site

The contractor shall remove all surplus pipes, special and other fittings from the site as directed by the Engineer. The site of works shall be leveled and all surplus excavation, debris, cut trees or bushes shall be carted to the approved tip sites.

12.34 Existing Installations

a) Cold Water

Where pipes for cold water are to be connected up to existing installations, the condition of the existing installation is to be reported to the Engineer in order to establish if part of the existing installation is to be replaced.

b) Sanitary Fittings

Where existing sanitary fittings are to be removed or replaced, the fittings are to be removed with utmost care and fittings and taps to be handed over to the client.

c) Sealing Off Existing Drains and Manholes

Existing foul, surface water and subsoil drains exposed during progress of work are to be recorded and reported for investigation by the Architects. Where not required to be removed, seal off with concrete or grout solid as directed. Seal o connection to manholes, demolish wall to 50mm below surrounding ground level and fill remainder of manhole with consolidated approved rubber and cover to level of surrounding ground as directed.

13 Cold Water Storage Tanks

Cold-water storage tanks shall include the ball valves and connectors for inlet, supply, washout, and overflow and may also include in his pricing the price of the overflow and amount pipes to a place to be indicated by the Engineer. He shall also include the washout valve.

Where paint is required the sub-contractor shall use the paints, which will not be toxic.
The tanks shall be manufactured to the following British Standards: -

(a) Galvanized Mild Steel tanks to BS 417
(b) Sectional Steel tanks to BS 1564

Where non-standard sizes shall be used, they shall be manufactured to the relevant standard but with the approval of the Engineer.

14 Water Heaters

Electricity Heated

Non-pressure and low-pressure types domestic electric water heaters shall comply with BS 843:1964. High-pressure types shall be of a standard not less than the appropriate BS

Domestic heaters shall, if nothing else is pacified with 25mm thick fibreglass lagging and enclosed in the corrosion-proofed steel, finished in white stove enamel and be similar to manufactured ' HEATRAE'

Electric thermostatically controlled immersion heaters shall comply with BS 3456 section A8:1963 and C.P. 324. 202:1948.

Purpose made storage water heaters of the specified size shall comply with BS 853 and shall be to the specified working and test pressure. The heaters shall be provided with all necessary bosses, coils etc, and shall be hot dip galvanized after manufacture. Installation shall, if nothing else is specified, be fiberglass to the specified thickness with finish suitable for painting.
Domestic heaters for floors mounting shall, if not provided with legs, be mounted on a minimum 100mm high concrete plinth.

Floor mounted purpose made heaters shall be provided with minimum 225mm high legs of sufficient strength welded to the heaters and to suitable floor plates. Before galvanizing, wall mounted heaters shall be supplied with all necessary brackets.

15.0 Electrical Services

Suitably rated control panels shall be supplied and installed as part of this section of the Contract to meet the starting and operating characteristics of the fan, and motors.

The panels shall be either wall or floor mounted to suit the specific area and requirements. Power supplies to these panels shall be extended from adjacent isolating switches to be provided under the electrical services section of this Contract. Complete co-ordination shall be maintained with the electrical services to ensure supply and termination details are satisfactorily carried out to suit the plant and installation requirements.

15.1 Motor Control Panels

All starters, control equipment and the like shall be enclosed in purpose made sheet panels. The panels shall be installed within the plant rooms to suit the dimensions of the actual panels. All details of the panels and layouts within the plant shall be to the approval of the Engineer and shall include:

- Triple pole isolating switch removable neutral link and HRC fuses.
- Control circuit fuses of the HR cartridge type
- Under voltage release, adjustable and complete tower to allow for voltage associated with the electrical supply and motor starting.
- Over voltage protection, details to be agreed.
- Ammeter of the moving iron mounted on panel with selector switch.
- Pilot lamp, green.
- Rotary switch for HAND/OFF/AUTO operation, where required. Removable neutral link of heavy section copper.
- Motor winding over-temperature release. The Contractor shall provide this feature in conjunction with the specified thermistor protection
- Duty selection switches.
- Manual stop-start button units to operate in conjunction with rotary switch.
- Hours run meter/counter.

The Contractor shall allow at present for the contractors to re-close automatically on the restoration of the mains voltage. This requirement shall be subject to further discussions with the Employer to suit the Diesel plant and the mode of operation of electrical supplies.

All starter panels shall include sufficient miniature circuit breakers, with neutral bar, to supply auxiliary or associated equipment. One 30TP and one spare 15TP MCBs shall be included as spares.

All starter panels, motor starters and controllers shall comply with BS 587. Enclosures shall be rigid, at least 1.6mm thick, with rolled corners stiffened as necessary, dust-proof, vermin-proof, damp and corrosion protected with a grey colour stone enamel or other approved finish, fully tropicalised, with washable air filters. Instruments, gauges, ammeters, indicator lamps, etc shall be flush mounted. Panel doors shall include isolating switches to prevent them being opened unless the switches are in the off position. Each door shall be provided with a lock, and three sets of keys for all panel door locks shall be handed over to the Engineer.

Terminals for all outgoing main and control cables shall be marked and positioned so that the cables may be carried to the outlet from the panel without crossing or being carried round the panel. Terminal numbers and markings shall correspond to those used on connected equipment and wiring diagrams. All internal interconnecting wiring between individual units and the terminal chamber shall be carried out by the panel manufacturer.

Each panel shall be provided with a main isolator so that the whole panel may be completely isolated.

The Contractor shall determine all motor starter requirements and associated auxiliaries and controls prior to manufacture and shall submit the design and circuit diagrams to the Engineer for approval.

Contractors shall determine all motor starter requirements and associated auxiliaries and controls prior to manufacture and shall submit the design and circuit diagrams to the Engineer for approval.

Contractors shall be of air-break type BS 5424 Part 1 and/or BS 587, and shall be provided as follows:

- Magnetic blow-outs and air chutes on each pole.
- Renewable hard drawn copper contacts.
- Auxiliary contacts for remote control.
- Continuously rated operating coils, (Max 240V)
- Thermal overload protection device incorporating single phasing protection.

Starters shall be rated as follows:

Ordinary duty - For motors which will run continuously for periods in excess of two hours.

Intermediate duty - For motors under automatic control other than time controls. When the intervals of operation are greater than two hours.

Starters shall be of the following type:

- Up to and including 4KW motor: Single phase on/off with overload protection (D.O.L.).
- Over 4 kW and up to 15 kW: Star Delta starter.
- For starters incorporating reduced voltage starting the changeover of voltage shall be automatic.

Terminals shall be accessible and shall be provided with adequate clearance between phases and between phases and earth. Where starters are not enclosed in a composite panel, an integral isolating switch as specified for control panels shall be provided. Where electric motors are either not visible from the control panel or are located more than 10m distance they shall be provided with a local lock-off stop control circuit switch, or a main circuit isolator where there is

no control circuit. A weatherproof lock-off stop control circuit switch shall be provided for motors located externally or otherwise exposed to the weather.

15.2 Motors

Motors shall comply with BS 816 Part 1 and shall be arranged for conduit entry.

Motors shall be fitted with locating type bearings and/or heavy thrust bearings at the non-driven and collar type at the drive end. Motors shall be of the totally enclosed fan cooled type, tropicalised to BS 5000 Part 99 suitably finished to resist corrosion by fluids or fumes. The rating of all motors shall be chosen to provide continuously the maximum power requirements of the plant. The motors shall be of the standard induction type. They may be of the squirrel cage, horizontal or vertical spindle type of all to the approval of the Engineer.

Vertical spindle type motors shall be provided with substantial canopies of approved design.

The locked rotor current shall be stated on the name plate of each motor and shall be not more than six times the full load current.

Thermistors shall be fitted to all motors above 5 kW. They shall be fitted during manufacture and their ends shall be brought out to additional terminals on the connector block of the motor.

All motors shall be rated 3 phases. 415 volt or single phase, 240 volt. high power factor continuous maximum rating complying with BS 5000 Part 99 and Class F insulation complying with BS 2757 unless otherwise specified. All motors larger than 4 kW shall be three phase.

All three phase motors shall be supplied with six stud terminals with each end of the stator phase windings connected, terminals shall be of suitable size to accept the cable lugs of the feeding cables. Terminal blocks shall be mounted on the side of the motor case in an approved box complete with lid, gasket and tapped ET entry hole.

Rubber installation shall not be used on coil connections. Each motor shall be fitted with cable terminals and glands to accept the specified types of cable.

No motor shall run at a speed higher than 1500 rpm unless otherwise specified. Motors driving through Vee-belts shall be fitted with slide rails. The power factor shall not be less than 0.9 lagging. All motors shall be from the same manufacturer as far as possible.

15.3 Cabling and Wiring

The Contractor shall carry out all power and control wiring including LV and ELV or any other voltage for the control equipment and alarm systems and interconnecting wiring between starter panels, remote control items, and motor units as required.

Cabling shall be carried out in PVC insulated, PVC sheathed, single wire armoured and PVC sheathed overall cable, using compression type glands provided with means of securing armoured wires within the body of the gland, under armour moisture seal and outer sheath seal.

Each core termination shall be fitted with a plastic ferrule engraved with an identification corresponding to the wiring diagrams.

Multicore control cables to the remote stop, start allow water cut-out/ alarms shall be 0.62mm^2 PVCSWAPVC where external to the pump station and PVC/PVC or similar, where internal. All cables, whether internal or external being suitably protected.

All conductors shall be copper and the installations, both internal and external being carried out in accordance with the regulations and by-laws previously stated. Trenching and the fixing of cables shall be in accordance with locally specified standards details of which have been specified within the subcontract documents for the electrical services. These details can be made available upon request should the Contractor not be familiar with these requirements.

Details of the ratings, types and methods for all cables and wiring to be supplied under this sub-contract shall be submitted with the tenders, wiring, PVC single core shall be run in either galvanised conduit or galvanised trunking of suitable sizes where surface in plant rooms and heavy gauge PVC were cast into walls, slabs etc.

PART C: PARTICULAR SPECIFICATIONS FOR PLUMBING AND DRAINAGE INSTALLATIONS

1 Introduction

The specifications cover the execution of Plumbing and Drainage installations and should be read in conjunction with other relevant specifications, drawings and contract documents issued to the contractor in conjunction with the sub-contract.

2 Included in the Sub-Contract

The works include, unless otherwise specified, supply delivery, installation, testing and commissioning, cleaning-up and setting to work all the installations described in the specifications and as shown on the contract drawings.

The provisions of all labour, materials, tools instruments testing apparatus and scaffolding necessary to execute the work in a first class manner, even such labour materials instruments or apparatus which are not specifically mentioned in the contract but are necessary for the satisfactory completion of the work, including such elements as:-

- Cold water supply pipework and fittings to the water storage tanks from the existing water mains.
- Water storage tanks complete with all necessary covers, fittings, washout and overflow pipes and supports. The subcontractor is expected to take the overflow and washout pipes to a reasonable discharge point.
- The water supply pipework to the functional and sanitary as shown on the drawing plus the necessary fixing support and jointing materials from the water storage tanks.
- The sanitary and operational fittings together with the fixing supports and jointing of the supply and discharge pipes.
- The waste and soil pipework from the sanitary and operational fittings to the first manhole including all fixing, supports and jointing materials.
- All cutting away and all making good will if nothing else is specified, be carried out by the main contractor but it will be the responsibility of the sub-contractor to ensure that this work is kept to a minimum, be responsible for the correct marking out of all chasers and holes; and will provide also necessary details to the main contractor.
- The sub-contractor shall also be responsible for ensuring that runs for floor or wall chases, holes ton be cut or left will be marked out at the appropriate stage of structural work.
- The sub-contractor shall undertake all notifications demanded by the Authorities in order to comply with current regulations and produce all certificates, if any, the authorities without extra charge.
- The sub-contractor shall as part of his tender supply all necessary information such as manufacture, catalogue or type numbers, bronchures or copies of catalogue pages, weight and all other relevant information which are necessary to classify the equipment tendered for.
- All other material labour, tools instruments, scaffolding, etc, which are necessary for completion in a first class manner of the plants to the Engineer satisfaction. Excluded are only materials and workmanship especially mentioned herein as " Excluded from this Sub-contractor"
- The sub-contractor shall include for cables, pipes etc from central facilities to working area.
- Provide the Engineer for his approval complete working and manufacturing drawing as specified.
- Commissioning and testing of the plants as specified.
- Supply of complete operation and maintenance manuals as specified as well as adequate instruction of the client's maintenance personnel as specified.
- The sub-contractor shall include for full maintenance during initial maintenance period as specified.

3 Excluded from the Sub-Contract

- All concrete works, inclusive of necessary holes, plinths etc

- All block work inclusive of necessary holes (to be marked by the Sub-contractor) etc

- All electrical wiring up to and inclusive of isolators and switchboards.

- The main contractor will provide central located facilities for supply of water and power during the construction period.

4 Extent of the Sub-Contractor's Duties

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

Any item or material found to be defective shall be replaced by the sub-contractor within seven days of his being notified and any result of defective workmanship shall be repaired including supply of new parts if necessary, immediately upon being notified.

The sub-contractor shall furnish at his own cost any samples of material or workmanship required for the sub-contract works, that may be called for by the Engineer for his approval, and the Engineer may reject materials or workmanship not in his opinion up to the approved standard. The sub-contractor shall allow in his prices such samples.

The sub-contractor shall when authorized in writing by the Architect or the Engineer, make variations from the specifications and drawing. No profit will be allowed on omitted items or works.

The sub-contractor shall submit to the Architect or to the Engineer claims for any work for which he considers demanding extra payments before the beginning of such work.

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

The sub-contractor shall request any alteration to the building structures within 30days of the awarding of the sub-contractor. Only such alteration as deemed unavoidable by the Engineer will be considered.

The sub-contractor shall collaborate with the Engineer and the main contractor in planning the installation before work is commenced. Particular care shall be taken to ensure that there is close collaboration with the other sub-contractors when installing services.

The Engineer and Architects shall have full rights to inspect the work in progress and all materials equipment for use in the installation prior to it's erection whether these are on site or the sub-contractor's workshop.

The sub-contractor shall allow for all reasonable access to the works for this purpose.
Where large items of equipment are to be installed, the sub-contractor shall advise the main contractor in good time so that access is provided for installation before work is commenced on site.

The sub-contractor or his responsible representative shall be in all site meetings as and when required in order to discuss the works, make necessary decisions, receiving relevant instructions and to confirm fulfillment of time schedules.

5 Finish Painting

When all the installations have been set to work, tested and commissioned, the sub-contractor shall prime the pipework with an undercoat and paint 2 No. coats of paints in accordance to BS 1710 Colour coding and to the satisfaction of the Engineer and the Architect.

PART D: PARTICULAR SPECIFICATION FOR THE SUPPLY AND INSTALLATION OF PORTABLE FIRE EXTINGUISHERS

1. General

The particular specifications details the requirements for the supply, installation and commissioning of the portable fire extinguishers which shall conform to BS 5423:19 77. The sub-contractor drawings but which are necessary for the completion and satisfactory function of the equipment.

2. Scope of works

The sub-contractor shall supply, deliver, erect, test and commission all the portable fire extinguishers which are called for in this specification and shown on the contract Drawings and listed in the Bills of Quantities.

3. Water/CO_2 Fire Extinguishers

The portable 9-litre water filled CO_2 cartridge operated portable fire extinguishers shall comply with BS 1382: 1977.Unless manufactured with stainless Steel, bodies shall all have internal surfaces completely coated with either a less tin, lead alloy, or zinc applied by hot dipping. There shall be no visibly unallocated areas.

The extinguishers shall be clearly marked with the following: -

a) Method of operation

b) The words '**WATER TYPE'(GAS PRESSURE)** in prominent letters

c) Name and address of the manufacturer or responsible vendor.

d) The nominal charge of the liquid in imperial gallons and litres

e) The liquid level to which the extinguisher is to be charged

f) The year of manufacture

g) A declaration to the effect that the extinguisher has been tested to a pressure of 350 lb/sq in (24.1 bar).

h) A declaration to the effect that the extinguisher has been tested to a pressure of 350 lb/sq in 24.1 Bar)

i) The number of the British Standard "BS 1382" or " BS 5423"

4. Portable Carbon Dioxide Fire Extinguishers

The portable carbon dioxide fire extinguishers shall comply with BS 3326: 1960 and BS 5423: 1977

The body of the extinguishers shall be a seamless steel cylinder manufactured to one of the following British Standards, BS 1287 or BS 1288.

The filling ratio shall comply with BS 5355 with Valves fittings for compressed gas cylinder to BS 341. Where a hose is fitted it shall be flexible and have a minimum working pressure of 300 lb/sq in (206.85 bar), the hose is not to be under internal pressure until the extinguisher is operated.

The nozzle shall be manufactured of brass gunmetal, Aluminium or Stainless Steel and may be fitted with a suitable valve for temporarily stopping the discharge if such means are not incorporated in the operation head.

The discharging horn shall be designed and constructed so as to direct the discharge and limit the entertainment for air. It shall be constructed of electrically non-conductive material.

The extinguishers shall be clearly marked with the following:

a) The words; 5kg carbon dioxide fire extinguishers and to include the appropriate nominal gas content.

b) Method of operation

c) The word “Re-charge immediately after use”

d) Instruction for periodical checking

e) The number of the British Standard BS 3326: 1960

f) The manufacturer’s name or identification markings.

5. Dry Powder Portable Fire Extinguishers

The portable dry powder fire extinguishers shall comply with BS 3465: 1962 and BS 1449 or aluminium to BS 1470: 1972 and shall be suitably protected against corrosion.

The dry powder charge shall be non-toxic and retain it’s free flowing properties under normal storage conditions. Any pressuring agent used as an expelling shall be in dry state; in particular compressed air.

The discharge tube and gas tube if either is fitted shall be made of steel, brass, copper or other not less suitable materials. Where a hose is provided it shall not exceed 1.060m and shall be acid and alkali resistant. Provision shall be made for securing the nozzle when not in use.

The extinguisher shall be clearly marked with the following information: -

a) The words “ Foam Spray Fire Extinguisher”

b) Method of operation in prominent letters

c) The working pressure and the capacity of the foam charge in litres

d) Manufacturer’s name or identification mark

e) The words “**RECHARGE AFTER USE**” if rechargeable type

f) Instructions to regularly check the weight of the pressure container or inspect the pressure indicator on stored pressure type when fitted, and remedy any loss indicated by either.

g) The year of manufacture

h) The pressure to which the extinguisher was tested.

i) The number of this British Standard BS 3465 or BS 5423: 1977.

j) When appropriate complete instructions for recharging the extinguisher shall be clearly marked on the extinguisher or otherwise be supplied with the refill.

k)

6 Foam Spray Portable Fire Extinguishers

The portable foam spray fire extinguishers shall comply with BS 3465: 1962 and BS 5423. The body shall be constructed of Steel not less than the requirements of BS 1449 or Aluminium to BS 1470: 1972 and shall be suitably protected against corrosion.

The foam spray charge shall be non-toxic and retain its free flowing properties under normal storage conditions. Any pressurizing agent used as an expelling shall be in dry state; in particular compressed air.

The discharge nozzle and gas tube if either is fitted shall be made of Steel, Brass, Copper or other not less suitable material. Provision shall be made for securing the nozzle when not in use.

The extinguisher shall be clearly marked with the following information:-

- The words ‘ Foam Spray Fire Extinguisher’

- Method of operation in prominent letters

- The working pressure and the capacity of the foam charge in letters
- Manufacturer's name or identification mark
- The words '**RECHARGE AFTER USE'** if rechargeable type
- Instructions to regularly check the weight of the pressure container or inspect the pressure indicator on stored pressure types when fitted, and remedy any loss indicated by either.
- The year of manufacture
- The pressure to which the extinguisher was tested
- The number of this British Standard BS 3465 or BS 5423:1977
- Appropriate complete instructions for recharging the extinguisher shall be clearly marked on the extinguisher or otherwise be supplied with the refill.

7 <u>Fire Blanket</u>

The fire blanket shall be made from cloth woven with pre-asbestos yarn or any other fire proof material and to measure 1210 x 1800mm and shall be fitted with specialties folded so as to offer instantaneous single action release blanket from storing jacket.

PART E: PARTICULAR SPECIFICATIONS FOR FIRE HOSEREEL SYSTEM

I.0 General

The following details the particular requirements for the supply, installation and commissioning of the hosereel installation. The hosereel installation shall comply in all respects to the requirements set out in B.S. 5306 Part I, B.S. 5041 and B.S. 5274.

The Sub-contractor shall include for all appurtenances and appliances not necessarily called for in this specification or shown on the Contract Drawings but which are necessary for the completion and satisfactory functioning of the Works.

No claims for extra payment shall be accepted from the Sub-contractor because of his non-compliance with the above requirements.

If in the opinion of the Sub-contractor there is a difference between the requirements of the specification and the Contract Drawings, he shall clarify these differences with the Engineer before tendering.

I.1 Scope of Work

The Sub-contractor shall supply, deliver, erect, test and commission all the automatic fire fighting hosereel installation which is called for in this specification and shown on the Contract Drawings listed in the drawing schedule.

Hose reels pumpsets consisting of control panel and 2 No. vertical multistage pumps are to be installed in the underground pumproom and arranged as shown on the drawings. A double pole pressure switch shall activate the pumps in case of pressure drop in the mains.

All the hosereels are to be supplied from the dedicated hose reel main serving the building as shown on the drawings.

I.2 Pipework

The pipework for the hosereel installation shall be galvanized wrought steel tubing "Heavy Grade Class `C' to B.S. 1387: 1967 with pipe threads to B.S. 21.

I.3 Pipe Fittings

The pipe fittings shall be galvanized wrought steel fittings conforming to B.S. 1740 Part 1, or galvanized malleable iron fittings to B.S. 143.

The hosereels to the installation shall consist of manually operated swinging wall hosereel as Thorn Norsen (Type B).

The hosereels shall be supplied and installed complete with first-aid non-kinking 20mm diameter hose 30 metre long, with nylon spray/jet/shut-off nozzle fitted. A screw down chrome plated globe valve to B.S. 1010 to the inlet to the reel is to be supplied.

The orifice to the nozzle is to be not less than 6.35mm to maintain a minimum flow of 0.5L/S to the jet.

The hosereels shall be installed at 1.5m centre above the finished floor level in locations shown on Contract Drawings.

I.4 Finish Painting

Upon completion of testing and commissioning of the hosereel installation the pipework shall be primed and finish painted with 2 No. coats of paint to the Engineers requirements.

I.5 Testing and Commissioning

The installation is to be tested to one and a half times the working pressure of the installation all to the approval of the Engineer. The Sub-contractor shall arrange at his own expense for acceptance and approval.

PART F: PARTICULAR SPECIFICATIONS FOR SOLAR WATER HEATING INSTALLATIONS

1.1 Location of Site

The site of the proposed Sub-contract works is situated in Jaramogi Oginga Odinga University of Science and Technology, Bondo.

1.2 Description

The project comprises of construction of four number single quarters accommodation units.

1.3.1 Commencement of Works

The Sub-contractor is submitting his tender shall be deemed to have included for commencing any necessary work on site at such time as will comply with the main contractors programme.

1.3.2 Climatic Conditions

The following climatic conditions apply at site of the works and all plant, equipment, apparatus, material and installations shall be suitable for these conditions.

Maximum temperature	33^0C
Minimum temperature	20^0C
Average temperature	27^0C
Relative Humidity Range	10-95^0C
Altitude	1975m above sea level
Rainfall	Extremely heavy at certain period of the Year.

1.4 Solar Panels

Solar panels shall be similar or equal to “Solarpak” absorber panels as manufactured by Solarhart, and shall be generally in accordance with the following.

Absorber panel area $2.0m^2$

Type: Liquid based flat plate solar energy in low heat sense.

Absorber panel

The copper panel shall be thermally bonded (suing soft solder) to tubular framework comprising of a series of 12.7mm diameter water tubes silver brazed to two 25, 4mm diameter heater tubes.

The absorber panel assembly shall be placed in an insulated 24 gauge galvanized box crometched internally and finished with red oxide. Complete with anti-condensate tubes. Water proofing is achieved by means of rubber grommets around the header tubes and sealings strips. The glass shall be retained by 24 gauge aluminium of GMS retaining strips held in position by stainless steel streaker screws.

Heat Absorbing Surface

(a) The material shall be copper panel with AMCRO selective surface.

(b) Radiation properties – Solar absorption 0.92 – 0.94 Thermal emission (at 70" == 0.07-0.09)

Cover: 4mm clear glass

Insulation: Beneath the absorber 25mm rockwool and side insulation 10mm thick fibre glass.

Module size: External dimensions

Width	Length	Thickness
1000mm	2000mm	70mm

Width ends of header 1210mm

Temperature: Ambient to 99^0C temperature

Range: Heating type installation

Maximum: The 'Solapak' absorbers shall be structurally capable for withstanding 'no flow' temperature.

Each unit shall be capable of raising 53 litres of water per day from 18^0C with solar radiation of 17.8j/m^2 per day.

The unit shall be assembled in banks on the Contract Drawings with an angle of inclination from the horizontal shown.

Inter connection between individual units shall be made by using Beasley connector fittings. Each bank of units shall be mounted upon a frame manufactured from angle or channel rolled mild steel sections galvanized after manufacture and bolted down to the structures.

1.5 Hot water Cylinders

The hot water cylinder shall be horizontal pattern stainless steel of all welded construction and of varying dimensions each with a capacity given of 500 litres. Thickness of steel sheet or plate for sides and dished ends shall be 3.2mm (Grade A).

The cylinder shall be manufactured and tested in accordance with B.S 417: part 2: 1973. Each tank shall be blanked off provision for 3kw heater which is to be located within hot water cylinder.

Each cylinder shall be complete with the following connections and mountings:-

40mm dia flow to solapaks
40mm dia return from solapaks
40mm dia Hot water flow
25mm dia Thermostat pocket
15mm dia drain cock
1 No. dia thermometer 0-100^0C
1 No. 3 kW electric heater

The cylinders shall be insulated neatly beveled to an of 45^0C round all fittings and connections.

1.6 Feed and Expansion Cistern

The feed and expansion cistern shall be of galvanized mild steel with loose cover all grade A: construction (3.2mm thick)

1.7 Pipework and Fittings

Pipework shall be galvanized mild steel tubing in accordance with B.S 138/GD 'B' fittings shall be galvanized mild steel fittings manufactured in accordance with B.S 143. All connections to items and equipment shall be made with union

connectors and connections of pipes above 50mm dia shall be flanged. Interconnections between solar panels shall be made using the special Beasly connectors.

All pipe supports shall be in brass, copper or gunmetal at centre not exceeding those given in the following table:

Pipework nominal bore	Intervals for Horizontal runs	Intervals for vertical runs
mm	m	m
13	1.4	2.0
19	1.4	2.0
25	1.7	2.4
32	1.7	2.4
38	2.0	2.8
51	2.0	2.8
63	2.0	2.8
76	2.4	3.4

1.8 Valve and Cocks

Valves shall be gunmetal with union connections similar or equal to those manufactured by Torkshire Imperial Metals Ltd. Isolating valves shall be in accordance with B.S 1952 with non rising spindle as type 610 but with union connectors with the exception of the valves on the cold feed which shall have a lockshield as type 610LS. Regulating valves shall be type 608. Drain cocks shall be the 562M. automatic air vents shall be of bronze construction as manufactured by Hatterslye (Ormskirt) Ltd or equivalent and approved.

1.9 Insulation

The piping insulation shall be as Armaflex flexible foamed tube insulation as manufactured by Armstrong and the fixing to be of the slip-on or snap-on method and then rejoined with Armaflex adhesive and to be in accordance with the following table.

Pipework norminal	Copper pipe	Armaflex I.D. (Nominal)
mm	gms	mm
12	12	22
19	22	27
25	28	35
32	35	45
38	42	48
51	54	60
64	67	76
76	80	89

PART G: TECHNICAL SPECIFICATIONS FOR FIRE SUPPRESSION SYSTEM

An Inert gas Fire Suppression System shall be furnished. The system shall be capable of protecting all hazard at the Data Centre spaces.

1.0 GENERAL

1.1 References

1.1.1 Underwriters Laboratories, Inc. (UL)
1.1.1.1 UL Standard 300
1.1.1.2 UL Standard 2092

1.1.2 Underwriters Laboratories of Canada (ULC)

1.1.3 National Fire Protection Association (NFPA)
1.1.3.1 NFPA 96
1.1.3.2 NFPA 17A

1.1.4 International Standards Orgaisation (ISO)
Gaseous Fire Extinguishing Systems.

1.2 Submittals

1.2.1 Submit two sets of manufacturer's data sheets

1.2.2 Submit two sets of piping design drawings

1.3 System Description

1.3. The system shall be an automatic fire suppression system using Inert agent.

1.3.2 The system shall be approved for uniform, overlapping appliance protection.

1.3.3 The system shall be capable of suppressing fires in the Data Centre

1.3.4 The system shall be the pre-engineered type having minimum and maximum guidelines established by the manufacturer and listed by Underwriters Laboratories, Inc. (UL) and Underwriters Laboratories of Canada (ULC).

1.3.5 The system shall be installed and serviced by personnel trained by the manufacturer.

1.4 Quality Control

1.4.1 Manufacturer: The Inert gas Fire Suppression System shall be manufactured by a company with at least forty years experience in the design and manufacture of pre-engineered fire suppression systems. The manufacturer shall be ISO 9001 registered.

1.5 Warranty, Disclaimer, and Limitations

1.5.1 The pre-engineered fire suppression system components, manufactured by Ansul, shall be war-ranted for five years from date of delivery against defects in workmanship and materials. Any purchased components, such as electric gas valves, reset relays, solenoids, pressure relief valves, regulators, electric switches, fusible links, etc. shall be warranted for one year from date of purchase.

1.6 Delivery

1.6.1 Packaging: All system components shall be securely packaged to provide protection during shipment.

1.7 Environmental Conditions

1.7.1 The Inert gas system shall be capable of operating in a temperature range of 32 °F to 130 °F (0 °C to 54 °C).

2.0 PRODUCT

2.1 Components

2.1.1 The basic system shall consist of an AUTOPULSE unit, stainless steel enclosure. The agent storage tank is purchased separately and shall be mounted within the enclosure. Agent storage tanks shall be available in nominal capacities of 5.7 to 12.3m^3. Nozzles, blow-off caps, detectors, cartridges, agent, fusible links, and pulley elbows shall be supplied in separate packages in quantities needed for fire suppression system arrangements. Additional equipment shall include remote manual pull station, mechanical and electrical gas valves, pressure switches, and electrical switches for automatic equipment and gas line shut-off.

2.1.3 Agent Tank: The agent tank shall be installed in a stainless steel enclosure. The tank shall be deep drawn carbon steel finished in red enamel. Tanks shall be available in 5.7 to 12.3m^3 capacities. The tanks shall have a working pressure of 150 psi (10.3 bar), a test pressure of 450 psi (31.0 bar), and a minimum burst pressure of 900 psi (62.1 bar). The tank shall include an adaptor/tube assembly containing a burst disc union.

2.2.4 Tank Valve: The tank valve shall be designed to discharge the agent onto the hazards being protected. The valve shall automatically shuttle to switch from wet chemical agent discharge to water discharge.

2.1.5 Regulated Release Mechanism: The regulated release mechanism shall be a automatic electric type capable of providing the expellant gas supply via a pressurized cartridge to a single agent tank. It shall contain a factory installed regulator deadset at 150 psi (10.3 bar) with an internal relief of approximately 190 psi (13.1 bar). The regulated release mechanism shall contain a release assembly, regulator, expellant gas hose, anti-siphonage valve, and agent storage tank housed in a stainless steel enclosure with cover. The enclosure shall contain knock-outs for 15mm. conduit. The cover shall contain an opening for a visual status indicator. It shall be compatible with electric gas shut-off devices.

2.1.6 Discharge Nozzles: Discharge nozzles shall be tested and listed with the Inergen system for all applications. One type shall be used for all low and high proximity

2.1.7 Distribution Piping: Distribution piping shall be Schedule 40 black iron, chrome-plated, or stainless steel pipe conforming to ASTM A120, A53, or A106.

2.1.8 Detectors: The detectors shall be the fusible link type designed to separate at a specific temperature.

2.1.9 Cartridges: The cartridge shall be a sealed steel pressure vessel containing nitrogen gas. The cartridge seal shall be designed to be punctured by the releasing device supplying the required pressure to expel the wet chemical agent from the storage tank.

3.0 IMPLEMENTATION

3.1 Installation

3.1.1 The Inert gas fire suppression system shall be designed, installed, inspected, maintained, and recharged in accordance with the manufacturer’s listed instruction manual.

3.2 Training

3.2. Employees shall be instructed in personal safety and the operation of the system by authorized distributors who are trained by the manufacturer.

SECTION VI:

DRAWINGS

JOB No. 1801

PROJECT: PROPOSED ADMINISTRATION BLOCK FOR JARAMOGI OGINGA
ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

DRAWING No.	DRAWING TITLE	DATE	REVISIONS A	B	C	D	E	F	G	H
M1801–01	FOURTH FLOOR PLAN PLUMBING & FIRE FIGHTING LAYOUT	5.03.18	✓							
M1801–02	THIRD FLOOR PLAN PLUMBING & FIRE FIGHTING LAYOUT	2.05.18 10.7.18		✓	✓					
M1801–03	SECOND FLOOR PLAN PLUMBING & FIRE FIGHTING LAYOUT									
M1801–04	FIRST FLOOR PLAN PLUMBING & FIRE FIGHTING LAYOUT									
M1801–05	GROUND FLOOR PLAN PLUMBING & FIRE FIGHTING LAYOUT									
M1801–06	BASEMENT FLOOR PLAN PLUMBING & FIRE FIGHTING LAYOUT									
M1801–07	ROOF PLAN SOLAR WATER HEATING LAYOUT									
M1801–08	FOURTH FLOOR PLAN PLUMBING (HWS) LAYOUT									
M1801–09	THIRD FLOOR PLAN PLUMBING (HWS) LAYOUT									
M1801–10	SECOND FLOOR PLAN PLUMBING (HWS) LAYOUT									
M1801–11	FIRST FLOOR PLAN PLUMBING (HWS) LAYOUT									
M1801–12	GROUND FLOOR PLAN PLUMBING (HWS) LAYOUT									

REVISIONS				
DATE				

ARCHITECTS:

BASELINE ARCHITECTS
P. O. BOX , 39928–00623
NAIROBI.

SERVICE ENGINEERS:

FDN Feradon Associates

FERADON ASSOCIATES LTD
CONSULTING ENGINEERS
P.o Box 7375-00300
TEL. 2723754 OR 2716143.
NAIROBI.
E-MAIL : consult@feradon.com

1503

PROJECT: PROPOSED ADMINISTRATION BLOCK FOR JARAMOGI OGINGA
ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

DRAWING TITLE:
DRAWING LIST – MECHANICAL INSTALLATIONS.

DES/DRN.	APPROVED.	DATE.	SCALE.	JOB No.	DRG No.	REV.
V.M/S.L	Eng.N.G	JULY.2018	N.T.S	1801	M1801–00	C

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JOB No. 1801

PROJECT: PROPOSED ADMINISTRATION BLOCK FOR JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

DRAWING No.	DRAWING TITLE	DATE	REVISIONS A	B	C	D	E	F	G	H
M1801–13	FOURTH FLOOR PLAN DRAINAGE LAYOUT	5.03.18	✓							
M1801–14	THIRD FLOOR PLAN DRAINAGE LAYOUT	2.05.18 10.7.18		✓	✓					
M1801–15	SECOND FLOOR PLAN DRAINAGE LAYOUT									
M1801–16	FIRST FLOOR PLAN DRAINAGE LAYOUT									
M1801–17	GROUND FLOOR PLAN DRAINAGE LAYOUT									
M1801–18	BASEMENT FLOOR PLAN DRAINAGE LAYOUT									
M1801–19	ROOF PLAN RAIN WATER DOWNPIPES LAYOUT									
M1801–20	FOURTH FLOOR PLAN RAIN WATER DOWNPIPES LAYOUT									
M1801–21	THIRD FLOOR PLAN RAIN WATER DOWNPIPES LAYOUT									
M1801–22	SECOND FLOOR PLAN RAIN WATER DOWNPIPES LAYOUT									
M1801–23	FIRST FLOOR PLAN RAIN WATER DOWNPIPES LAYOUT									
M1801–24	GROUND FLOOR PLAN RAIN WATER DOWNPIPES LAYOUT									
M1801–25	BASEMENT FLOOR PLAN RAIN WATER DOWNPIPES LAYOUT									

REVISIONS				
DATE				

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PROJECT: PROPOSED ADMINISTRATION BLOCK FOR JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

DRAWING TITLE:

DRAWING LIST – MECHANICAL INSTALLATIONS.

DES./DRN.	APPROVED.	DATE.	SCALE.	JOB No.	DRG No.	REV.
V.M/S.L	Eng.N.G	JULY.2018	N.T.S	1801	M1801–00	C

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JOB No. 1801

PROJECT: PROPOSED ADMINISTRATION BLOCK FOR JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

DRAWING No.	DRAWING TITLE	DATE	REVISIONS A	B	C	D	E	F	G	H
M1801–26	ROOF PLAN AIR CONDITIONING & MECHANICAL VENTILATION EQUIPMENT LAYOUT	8.03.18 2.05.18 10.7.18	✓	✓	✓					
M1801–27	FOURTH FLOOR PLAN AIR CONDITIONING & MECHANICAL VENTILATION LAYOUT									
M1801–28	THIRD FLOOR PLAN AIR CONDITIONING & MECHANICAL VENTILATION LAYOUT									
M1801–29	SECOND FLOOR PLAN AIR CONDITIONING & MECHANICAL VENTILATION LAYOUT									
M1801–30	FIRST FLOOR PLAN AIR CONDITIONING & MECHANICAL VENTILATION LAYOUT									
M1801–31	GROUND FLOOR PLAN AIR CONDITIONING & MECHANICAL VENTILATION LAYOUT									
M1801–32	PETROL INTERCEPTOR DETAILS LAYOUT									
M1801–33	SERVER ROOM FIRE SUPRESSION LAYOUT									
M1801–34	GATE HOUSE PLUMBING AND DRAINAGE LAYOUT									

REVISIONS				
DATE				

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1503

PROJECT: PROPOSED ADMINISTRATION BLOCK FOR JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

DRAWING TITLE:

DRAWING LIST – MECHANICAL INSTALLATIONS.

DES/DRN.	APPROVED.	DATE.	SCALE.	JOB No.	DRG No.	REV.
V.M/S.L	Eng.N.G	JULY.2018	N.T.S	1801	M1801–00	C

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SECTION VII:

BILLS OF QUANTITIES

Notes for preparing Bills of Quantities

1.0 **Preamble To Bill of Quantities**

a) The Bill of Quantities shall form part of the Contract Documents and is to be read in conjunction with the Instructions to Tenderers, Conditions of Contract Parts I and II, Specifications and Drawings.

b) The brief description of the items in the Bill of Quantities is purely for the purpose of identification, and in no way modifies or supersedes the detailed descriptions given in the conditions of Contract and Specifications for the full direction and description of work and materials.

c) The Quantities set forth in the Bill of Quantities are estimated and provisional, representing substantially the work to be carried out, and are given to provide a common basis for tendering and comparing of Tenders. There is no guarantee to the Contractor that he will be required to carry out all the quantities of work indicated under any one particular item or group of items in the Bill of Quantities. The basis of payment shall be the Contractor's rates and the quantities of work actually done in fulfilment of his obligation under the Contract.

d) The prices and rates inserted in the Bills of Quantities will be used for valuing work executed, and the Engineer will measure the whole of the works executed in accordance with this Contract.

e) A price or rate shall be entered in ink against every item in the Bill of Quantities with the exception of items, which already have provisional sums, affixed thereto. The Tenderers are reminded that no "nil" or "included" rates or "lump-sum" discounts will be accepted. The rates for various items should include discounts if any. Tenderers who fail to comply will be disqualified.

f) Provisional sums (including Dayworks) in the Bill of Quantities shall be expended in whole or in part at the discretion of the Engineer in accordance with Sub-clause 52.4 and Clause 58 of part of the Conditions of Contract.

g) The price and rates entered in the Bill of Quantities shall, except insofar as it is otherwise provided under the Contract, include all Constructional plant to be used, labour, insurance, supervision, compliance, testing, materials, erection, maintenance or works, overheads and profits, taxes and duties together with all general risks, liabilities and obligations set out or implied in the Contract, transport,
electricity and telephones, water, use and replenishment of all consumables, including those required under the Contract by the Engineer and his staff.

h) Errors will not be corrected by the Employer for any arithmetic errors in computation or summation

i) The Bills of Quantities, unless otherwise expressly stated therein, shall be deemed to have been prepared in accordance with the principles of the latest edition of the Civil Engineering Standard Method of Measurement (CESMM).

j) "Authorised" "Directed" or "Approved" shall mean the authority, direction or approval of the Engineer.

k) Unless otherwise stated, all measurements shall be net taken on the finished work carried out in accordance with the details shown on the drawings or instructed, with no allowance for extra cuts or fills, waste or additional thickness necessary to obtain the minimum finished thickness or dimensions required in this Contract. Any work performed in excess or the requirements of the plans and specifications will not be paid for, unless ordered in writing by the Engineer.

l) (a) Hard material, in this Contract, shall be defined as the material which, in the opinion of the Engineer, require blasting, or the use of metal wedges and sledgehammers, or the use of compressed air drilling for their removal, and which cannot be extracted by ripping with a dozer tractor of at least 150 brake horse power (112 kilowatt) with a single, rear-mounted, hydraulic ripper. Boulders of more than $0.2m^3$ occuring in soft material shall be classified as hard material
(b) Soft material shall be all material other than hard material.

2.0 The objectives of the Bills of Quantities are;

(a) to provide sufficient information on the quantities of Works to be performed to enable tenders to be prepared efficiently and accurately;and

(b) when a Contract has been entered into, to provide a priced Bills of Quantities for use in the periodic valuation of Works executed.

In order to attain these objectives, Works should be itemized in the Bills of Quantities in sufficient detail to distinguish between the different classes of Works, or between Works of the same nature carried out in different locations or in other circumstances which may give rise to different considerations of cost. Consistent with these requirements, the layout and content of the Bills of Quantities should be as simple and brief as possible.

3.0 The Bills of Quantities should be divided generally into the following sections:

(a) Preliminaries.

The preliminaries should indicate the inclusiveness of the unit prices, and should state the methods of measurement which have been adopted in the preparation of the Bills of Quantities and which are to be used for the measurement of any part of the Works.

The number of preliminary items to be priced by the tenderer should be limited to tangible items such as site office and other temporary works, otherwise items such as security for the Works which are primarily part of the Contractor's obligations should be included in the Contractor's rates.

(b) Work Items

(i) The items in the Bills of Quantities should be grouped into sections to distinguish between those parts of the Works which by nature, location, access, timing or any other special characteristics may give rise to different methods of construction or phasing of the Works or considerations of cost. General items common to all parts of the Works may be grouped as a separate section in the Bills of Quantities.

(ii) The brief description of the items in the Bill of Quantities should in no way modify or supersede the detailed descriptions given in the Contract drawings, Conditions of Contract and Specifications.

(iii) Quantities should be computed net from the Drawings, unless directed otherwise in the Contract, and no allowance should be made for bulking, shrinkage or waste. Quantities should be rounded up or down where appropriate.

(iv) The following units of measurement and abbreviations are recommended for use

Unit	*Abbreviation*	*Unit*	*Abbreviation*
cubic meter	M^3 or cu m	millimeter	mm
hectare	ha	month	mon
hour	h	number	nr
kilogram	kg	square meter	m^2 or sq m
lump sum	sum	square millimeter	mm^2 or sq mm
meter	m	week	wk
metric ton (1,000 kg)	t		

(v) The commencing surface should be identified in the description of each item for Work involving excavation, boring or drilling, for which the commencing surface is not also the original surface. The excavated surface should be identified in the description of each item for Work involving excavation for which the excavated surface is not also the final surface. The depths of Work should be measured from the commencing surface to the excavated surface, as defined.

(c) Daywork Schedule

A Daywork Schedule should be included if the probability of unforeseen work, outside the items included in the Bills of Quantities is relatively high. To facilitate checking by the Employer of the realism of rates quoted by the tenderers, the Daywork Schedule should normally comprise:

(i) a list of the various classes of labour, and materials for which basic Daywork rates or prices are to be inserted by the tenderer, together with a statement of the conditions under which the Contractor will be paid for Work executed on a Daywork basis; and

(ii) a percentage to be entered by the tenderer against each basic Daywork Subtotal amount for labour, materials and plant representing the Contractor's profit, overheads, supervision and other charges.

(d) Provisional Quantities and Provisional Sums

(i) Provision for quantity contingencies in any particular tem or class of Work with a high expectation of quantity overrun should be made by entering specific "Provisional Quantities" or "Provisional Items" in the Bills of Quantities, and *not* by increasing the quantities for that item or class of Work beyond those of the Work normally expected to be required. To the extent not covered above, a general provision for physical contingencies (quantity overruns) should be made by including a "Provisional Sum" in the Summary of the Bills of Quantities. Similarly, a contingency allowance for possible price increases should be provided as a "Provisional Sum" in the Summary of the Bills of Quantities. The inclusion of such provisional sums often facilitates budgetary approval by avoiding the need to request periodic supplementary approvals as the future need arises.

(ii) Provisional Sums to cover specialized works normally carried out by Nominated Sub Contractors should be avoided and instead Bills of Quantities of the specialised Works should be included as a section of the main Bill of Quantities to be priced by the Main Contractor. The Main Contractor should be required to indicate the name (s) of the specialised firms he proposes to engage to carry out the specialized Works as his approved domestic sub-contractors. Only Provisional Sums to cover specialized Works by statutory authorities should be included in the Bills of Quantities.

(iii) Unless otherwise provided in the Contract, the Provisional Sums included in the Bills of Quantities should always be expended in whole or in part at the discretion of the Engineer after full consultation with the Employer.

(e) Summary

The Summary should contain a tabulation of the separate parts of the Bills of Quantities carried forward, with Provisional Sums for Dayworks, physical (quantity) contingencies, and price contingencies (upward price adjustment) where applicable.

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PROPOSED ADMINISTRATION BLOCK
BILLS OF QUANTITIES FOR PLUMBING, DRAINAGE & FIRE FIGHTING INSTALLATIONS

BILL NO. 1:- GROUND FLOOR SANITARY FITTINGS

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KSh. Cts.
	Supply, deliver and install the following sanitary fittings including all the necessary fittings and jointing.**Tenderers to note that ANY ALTERNATIVE will ONLY be considerd if they MATCH of exceed the specified items interms of TECHNICAL capabilities and MUST be accompanied with PRODUCT CATALOGUES**				
	WC Suite				
1.01	**"Duravit D Code range** 'Vitreous China' Wall hung, back inlet water closet pan in white, Horizontal outlet with heavy-duty seat and cover complete with metal hinges or an approved equivalent.	9	No.		
1.02	WC "S" or "P" connector to drain pipe for horizontal outlet WC Pan	9	No.		
1.03	**Geberit Delta** concealed cistern for wall hung WC, front actuated with dual-flush actuator in chromium plated finish, including flush pipe and pan connector, water supply connection with angle stop valve, protection cover for service opening and protection cover for flush pipe, fixed with included fastening materials in "PreWall" brick. All with Geberit conditional guarantee	9	No.		
1.04	**Toilet Seat sanitizer as 'Rentokil Initial'** or approved equivalent. The unit to be fitted close to a toilet tissue dispenser and to be of size 145x90x215mm.	9	No.		
1.05	"**Duravit**" urinal bowl in white vitreous china complete with exposed flush valve as **'Cobra'**, connector pipe and spray rose and to have wall hangers or an approved equivalent and chrome plated bottle trap (P trap) with 75 mm seal	3	No.		
1.06	"**Duravit**" white urinal wall mounted division complete with wall hangers to be mounted between 2 No. Urinal bowls.	3	No.		
	Wash Hand Basin				
1.07	**Duravit D Code** range **Countertop** Wash hand basin in vitreous china with 1 No. center tap-hole or equal and approved size 650 x 500mm complete with the following:- - Hansgrohe Chrome plated waste fitting . - Wall hangers - Chrome plated bottle trap - Hansgrohe Chrome plated bottle trap **The countertop to be installed on top to be provided by others.**	9	No.		
	Whb tap				
1.08	Hansgrohe Focus S range CP press action delay basin tap or an approved equivalent	9	No.		
1.09	**Mediclinics** Chrome plated open paper holder or an approved equivalent	9	No.		
1.10	Plain size bevelled 6mm thick glass plate **mirror** size 750 x 750mm complete with dome headed chrome plated fixing Screws.	9	No.		
	Total C/F to 75				

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BILL NO. 1:- GROUND FLOOR SANITARY FITTINGS

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KSh. Cts
	Total B/F from 74				
1.11	Sensor Activated Electronic **Soap Dispenser** Touch-free operation as **mediclinic** or an approved equivalent. The dispenser is to be complete with wall mounting brackets, key and initial discharge.	7	No.		
1.12	Fast hot air hand & face drier with automatic operation by touch-free infra-red control with sensor range of 150mm vertically under air inlet as **mediclinics.**	5	No.		
1.13	**Barrel Centre pull** hand drying **Tissue Dispenser** as '**VELVEX VEL-040' or approved equivalent.**	3	No.		
1.14	Duravits cleaner's sink in white enamelled fireclay with grating and pad WH, size 480 x 425mm. The sink to be complete with:- - ½" chrome plated bib tap SF 5204 CP - 1½" chrome plated grid waste WF4343CP - 1½" chrome plated bottle trap and 75 mm seal WF8461CP **Legs and bearers with sink screwed to wall using built-in brackets.**	1	No.		
1.15	For WC suite Wall hung WC Pan by Duravit – D Code range in white Consisting of Wall hung Barrier Free WC Pan, H/Duty soft close WC Seat & Cover with S/Steel Hinges, Geberit Kombifix concealed cistern for wall hung WC (article no. 110.350.00.1), height 1140mm, actuated with hytouch pneumatic cover plate. **Complete with wash hand basin described as item 1.07 but with hansgrohe single lever basin mixer or an approved equivalent.** **Mediclinic Hinge Down Grab Rail with Toilet Roll Holder and Straight Grab Rail**	1	No.		
1.16	Air hygiene unit as 'Rentokil Initial' modular air freshener or approved equivalent. The unit to be complete with long life batteries, 11 fan settings for optimum odour control, 4 fragrance choices and lockable unit to prevent vandalism and theft.	5	No.		
	Coat Hook				
1.17	Double Robe/Coat Hook as approved.	9	No.		
	Towel Ring				
1.18	Stainless steel square towel ring in satin finish to engineer's approval to be installed next to the WHB in executive toilets.	2	No.		
	Kitchen Sink				
1.19	1500 x 500mm double bowl double drainer stainless steel sink made out of 18 SWG stainless steel sheet and complete with: 15mm (1/2") kitchen swivel mixer tap as "Cobra" - 40mm (1 ½ ") waste and stopper with chrome plated chain - 40mm (1 ½") chrome plated bottle trap.	2	No.		
	Total C/F to Summary Page				

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BILLS OF QUANTITIES FOR PLUMBING, DRAINAGE & FIRE FIGHTING INSTALLATIONS

BILL NO. 2:- FIRST FLOOR SANITARY FITTINGS

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KSh. Cts.
	Supply, deliver and install the following sanitary fittings including all the necessary fittings and jointing.**Tenderers to note that ANY ALTERNATIVE will ONLY be considerd if they MATCH of exceed the specified items interms of TECHNICAL capabilities and MUST be accompanied with PRODUCT CATALOGUES**				
	WC Suite				
2.01	**"Duravit D Code range** 'Vitreous China' Wall hung, back inlet water closet pan in white, Horizontal outlet with heavy-duty seat and cover complete with metal hinges or an approved equivalent.	8	No.		
2.02	WC "S" or "P" connector to drain pipe for horizontal outlet WC Pan	8	No.		
2.03	**Geberit Delta** concealed cistern for wall hung WC, front actuated with dual-flush actuator in chromium plated finish, including flush pipe and pan connector, water supply connection with angle stop valve, protection cover for service opening and protection cover for flush pipe, fixed with included fastening materials in "PreWall" brick. All with Geberit conditional guarantee	8	No.		
2.04	**Toilet Seat sanitizer as 'Rentokil Initial'** or approved equivalent. The unit to be fitted close to a toilet tissue dispenser and to be of size 145x90x215mm.	8	No.		
2.05	"**Duravit**" urinal bowl in white vitreous china complete with exposed flush valve as **'Cobra'**, connector pipe and spray rose and to have wall hangers or an approved equivalent and chrome plated bottle trap (P trap) with 75 mm seal .	3	No.		
2.06	"**Duravit**" white urinal wall mounted division complete with wall hangers to be mounted between 2 No. Urinal bowls.	3	No.		
	Wash Hand Basin				
2.07	**Duravit D Code** range **Countertop** Wash hand basin in vitreous china with 1 No. center tap-hole or equal and approved size 650 x 500mm complete with the following:- - Hansgrohe Chrome plated waste fitting . - Wall hangers - Chrome plated bottle trap - Hansgrohe Chrome plated bottle trap **The countertop to be installed on top to be provided by others.**	8	No.		
	Whb tap				
2.08	Hansgrohe Focus S range CP press action delay basin tap or an approved equivalent	8	No.		
2.09	**Mediclinics** Chrome plated open paper holder or an approved equivalent	8	No.		
2.10	Plain size bevelled 6mm thick glass plate **mirror** size 750 x 750mm complete with dome headed chrome plated fixing Screws.	8	No.		
	Total C/F to 77				

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BILL NO. 2:- FIRST FLOOR SANITARY FITTINGS

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KSh. Cts
	Total B/F from 76				
2.11	Sensor Activated Electronic **Soap Dispenser** Touch-free operation as **mediclinic** or an approved equivalent. The dispenser is to be complete with wall mounting brackets, key and initial discharge.	7	No.		
2.12	Fast hot air hand & face drier with automatic operation by touch-free infra-red control with sensor range of 150mm vertically under air inlet as **mediclinics.**	5	No.		
2.13	**Barrel Centre pull** hand drying **Tissue Dispenser** as **'VELVEX VEL-040' or approved equivalent.**	5	No.		
2.14	Duravits cleaner's sink in white enamelled fireclay with grating and pad WH, size 480 x 425mm. The sink to be complete with:- - ½" chrome plated bib tap SF 5204 CP - 1½" chrome plated grid waste WF4343CP - 1½" chrome plated bottle trap and 75 mm seal WF8461CP **Legs and bearers with sink screwed to wall using built-in brackets.**	1	No.		
2.15	For WC suite Wall hung WC Pan by Duravit – D Code range in white Consisting of Wall hung Barrier Free WC Pan, H/Duty soft close WC Seat & Cover with S/Steel Hinges, Geberit Kombifix concealed cistern for wall hung WC (article no. 110.350.00.1), height 1140mm, actuated with hytouch pneumatic cover plate. **Complete with wash hand basin described as item 1.07 but with hansgrohe single lever basin mixer or an approved equivalent**	1	No.		
	Mediclinic Hinge Down Grab Rail with Toilet Roll Holder and Straight Grab Rail				
2.16	Air hygiene unit as 'Rentokil Initial' modular air freshener or approved equivalent. The unit to be complete with long life batteries, 11 fan settings for optimum odour control, 4 fragrance choices and lockable unit to prevent vandalism and theft.	5	No.		
	Coat Hook				
2.17	Double Robe/Coat Hook as approved.	8	No.		
	Towel Ring				
2.18	Stainless steel square towel ring in satin finish to engineer's approval to be installed next to the WHB in executive toilets.	2	No.		
	Kitchen Sink				
2.19	1500 x 500mm double bowl double drainer stainless steel sink made out of 18 SWG stainless steel sheet and complete with: 15mm (1/2") kitchen swivel mixer tap as "Cobra" - 40mm (1 ½ ") waste and stopper with chrome plated chain - 40mm (1 ½") chrome plated bottle trap.	2	No.		
	Total C/F to Summary Page				

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BILL NO. 3:- SECOND FLOOR SANITARY FITTINGS

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KSh. Cts.
	Supply, deliver and install the following sanitary fittings including all the necessary fittings and jointing.**Tenderers to note that ANY ALTERNATIVE will ONLY be considerd if they MATCH of exceed the specified items interms of TECHNICAL capabilities and MUST be accompanied with PRODUCT CATALOGUES**				
	WC Suite				
3.01	**"Duravit D Code range** 'Vitreous China' Wall hung, back inlet water closet pan in white, Horizontal outlet with heavy-duty seat and cover complete with metal hinges or an approved equivalent.	6	No.		
3.02	WC "S" or "P" connector to drain pipe for horizontal outlet WC Pan	6	No.		
3.03	**Geberit Delta** concealed cistern for wall hung WC, front actuated with dual-flush actuator in chromium plated finish, including flush pipe and pan connector, water supply connection with angle stop valve, protection cover for service opening and protection cover for flush pipe, fixed with included fastening materials in "PreWall" brick. All with Geberit conditional guarantee.	6	No.		
3.04	**Toilet Seat sanitizer as 'Rentokil Initial'** or approved equivalent. The unit to be fitted close to a toilet tissue dispenser and to be of size 145x90x215mm.	6	No.		
3.05	"**Duravit**" urinal bowl in white vitreous china complete with exposed flush valve as **'Cobra'**, connector pipe and spray rose and to have wall hangers or an approved equivalent and chrome plated bottle trap (P trap) with 75 mm seal .	3	No.		
3.06	"**Duravit**" white urinal wall mounted division complete with wall hangers to be mounted between 2 No. Urinal bowls.	3	No.		
	Wash Hand Basin				
3.07	**Duravit D Code** range **Countertop** Wash hand basin in vitreous china with 1 No. center tap-hole or equal and approved size 650 x 500mm complete with the following:- - Hansgrohe Chrome plated waste fitting . - Wall hangers - Chrome plated bottle trap - Hansgrohe Chrome plated bottle trap **The countertop to be installed on top to be provided by others.**	8	No.		
	Whb tap				
3.08	Hansgrohe Focus S range CP press action delay basin tap or an approved equivalent	8	No.		
3.09	**Mediclinics** Chrome plated open paper holder or an approved equivalent	8	No.		
3.10	Plain size bevelled 6mm thick glass plate **mirror** size 750 x 750mm complete with dome headed chrome plated fixing Screws.	8	No.		
	Total C/F to 79				

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BILL NO. 3:- SECOND FLOOR SANITARY FITTINGS

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KSh. Cts
	Total B/F from 78				
3.11	Sensor Activated Electronic **Soap Dispenser** Touch-free operation as **mediclinic** or an approved equivalent. The dispenser is to be complete with wall mounting brackets, key and initial discharge.	7	No.		
3.12	Fast hot air hand & face drier with automatic operation by touch-free infra-red control with sensor range of 150mm vertically under air inlet as **mediclinics.**	5	No.		
3.13	**Barrel Centre pull** hand drying **Tissue Dispenser** as **'VELVEX VEL-040' or approved equivalent.**	5	No.		
3.14	Duravits cleaner's sink in white enamelled fireclay with grating and pad WH, size 480 x 425mm. The sink to be complete with:- - ½" chrome plated bib tap SF 5204 CP - 1½" chrome plated grid waste WF4343CP - 1½" chrome plated bottle trap and 75 mm seal WF8461CP **Legs and bearers with sink screwed to wall using built-in brackets.**	1	No.		
3.15	For WC suite Wall hung WC Pan by Duravit – D Code range in white Consisting of Wall hung Barrier Free WC Pan, H/Duty soft close WC Seat & Cover with S/Steel Hinges, Geberit Kombifix concealed cistern for wall hung WC (article no. 110.350.00.1), height 1140mm, actuated with hytouch pneumatic cover plate. **Complete with wash hand basin described as item 1.07 but with hansgrohe single lever basin mixer or an approved equivalent**	1	No.		
	Mediclinic Hinge Down Grab Rail with Toilet Roll Holder and Straight Grab Rail				
3.16	Air hygiene unit as 'Rentokil Initial' modular air freshener or approved equivalent. The unit to be complete with long life batteries, 11 fan settings for optimum odour control, 4 fragrance choices and lockable unit to prevent vandalism and theft.	3	No.		
	Coat Hook				
3.17	Double Robe/Coat Hook as approved.	6	No.		
	Towel Ring				
3.18	Stainless steel square towel ring in satin finish to engineer's approval to be installed next to the WHB in executive toilets.	2	No.		
	Kitchen Sink				
3.19	1500 x 500mm double bowl double drainer stainless steel sink made out of 18 SWG stainless steel sheet and complete with: 15mm (1/2") kitchen swivel mixer tap as "Cobra" - 40mm (1 ½ ") waste and stopper with chrome plated chain - 40mm (1 ½") chrome plated bottle trap.	1	No.		
	Total C/F to Summary Page				

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BILL NO. 4:- THIRD FLOOR SANITARY FITTINGS

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KSh. Cts.
	Supply, deliver and install the following sanitary fittings including all the necessary fittings and jointing.**Tenderers to note that ANY ALTERNATIVE will ONLY be considerd if they MATCH of exceed the specified items interms of TECHNICAL capabilities and MUST be accompanied with PRODUCT CATALOGUES**				
	WC Suite				
4.01	**"Duravit D Code range** 'Vitreous China' Wall hung, back inlet water closet pan in white, Horizontal outlet with heavy-duty seat and cover complete with metal hinges or an approved equivalent.	9	No.		
4.02	WC "S" or "P" connector to drain pipe for horizontal outlet WC Pan	9	No.		
4.03	**Geberit Delta** concealed cistern for wall hung WC, front actuated with dual-flush actuator in chromium plated finish, including flush pipe and pan connector, water supply connection with angle stop valve, protection cover for service opening and protection cover for flush pipe, fixed with included fastening materials in "PreWall" brick. All with Geberit conditional guarantee	9	No.		
4.04	**Toilet Seat sanitizer as 'Rentokil Initial'** or approved equivalent. The unit to be fitted close to a toilet tissue dispenser and to be of size 145x90x215mm.	9	No.		
4.05	"**Duravit**" urinal bowl in white vitreous china complete with exposed flush valve as **'Cobra'**, connector pipe and spray rose and to have wall hangers or an approved equivalent and chrome plated bottle trap (P trap) with 75 mm seal	3	No.		
4.06	"**Duravit**" white urinal wall mounted division complete with wall hangers to be mounted between 2 No. Urinal bowls.	3	No.		
	Wash Hand Basin				
4.07	**Duravit D Code** range **Countertop** Wash hand basin in vitreous china with 1 No. center tap-hole or equal and approved size 650 x 500mm complete with the following:- - Hansgrohe Chrome plated waste fitting . - Wall hangers - Chrome plated bottle trap - Hansgrohe Chrome plated bottle trap **The countertop to be installed on top to be provided by others.**	9	No.		
	Whb tap				
4.08	Hansgrohe Focus S range CP press action delay basin tap or an approved equivalent	9	No.		
4.09	**Mediclinics** Chrome plated open paper holder or an approved equivalent	9	No.		
4.10	Plain size bevelled 6mm thick glass plate **mirror** size 750 x 750mm complete with dome headed chrome plated fixing Screws.	9	No.		
	Total C/F to 81				

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BILL NO. 4:- THIRD FLOOR SANITARY FITTINGS

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KSh. Cts
	Total B/F from 80				
4.11	Sensor Activated Electronic **Soap Dispenser** Touch-free operation as **mediclinic** or an approved equivalent. The dispenser is to be complete with wall mounting brackets, key and initial discharge.	8	No.		
4.12	Fast hot air hand & face drier with automatic operation by touch-free infra-red control with sensor range of 150mm vertically under air inlet as **mediclinics.**	6	No.		
4.13	**Barrel Centre pull** hand drying **Tissue Dispenser** as **'VELVEX VEL-040' or approved equivalent.**	6	No.		
4.14	Duravits cleaner's sink in white enamelled fireclay with grating and pad WH, size 480 x 425mm. The sink to be complete with:- - ½" chrome plated bib tap SF 5204 CP - 1½" chrome plated grid waste WF4343CP - 1½" chrome plated bottle trap and 75 mm seal WF8461CP **Legs and bearers with sink screwed to wall using built-in brackets.**	1	No.		
4.15	For WC suite Wall hung WC Pan by Duravit – D Code range in white Consisting of Wall hung Barrier Free WC Pan, H/Duty soft close WC Seat & Cover with S/Steel Hinges, Geberit Kombifix concealed cistern for wall hung WC (article no. 110.350.00.1), height 1140mm, actuated with hytouch pneumatic cover plate. **Complete with wash hand basin described as item 1.07 but with hansgrohe single lever basin mixer or an approved equivalent.** **Mediclinic Hinge Down Grab Rail with Toilet Roll Holder and Straight Grab Rail**	1	No.		
4.16	Air hygiene unit as 'Rentokil Initial' modular air freshener or approved equivalent. The unit to be complete with long life batteries, 11 fan settings for optimum odour control, 4 fragrance choices and lockable unit to prevent vandalism and theft.	6	No.		
	Coat Hook				
4.17	Double Robe/Coat Hook as approved.	9	No.		
	Towel Ring				
4.18	Stainless steel square towel ring in satin finish to engineer's approval to be installed next to the WHB in executive toilets.	1	No.		
	Kitchen Sink				
4.19	1500 x 500mm double bowl double drainer stainless steel sink made out of 18 SWG stainless steel sheet and complete with: 15mm (1/2") kitchen swivel mixer tap as "Cobra" - 40mm (1 ½ ") waste and stopper with chrome plated chain - 40mm (1 ½") chrome plated bottle trap.	3	No.		
	Total C/F to Summary Page				

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BILL NO. 5:- FOURTH FLOOR SANITARY FITTINGS

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KSh. Cts.
	Supply, deliver and install the following sanitary fittings including all the necessary fittings and jointing.**Tenderers to note that ANY ALTERNATIVE will ONLY be considerd if they MATCH of exceed the specified items interms of TECHNICAL capabilities and MUST be accompanied with PRODUCT CATALOGUES**				
	WC Suite				
5.01	**"Duravit D Code range** 'Vitreous China' Wall hung, back inlet water closet pan in white, Horizontal outlet with heavy-duty seat and cover complete with metal hinges or an approved equivalent.	12	No.		
5.02	WC "S" or "P" connector to drain pipe for horizontal outlet WC Pan	12	No.		
5.03	**Geberit Delta** concealed cistern for wall hung WC, front actuated with dual-flush actuator in chromium plated finish, including flush pipe and pan connector, water supply connection with angle stop valve, protection cover for service opening and protection cover for flush pipe, fixed with included fastening materials in "PreWall" brick. All with Geberit conditional	12	No.		
5.04	**Toilet Seat sanitizer as 'Rentokil Initial'** or approved equivalent. The unit to be fitted close to a toilet tissue dispenser and to be of size 145x90x215mm.	12	No.		
5.05	"**Duravit**" urinal bowl in white vitreous china complete with exposed flush valve as **'Cobra'**, connector pipe and spray rose and to have wall hangers or an approved equivalent and chrome plated bottle trap (P trap)	5	No.		
5.06	"**Duravit**" white urinal wall mounted division complete with wall hangers to be mounted between 2 No. Urinal bowls.	5	No.		
	Wash Hand Basin				
5.07	**Duravit D Code** range **Countertop** Wash hand basin in vitreous china with 1 No. center tap-hole or equal and approved size 650 x 500mm complete with the following:- - Hansgrohe Chrome plated waste fitting . - Wall hangers - Chrome plated bottle trap - Hansgrohe Chrome plated bottle trap **The countertop to be installed on top to be provided by others.**	12	No.		
	Whb tap				
5.08	Hansgrohe Focus S range CP press action delay basin tap or an approved equivalent	12	No.		
5.09	**Mediclinics** Chrome plated open paper holder or an approved equivalent	12	No.		
5.10	Plain size bevelled 6mm thick glass plate **mirror** size 750 x 750mm complete with dome headed chrome plated fixing Screws.	12	No.		
5.11	Sensor Activated Electronic **Soap Dispenser** Touch-free operation as **mediclinic** or an approved equivalent. The dispenser is to be complete with wall mounting brackets, key and initial discharge.	9	No.		
	Total C/F to 83				

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BILL NO. 5:- FOURTH FLOOR SANITARY FITTINGS

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KSh. Cts
	Total B/F from 82				
5.12	Fast hot air hand & face drier with automatic operation by touch-free infra-red control with sensor range of 150mm vertically under air inlet as **mediclinics.**	7	No.		
5.13	**Barrel Centre pull** hand drying **Tissue Dispenser** as **'VELVEX VEL-040' or approved equivalent.**	7	No.		
5.14	Duravits cleaner's sink in white enamelled fireclay with grating and pad WH, size 480 x 425mm. The sink to be complete with:- - ½" chrome plated bib tap SF 5204 CP - 1½" chrome plated grid waste WF4343CP - 1½" chrome plated bottle trap and 75 mm seal WF8461CP **Legs and bearers with sink screwed to wall using built-in brackets.**	1	No.		
5.15	For WC suite Wall hung WC Pan by Duravit – D Code range in white Consisting of Wall hung Barrier Free WC Pan, H/Duty soft close WC Seat & Cover with S/Steel Hinges, Geberit Kombifix concealed cistern for wall hung WC (article no. 110.350.00.1), height 1140mm, actuated with hytouch pneumatic cover plate. **Complete with wash hand basin described as item 1.07 but with hansgrohe single lever basin mixer or an approved equivalent.** **Mediclinic Hinge Down Grab Rail with Toilet Roll Holder and Straight Grab Rail**	1	No.		
5.16	Air hygiene unit as 'Rentokil Initial' modular air freshener or approved equivalent. The unit to be complete with long life batteries, 11 fan settings for optimum odour control, 4 fragrance choices and lockable unit to prevent vandalism and theft.	9	No.		
5.17	Double Robe/Coat Hook as approved.	12	No.		
5.18	Wall mounted Eurobath Soap Dish as LEV-182	1	No.		
5.19	Eurobath Double Towel Rail as LEV-184A	1	No.		
5.20	Cobra CARINA 461 concealed 4-way shower mixer No. 101.000.22 complete with shower rose, rain shower head and arm	1	No.		
5.21	Stainless steel square towel ring in satin finish to engineer's approval to be installed next to the WHB in executive toilets.	2	No.		
5.22	**Kitchen Sink** 1500 x 500mm double bowl double drainer stainless steel sink made out of 18 SWG stainless steel sheet and complete with: 15mm (1/2") kitchen swivel mixer tap as "Cobra" - 40mm (1 ½ ") waste and stopper with chrome plated chain - 40mm (1 ½") chrome plated bottle trap.	1	No.		
	Total C/F to Summary Page				

JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
PROPOSED ADMINISTRATION BLOCK
BILLS OF QUANTITIES FOR PLUMBING, DRAINAGE & FIRE FIGHTING INSTALLATIONS
BILL NO. 6: COLD/HOT WATER SUPPLY PIPEWORK

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KSh. Cts.
	Supply and Instal Chlorinated Polyvinyl Chloride (CPVC) as manufactured by Astral FlowGuard under lincense from Lubrizol or an approved equivalent. The CPVC compound shall meet cell class 23447 B by ASTM D1784 and have design stress of 2000 PSI and maximum service temperature of upto 93 degrees celsius. Jointing & installation methods shall be as per manufacturers' recommendations only. All pipe diameters are internal diameters. **Astral FlowGuard CPVC has been used as a guide.** Equal and approved brands shall be accepted only with the Engineers approval. **Tenderers must allow in their prices for all couplings, connectors, holding brackets expansion joints as required in the running lengths of pipes.**				
6.01	**Pipes (Class I - Pipe SDR-11)**				
	a) 15mm diameter CPVC pipe	520	LM		
	b) 20mm ditto	280	LM		
	c) 25mm ditto	220	LM		
	d) 32mm ditto	160	LM		
	e) 40mm ditto	120	LM		
	f) 50mm ditto	140	LM		
	g) 65mm ditto	42	LM		
	h) 80mm ditto	30	LM		
6.02	**Elbow and Bends**				
	a) 15mm diameter CPVC elbow	300	No.		
	b) 20mm ditto	120	No.		
	c) 25mm ditto	96	No.		
	d) 32mm ditto	56	No.		
	e) 40mm ditto	54	No.		
	f) 50mm ditto	44	No.		
	g) 65mm ditto	12	No.		
	h) 80mm ditto	8	No.		
6.03	**Reducers**				
	a) 32x25mm diameter CPVC reducer	14	No.		
	b) 40x32mm ditto	86	No.		
	c) 32x15mm ditto	110	No.		
	d) 65x50mm ditto	6	No.		
	e) 25x20mm ditto	74	No.		
	f) 50x40mm ditto	32	No.		
	g) 20x15mm ditto	140	No.		
	h) 80x65mm ditto	2	No.		
6.04	**Tees**				
	a) 20mm diameter CPVC equal tee	46	No.		
	b) 25mm ditto	64	No.		
	c) 32mm ditto	96	No.		
	d) 40mm ditto	40	No.		
	e) 50mm ditto	32	No.		
	f) 65mm ditto	4	No.		
	e) 80mm ditto	2	No.		
	Total C/F to 85				

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BILL NO.6: COLD/HOT WATER SUPPLY PIPEWORK

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KSh. Cts.
	Total B/F from 84				
6.05	**Concealed Valves -Chrome Plated**				
	(a) 20mm diameter Isolation valve	2	No.		
	(b) 25mm ditto	4	No.		
	(c) 32mm ditto	4	No.		
	(d) 40mm ditto	20	No.		
	(e) 50mm ditto	20	No.		
	(f) 65mm ditto	2	No.		
	(g) 80mm ditto	1	No.		
6.06	**Male threaded joints**				
	a) 15mm diameter CPVC male threaded joint	140	No.		
	b) 20mm ditto	26	No.		
	c) 25mm ditto	20	No.		
	d) 32mm ditto	18	No.		
	e) 40mm ditto	22	No.		
	f) 50mm ditto	32	No.		
	g) 65mm ditto	4	No.		
	h) 80mm ditto	2	No.		
6.07	**Female threaded joints**				
	a) 15mm diameter CPVC female threaded joint	140	No.		
	b) 20mm ditto	26	No.		
	c) 25mm ditto	20	No.		
	d) 32mm ditto	18	No.		
	e) 40mm ditto	22	No.		
	f) 50mm ditto	32	No.		
	g) 65mm ditto	4	No.		
	h) 80mm ditto	2	No.		
6.08	Euro Bath angle valves No. PEX-225	120	No.		
6.09	Cobra c.p flexible connector No.C-15/350	120	No.		
	Total C/F to Summary Page				

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BILL NO.7: INTERNAL DRAINAGE PIPEWORK

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KSh. Cts.
	All pipes to be as "Key Terrain" or "Metro" and prices to include connectors, adapters, socket reducers, etc.				
7.01	**Pipes**				
	a) 150mm diameter UPVC Grey pipe (heavy duty)	360	LM		
	b) 100mm ditto	280	LM		
	c) 75mm ditto	66	LM		
	d) 50mm ditto	220	LM		
	e) 40mm ditto	360	LM		
	f) 32mm ditto	240	LM		
	g) 100mm diameter UPVC golden brown pipe (heavy duty)	110	LM		
	h) 150mm ditto	200	LM		
7.02	**Bends**				
	a) 150mm diameter UPVC access bend	22	No.		
	b) 100mm ditto	36	No.		
	c) 150mm diameter UPVC sweep bend	24	No.		
	d) 100mm ditto	64	No.		
	e) 75mm ditto	8	No.		
	f) 50mm ditto	110	No.		
	g) 40mm ditto.	120	No.		
	h) 32mm ditto.	24	No.		
7.03	**Tees**				
	a) 150mm diameter tee	24	No.		
	b) 100mm diameter tee	32	No.		
	c) 75mm ditto	2	No.		
	d) 50mm ditto	44	No.		
	e) 40mm ditto	42	No.		
	f) 32mm rodding tee	20	No.		
7.04	**Reducing Sockets**				
	a) 150x40mm diameter reducing socket	12	No.		
7.05	**Boss Connectors**				
	a) 150x50mm diameter boss connector	12	No.		
	b) 150x40mm diameter boss connector	22	No.		
	c) 100x50mm diameter boss connector	18	No.		
	d) 100x40mm diameter boss connector	20	No.		
7.06	**Inspection Plugs/Access caps**				
	a) 150mm diameter access caps	22	No.		
	b) 150mm diameter inspection plugs	12	No.		
	c) 100mm ditto	36	No.		
	d) 50mm ditto	22	No.		
	e) 40mm ditto	40	No.		
	f) 32mm ditto	20	No.		
Total C/F to 87					

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BILL NO.7: INTERNAL DRAINAGE PIPEWORK

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KSh. Cts.
	Total B/F from 86				
7.07	Four-way 100 x 50mm stainless steel floor trap complete with grating.	60	No.		
7.08	100mm diameter WC connectors	45	No.		
7.09	100mm diameter gulley trap complete with chamber and cover.	1	No.		
7.10	100mm diameter vent cowl	12	No.		
7.11	100mm diameter weathering slate	12	No.		
7.12	Allow for connection of new drainage pipe work to sewer line		Item		
7.13	**Reducing sockets.**				
	a) 100x40mm ditto	6	No.		
	b) 100x50mm ditto	4	No.		
	c) 50x40mm ditto	4	No		
	d) 50x32mm ditto	6	No		
	e) 40x32mm ditto	6	No		
	Total C/F to 88				

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BILL NO.7: INTERNAL DRAINAGE PIPEWORK

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KSh. Cts.
	Total B/F from 87				
	Rain Water Harvesting				
7.14	Allow for downpipes for rain water disposal (150mm dia UPVC) with all other necessary accessories and jointings and clips.	200	LM		
7.15	Allow for downpipes for rain water disposal (100mm dia UPVC) with all other necessary accessories and jointings and clips.	520	LM		
7.16	150x100mm reducing socket	24	No.		
7.17	150mm Diameter fulbora to engineers specification	12	No.		
7.18	Excavate trench approx. 500mm wide and with an average depth of 750mm for rain water harvesting as described elsewhere in this document. Back fill, ram, and cart away the remainder	250	LM		
	Petrol Interceptor				
7.19	Allow for construction of a Petrol Interceptor complete with accessories as per Engineer's detail attached in the appendix.	1	No.		
	Sump pumps				
7.20	Submersible waste- water pump capable of $12m^3/hr$ against pressure head of 8 metres with level switch to automatically control pump operation. The pump to be provided with an integral asynchronous motor of the canned motor type with liquid filled rotor chamber and a thermal cut-out to protect against overload and to be complete with wiring from local isolator provided by others. The pump to be as GRUNDFOS Model No.AP12	4	No.		
7.21	Allow for construction of 450 × 450 drainage manhole for basement water drainage complete with heavy duty grating to engineer's approval	12	No.		
7.22	Allow for water disposal pipe at basement (200mm dia UPVC). The rate to include all necessary jointings and other necessary accessories.	200	LM		
	Total C/F to Summary Page				

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BILL NO. 8: HOSEREEL SYSTEM

ITEM No.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (Ksh Cts.)
	Supply, fix, test and commission the following equipment and fitting as described:- Tenderers must allow in pipework prices for all couplings, unions, nipples, sockets connectors, joints e.t.c in running lengths of pipes and also where necessary for fixing clips, holderbats plugged and screwed.				
8.01	**Hosereel System Pipework**				
	a) 25mm diameter pipe GMS Class B to BS 1387	60	LM.		
	b) 40mm ditto	112	LM.		
8.02	**Elbows**				
	a) 25mm elbows malleable iron galvanized.	33	No.		
	b) 40mm ditto.	10	No.		
8.03	**Tees**				
	40 mm diameter malleable iron tee	12	No		
8.04	**Reducers**				
	a) 40 x 25mm malleable galvanized iron reducing bush	11	No.		
8.05	**Valves**				
	a) 25 mm bronze gate valve to BS 5154	11	No.		
	b) 40mm air relief valve screwed as CRANE.	2	No.		
8.06	**Hose reels**				
	Swinging type hose reel complete with 30m long hose of 20mm diameter, 25mm internal diameter rubber fire hose with nylon spray/jet and shut off nozzle, and mounting brackets conforming to BS 5274	11	No.		
8.07	**Hosereel Pipework Painting**				
	Wire brush, clean and paint complete installation with one coat of red oxide primer, under coat and gloss coat to Architects colour including banding and colour coding to British standards.		Item		
8.08	9 Litre water/carbon dioxide gas fire extinguishers complete with pressure gauge, initial charge and mounting brackets.	11	No.		
8.09	4.5 Kg carbon dioxide gas fire extinguisher complete with pressure gauge, initial charge and mounting brackets.	11	No.		
8.10	9 Litre dry chemical powder fire extinguishers complete with pressure gauge, initial charge and mounting brackets.	11	No.		
8.10	8” x 8” Fire Blanket	8	No.		
	Total C/F to Summary Page				

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BILL NO. 9: WATER BOOSTER PUMPSET

ITEM No.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KSh. Cts.
9.01	Supply , install and commission booster set as Grundfos Hydro Multi-E booster set for pressure boosting of clean water in buildings. The booster set will consist of **4No.** vertical pumps as **Grunfos CRIE 3-11** coupled in parallel and mounted on a common base frame. Motor to be as Grundfos blueflux or equal and approved IE4 or IE5 class The booster shall maintain a constant pressure through continuous adjustmentof speed of the pumps and starting and stopping the pumps to meet the required flow. Each pump shall be capable of delivering 3 cubic meters per hour at 60 meters. The pumps shall have an integrated speed drive manufactured by the pump manufacturer to ensure proper optimisation and operation of the set. Motors must be off efficiency class IE5 or better The pump must be delivered with dry-running protection for positive suction conditions but also allows for addition of a floatswitch in negative suction conditions. The set must be factory tested and ready for operation. The pumps to be mounted on a common base frame made of stainless steel. The pumpset to be completet with isolation valves, non return valve on discharge side of each pump, pressure gauge and diaphragm tank and stainless steel manifold. Each pump is to have pressure switch to allow for individual emergency operation in case the pressure sensor or the main controller fails. **Controls & Settings** The pumpset shall be fitted with an on/off-switch for the supply voltage and a breaker for each pump allowing simple set up and operation. All the settings shall be made and adjusted through one master pump only with no adjustments necessary on the slave pumps. However, each pump should have capability to take over as master pump should the master fail. The controller shall have a stop/sleep function to stop pumps during times of extremely low flow. Controller shall have settings for emergency operation where each pump can still run even when the main controller fails i.e. each pump to have pressure switch.	1	Set		
9.02	Allow for supply and installation of Automatic Voltage Stabilizer with all necessary accessories for the pumpset described in Item 9.01		Item		
	Total C/F to Summary Page				

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BILL NO.10: INERT GAS SUPPRESSION FOR SERVER ROOM

ITEM No.	DESCRIPTION	QTY	UNIT	RATE (KSh Cts.)	AMOUNT KSH. Cts.
	Supply, install, test and commission the following Inert fire suppression system for room size 4.85x4.2x2.9 without a sub-floor. **NB: Tenderers may submit alternative inert gas fire suppressants (Carbon dioxide will NOT be accepted).** **However, full design, calculations, specifications and Itemized Bills of Quantities must accompany these systems and must reflect the intended scope of works as per the Inert gas suppression system described below for the approval of the Engineer.** **Quotations that do not meet these criteria will NOT be considered.**				
10.01	Inert gas cylinder fully charged with Argon agent	2	No.		
10.02	Discharge Hose	2	No.		
10.03	Electric actuators	1	No.		
10.04	Manual release valve	1	No.		
10.05	Pneumatic Switch	1	No.		
10.06	Warning Plates- Inside & Outside	1	No.		
10.07	Discharge Nozzles	1	No.		
10.08	Agent deflector shield	1	No.		
10.09	Backframes and support for the 2 No. gas cylinders	1	Lot.		
10.10	Agent release Control unit	1	No.		
10.11	Ionization smoke detectors	1	No.		
10.12	Photoelectric smoke detectors	2	No.		
10.13	Standard detector base	2	No.		
10.14	Electric manual release stations	1	No.		
10.15	7AMP Hour battery	1	No.		
10.06	24VDC Alarm horn	1	No.		
10.17	6" Alarm Bell - 24V,DC	1	No.		
10.18	Dual colored status flasher units	1	No.		
10.19	Maintenance/abort Switch	1	No.		
	Total C/F to 92				

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BILL NO.10: INERT GAS SUPPRESSION FOR SERVER ROOM

ITEM No.	DESCRIPTION	QTY	UNIT	RATE (KSh Cts.)	AMOUNT (Ksh Cts.)
	Total B/F From 91				
	Pipework				
	Supply and fix **seamless black Steel pipes SCH 40** conforming to ASTM A-53A ERW or ASTM A-106A. All piping shall comply with NFPA 2001.				
	Fittings beyond Orifice union/nipple shall be, 300lb class fittings conforming to ANSI B-16.3. **Ordinary cast iron fittings shall not be used.** Piping shall be bracketed within 12" (0.3m.) of all discharge nozzles.				
	Tenderers must allow in their pipework prices for all the couplings, unions, sockets, nipples, tees, caps, connectors, joints, anchoring, support brackets etc in running lengths of pipes.				
	Pipes				
10.20	20mm diameter seamless black Steel pipe as SCH 40	12	LM		
10.21	32mm ditto	10	LM		
	Elbows/Bends				
10.22	20mm diameter elbow	6	No.		
10.23	32mm ditto	6	No.		
	Tees				
10.24	32mm Tee	4	No.		
	Reducers				
10.25	32 x 20 mm diameter reducers	4	No.		
10.26	Pressure relief vents	1	No.		
10.27	Allow a sum for wire brushing and cleaning followed by painting of the whole pipe-work installation with one coat of epoxy cold cured zinc chromate primer (two pack) and three coats two pact epoxy enamel to Architect's colour.	22	LM		
	Total C/F to M 93				

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BILL NO.10: INERT GAS SUPPRESSION FOR SERVER ROOM

ITEM No.	DESCRIPTION	QTY	UNIT	RATE (KSh Cts.)	AMOUNT (Ksh Cts.)
	Total B/F From 92				
10.28	**Low smoke, zero halogen, 1.5mm^2 2 core cables and all necessary cabling for all smoke detctors, firm alarm panel and sounders as delta firetuff complete with flame-resistant terminations, and accessories.**	30	LM		
10.29	Heavy duty electronic relay, mounted separately from the control panel, but triggered by fire signals generated from the panel, complete with four sets of NO/NC contacts wired to disable (disconnect) the following; a) 2 No. air conditioning units in the server room b) Mains supply to the computer room UPS's c) Load connected to the UPS machines **(Note: Quotation shall include for wiring of the relays).**	1	Set		
10.30	25mm diameter heavy gauge PVC conduit	20	LM		
10.31	20mm diameter flexible conduit complete with adapter	20	LM		
10.32	Module mounting box	1	No.		
10.33	Allow sum for testing and commissioning of the detection system as described in the specification		Item		
10.34	Any other items to complete installation of the detection and extinguishant release system such as mounting accessories etc.(list the items and price)		Item		
	Total C/F to Summary Page				

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BILL NO. 11: WATER SPRINKLER INSTALLATIONS FOR BASEMENT PARKING

ITEM No.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (Ksh Cts.)
	All pipework in this installation to be **Black Steel** heavy gauge to BS 1387 and fittings to BS143. Tenderers must allow in their prices for jointings, couplings, plugging and clamping, reducers, mortices, pipe sleeves through structural members, etc for proper functioning of the system **ALL PIPE JOINTS TO BE WELDED**				
11.01	**Pipes**				
	a) 20mm diameter Black mild Steel tubing	110	LM		
	b) 25mm ditto	60	LM		
	c) 32mm ditto	40	LM		
	d) 40mm ditto	20	LM		
	e) 50mm ditto	15	LM		
	f) 65mm ditto	15	LM		
	g) 75mm ditto	15	LM		
	h) 100mm ditto	60	LM		
11.02	**Elbows/Bends**				
	a) 20mm diameter black mild Steel bend/elbow	22	No		
	b) 25mm ditto	12	No		
	c) 32mm ditto	10	No		
	d) 40mm ditto	8	No		
	e) 50mm ditto	4	No		
	f) 65mm ditto	4	No		
	g) 75mm ditto	5	No		
	h) 100mm ditto	12	No		
11.03	**Reducers**				
	a) 25x20 mm diameter black mild steel reducing bush	12	No		
	b) 32x25 mm ditto	12	No		
	c) 40x32mm ditto	8	No		
	d) 50x40 mm ditto	6	No		
	e) 65x50mm ditto	8	No		
	f) 75x65 mm ditto	8	No		
	g) 100x75mm ditto	10	No		
11.04	**TEES**				
	a) 65mm ditto	2	No		
	b) 75mm ditto	3	No		
	c) 100mm ditto	10	No		
11.05	**CONTROL VALVE** 40mm diameter Installation Control valve complete with stop valve, alarm valve, combined with drain and test valve, pressure gauges, alarm motor stop valves, strainers, alarm motor and gongs, etc as manufactured by "Angus Fire " or an approved equivalent.	1	No.		
11.06	65mm diameter fire brigade twin breaching valve	1	No.		
11.07	40mm diameter approved high pressure screw-down full way non arising stem solid wedge disc gate valve to BS 5154 PN16 for series B rating with wheel head and joints to steel tubing as "crane" model 156 or an approved equivalent.	1	No		
	Total C/F to 95				

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BILL NO. 11: WATER SPRINKLER INSTALLATIONS FOR BASEMENT PARKING

ITEM No.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (Ksh Cts.)
	Total B/F from 94				
	SPRINKLER PUMPS				
11.08	Supply and install packaged sprinkler pumping set as SPP/GROUNDFOS FIRE PUMPS(FM APPROVED) , comprising of two pumps and a Jockey pump. One pump to be duty and the other pump standby. One pump is to be Electrically driven and the other diesel driven and to be complete with delivery check valves, delivery stop valves, start pressure switch, etc.(**Any alternative that is not fire rated will NOT be accepted)**				
	i) **Electric pump**	`			
	Should be capable of delivering (840L/min) against a pressure of 8 bar plus pressure equivalent. It should be close coupled complete with the panel (Star delta starter). The pump to be as SPP Eurostream pumps type.				
	ii) **Diesel Pump**				
	Should be capable of delivering L/s (840L/min) against a pressure head of 8 bar plus pressure equivalent. The pump to be complete with Engine, Fuel tank, controller, led acid batteries and the exhaust system comprising riser, flexible connector, bend and industrial silencers.	1	Sets		
	iii) **Jockey pump**				
	An automatic jockey pump with a capacity of 0.14L/s (8.3 L/min) at a static pressure of 10.0 bar as SPP model complete with accessories and connected to the same control panel as for the main sprinkler pumps.				
	The pumps and connections to equipment to be mounted on a common pumps baseframe all welded on a common base plate. The installation to be with alignment facilities and mounting. The pumps should have a flooded suction. The entire installation to conform to FOC rules 29th Edition.				
	Total C/F to 96				

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BILL NO. 11: WATER SPRINKLER INSTALLATIONS FOR BASEMENT PARKING

ITEM No.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (Ksh Cts.)
	Total B/F from 95				
11.10	**Control Panel**				
	Supply and install dual control panel for the above three sprinkler pumps complete with overload protection, phase failure protection, automatic change over switch, star-delta starter for Electric pump, neon indicators for tripping and Resetting plus any other necessary control accessories to operate all the three pumps.	1	No.		
11.11	Allow a sum for painting of the whole sprinkler pipe-work installation with one coat of red oxide primer, undercoat and gloss coat to Architect's colour.		Item		
3.12	Allow a sum for wire brushing and cleaning followed by painting of the whole sprinkler pipe-work installation with one coat of epoxy cold cured zinc chromate primer (two pack) and three coats two pact epoxy enamel to Architect's colour.		Item		
11.12	**Sprinkler Heads (Nozzles)**				
11.13	Supply and Install 20mm diameter automatic sprinkler heads (nozzles), with a universal deflector and red bulb for 68^0C (degrees Celsius) operating temperature as manufactured by FIREKIL INTERNATIONAL or an approved equivalent.	54	No.		
	Spares				
11.14	Sprinkler heads as spare and as described above to be handed over to the client after completion of the entire installations.	5	No.		
11.15	Allow for setting to work, testing and commissioning of the sprinkler system.		Item		
	Total C/F to Summary Page				

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BILL NO. 12: DRY RISER INSTALLATIONS FOR OFFICE BLOCK

ITEM No.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT (Ksh Cts.)
	DRY RISER INSTALLATION				
	Supply and fix galvanized mild Steel pipes and tubing to BS 1387 class 'C' with all couplings.				
12.01	100mm diameter GMS class "C" pipe	50	LM		
12.02	100mm diameter GI bend	6	No.		
12.03	100mm diameter GI tee	12	No.		
12.04	100x65 diameter GI reducer	12	No.		
12.05	65mm diameter drain complete with valve	1	No.		
12.06	65mm diameter fire brigade twin breaching valve	1	No.		
12.07	65mm diameter wet riser landing valve complete with cap on chain to be installed 1.0 metre above floor level.	12	No.		
12.08	50mm diameter automatic air release valve as "Greenfield" to be connected to the top of riser pipe.	2	No.		
12.09	Allow for painting of the entire pipework in red oxide to the approval of the Engineer.		Item		
12.10	65mm diameter x 25m long rubber lined delivery hose pipe complete with quick fitting coupling to fit into a 65mm diameter dry riser outlet.	12	No.		
	Total C/F to Summary Page				

JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
PROPOSED ADMINISTRATION BLOCK
BILLS OF QUANTITIES FOR PLUMBING, DRAINAGE & FIRE FIGHTING INSTALLATIONS

BILL NO. 13: WATER RETICULATION

ITEM No.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT KSH. Cts.
	Supply and fix galvanized mild steel pipes and tubing class 'C' to BS 1387 with screwed and socketed joints to BS 143 and 1256 of approved manufacture. Tenderers must allow in their pipework prices for all the coupling, unions, connector joints, reducers etc as required in the running lengths of pipe, fixing clip, holder bats, flanges for tees, plugged and screwed.				
13.01	Class 'C' GMS pipework				
	a) 32 mm diameter	120	LM		
	b) 50mm ditto	100	LM		
13.02	a) 32 mm elbow/bend	18	No.		
	b) 50mm ditto	14	No.		
13.03	50mm diameter Sluice valve with wheel as Crane	1	No.		
13.04	50mm diameter high pressure non-return valve	1	No.		
	Excavations				
13.05	Excavate trench approx. 300mm wide and with an average depth of 750mm for water distribution as described elsewhere in this document. Back fill, ram, and cart away the remainder	150	LM		
13.06	**Gate Valves (Pegler)** a) 50mm diameter approved pattern brass rising stem full-way gate valve with wheel or equal and approved	1	No.		
13.07	Allow for identification, excavation, removal, re-routing, re-connecting and setting to work, any existing water pipes that may be existing on site.		Item		
13.08	Supply and install 1NO. Booster pump for gardenning water pumping. The pump capacity is 2.5 cubic meters per hour at 32 meters Head. The pump is to be complete with control pannel, diaphragm and all necessary accessories for proper functioning of the pump. The pump is to be as **'Dayliff DB2/50'**	1	No.		
13.09	Allow for a sum for Water Feature Pump and Accessories Installation of 3NO. Water features.		Sum	400,000.00	400,000.00
	Total C/F to Summary Page				

JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
PROPOSED ADMINISTRATION BLOCK
BILLS OF QUANTITIES FOR PLUMBING, DRAINAGE & FIRE FIGHTING INSTALLATIONS

BILL NO. 14 - SOLAR WATER HEATING INSTALLATIONS

ITEM No.	DESCRIPTION	QTY	UNIT	RATE (KShs Cts)	AMOUNT (KShs Cts)
14.01	**Supply and install solar hot water system as described below.**				
14.02	High efficiency 2.3 sq. Meters solar collectors sourced from **Calpak, shell, BP or equal and approved equivalent** which incorporate full area copper absorption plates ultrasonically welded to copper circulation tubes, advanced specification insulation and tempered security glass to provide energy absorption of up to 95%	4	No.		
14.03	Galvanised steel mounting frame and supplied complete with all fittings including air bleed and pressure release valve.	4	No.		
14.04	600 Ltrs Long life hot water storage tanks including resin insulated GRP casing for indefinite life, **STAINLESS STEEL** cylinder internally piped to optimise hot water availability and a built in electric booster.	1	No.		
14.05	25mm diameter air release valve	1	No.		
14.06	25mm diameter Heat resistant rubber tubing to discharge at the gutter	15	LM		
14.07	Supply and install 2 No. sound attenuated circulator pump as grundfos or approved equivalent delivering 2 **cubic meters of water per hour** at 20 m head for the solar system and associated electrical installations through a control panel and working on duty and standby.		Set		
	Total C/F to Summary Page				

JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
PROPOSED ADMINISTRATION BLOCK
BILLS OF QUANTITIES FOR PLUMBING, DRAINAGE & FIRE FIGHTING INSTALLATIONS

BILL NO. 14: GENERAL ITEMS

ITEM NO.	DESCRIPTION	QTY	UNIT	RATE KSH CTS.	AMOUNT KSH CTS.
15.01	Allow for liaising and obtaining necessary licenses/permission and/or certificates from local authorities to complete works		Item		
15.02	Acquire and submit a Bank Guarantee for 10% of the sub-contract sum, as a Performance Guarantee.		Item		
15.03	Acquire and submit Insurance for the sub-contract work.		Item		
15.04	Allow for presentation of all the required samples as per specifications, Bills of Quantities and Drawings.		Item		
15.05	Allow for testing and commissioning of all plumbing, drainage & fire fighting installations as per Bills of quantities, specifications and drawings to the satisfaction of the Engineer.		Item		
15.06	Prepare and submit Working Drawings comprising the following to the satisfaction of the Engineer both in hard and soft copy. All drawings to be in Autocad® 2000 format or an approved higher version: - i) Fully dimensioned drawings of all plants and apparatus. ii) General arrangement drawings of equipment, plant etc. iii) Routes – types and sizes and arrangement of all pipe work. iv) Wiring and piping diagrams of plant and apparatus. v) Schematic diagram of individual plants and switch and control boards. vi) All the required operating instructions for all panels, boards, control panels etc. **(Note: Full set of drawings to be presented as per drawing list).**		Item		
15.07	Allow for dismantling, removal of all existing services, on verification through an inventory and handing over to the client through a signed deliverv				
15.08	As item no 15.06, but for Record (As-Installed)		Item		
15.09	Prepare and submit Maintenance Manuals for all items installed.		Item		
15.10	Provide a year's (12 months') initial maintenance upon expiry of the Defects Liability Period. The maintenance to be carried out every quarter (3 months) for a period of 12 months.		Item		
15.11	All other items of general preliminary to cover, but not limited to:- i. Attendance on all other sub-contractors, such as for Communication Services, Electrical Installations, Security Installations, Sound Equipment/ Wiring Installations, Generator Installations, Lift Services, Solar Water Heating, V-Sat services etc. ii. Hiring and keeping a Supervisor/Foreman on site iii. Constant supervision of the works. iv. Provision of all the required spares. v. Testing and Inspection of materials/works. vi. Provision of labour camps. vii. Storage of materials. viii. Initial maintenance (During Defects Liability) ix. Providing water/electricity for the works. x. Protection of the works/materials xi. Clearing away on completion. xii. Preparing Final Account. xiii. Providing all Test Certificates, etc.		Item		
	Total C/F to Summary Page				

JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
PROPOSED ADMINISTRATION BLOCK
BILLS OF QUANTITIES FOR PLUMBING, DRAINAGE & FIRE FIGHTING INSTALLATIONS

SUMMARY PAGE

ITEM NO.	DESCRIPTION	AMAOUNT KSh. Cts.
1	Preliminaries related to Plumbing, Drainage and Firefighting Instalations	
2	Bill No. 1, B/F from 75	
3	Bill No. 2, B/F from 77	
4	Bill No. 3, B/F from 79	
5	Bill No. 4, B/F from 81	
6	Bill No. 5, B/F from 83	
7	Bill No. 6, B/F from 85	
8	Bill No. 7, B/F from 88	
9	Bill No. 8, B/F from 89	
10	Bill No. 9, B/F from 90	
11	Bill No. 10, B/F from 93	
12	Bill No. 11, B/F from 96	
13	Bill No. 12, B/F from 97	
14	Bill No. 13, B/F from 98	
15	Bill No. 14, B/F from 99	
16	Bill No. 15, B/F from 100	
17	Sub-Total	
18	Allow for 10% of Sub-Total as Contingency	
Total for Pluming, Drainage & Fire Fighting C/F to Form of Tender		

Total Amount in words

_____

Tenderer's Name and Stamp _____
(as in form of tender)

Signature_____ **Date** _____

SECTION VIII

STANDARD FORMS

(i) Form of Invitation for Tenders
(ii) Form of Tender
(iii) Appendix to Form of Tender
(iv) Letter of Acceptance
(v) Form of Agreement
(vi) Form of Tender Security
(vii) Performance Bank Guarantee (unconditional)
(viii) Bank Guarantee for Advance Payment
(ix) Tender Questionnaire
(xi) Confidential Business Questionnaire
(x) Statement of Foreign Currency Requirement
(xi) Schedule of Materials;- Basic Prices
(xii) Schedule of Labour;- Basic Prices
(xiii) Schedule of Plant and Equipment
(xv) Details of Sub-Contractors
(xvi) Certificate of Tenderer's Site visit
(xvii) Form of Written Power of Attorney
(xviii) Key Personnel
(xix) Completed Civil Works
(xx) Schedule of Ongoing Projects
(xxi) Other Supplementary Information
(xxii) Request for Review Form

FORM OF INVITATION FOR TENDERS

_____*[date]*

To: _____ *[name of Contractor]*
_____*[address]*
_____
_____

Dear Sirs:

Reference:_____[Contract Name]

You have been prequalified to tender for the above project.

We hereby invite you and other prequalified tenderers to submit a tender for the execution and completion of the above Contract.

A complete set of tender documents may be purchased by you from _____
_____[mailing address, cable/telex/facsimile numbers].

Upon payment of a non-refundable fee of Kshs _____

All tenders must be accompanied by _____number of copies of the same and a security in the form and amount specified in the tendering documents, and must be delivered to

_____
_____[address and location]

at or before _____**(time and date).** ***Tenders will be opened immediately thereafter, in the presence of tenderers' representatives who choose to attend.***

Please confirm receipt of this letter immediately in writing by cable/facsimile or telex.

Yours faithfully,

_____ ***Authorised Signature***
_____ ***Name and Title***

FORM OF TENDER

TO: _____*[Name of Employer)* _____*[Date]*

_____*[Name of Contract]*

Dear Sir,

1. In accordance with the Conditions of Contract, Specifications, Drawings and Bills of Quantities for the execution of the above named Works, we, the undersigned offer to construct, install and complete such Works and remedy any defects therein for the sum of Kshs._____*[Amount in figures]*Kenya Shillings_____
_____*[Amount in words]*

2. We undertake, if our tender is accepted, to commence the Works as soon as is reasonably possible after the receipt of the Project Manager'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 until _____*[Insert date]*, and it 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. We 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 Employer]* of_____[*Address of Employer]*

Witness; Name_____

Address_____

Signature_____

Date_____

APPENDIX TO FORM OF TENDER

(This appendix forms part of the tender)

CONDITIONS OF CONTRACT	CLAUSE	AMOUNT
Tender Security (Bank Guarantee only)		Kshs
Amount of Performance Security (Unconditional Bank Guarantee)	10.1	___ percent of Tender Sum in the form of Unconditional Bank Guarantee
Program to be submitted	14.1	Not later than ___ days after issuance of Order to Commence
Cashflow estimate to be submitted	14.3	Not later than ___ days after issuance of Order to Commence
Minimum amount of Third Party Insurance	23.2	Kshs.
Period for commencement, from the Engineer's order to commence	41.1	_____ days
Time for completion	43.1	……
Amount of liquidated damages	47.1	Kshs. per day
Limit of liquidated damages	47.1	___% of Contract Value
Defect Liability period	49.1	Months
Percentage of Retention	60.5	___ of Interim Payment Certificate
Limit of Retention Money	60.5	___ % of Contract Price
Minimum amount of interim certificates	60.2	Contract value/Time for completion in months
Time within which payment to be made after Interim Payment Certificate signed by Engineer	60.8	_____days
Time within which payment to be made after Final Payment Certificate signed by Engineer	60.8	_____ days
Appointer of Arbitrator	67(3)	Chief Justice of The Republic of Kenya
Notice to Employer and Engineer	68.2	The Employers address is: Permanent Secretary, Ministry of……, P.O.Box …… NAIROBI The Engineer's address is: Chief Engineer(……), Ministry of……, P.O.Box…… NAIROBI

Signature of Tender……Date……

LETTER OF ACCEPTANCE

[letterhead paper of the Employer]

_____*[date]*

To: _____
[name of the Contractor]

_____
[address of the Contractor]

Dear Sir,

This is to notify you that your Tender dated _____
for the execution of _____
[name of the Contract and identification number,as given in the Tender documents] for the Contract Price of Kshs. _____ *[amount in figures]*[Kenya Shillings_____*(amount in words)*] in accordance with the Instructions to Tenderers is hereby accepted.

You are hereby instructed to proceed with the execution of the said Works in accordance with the Contract documents.

Authorized Signature ……

Name and Title of Signatory ……

Attachment : Agreement

FORM OF AGREEMENT

THIS AGREEMENT, made the _____ day of _____ 20 _____ between_____of[or whose registered office is situated at]_____
(hereinafter called "the Employer") of the one part AND
_____of[or whose registered office is situated at]_____
(hereinafter called "the Contractor") of the other part.

WHEREAS THE Employer is desirous that the Contractor executes
_____
(name and identification number of Contract) (hereinafter called "the Works") located at_____*[Place/location of the Works*]and the Employer has accepted the tender submitted by the Contractor for the execution and completion of such Works and the remedying of any defects therein for the Contract Price of Kshs_____[*Amount in figures*],Kenya Shillings_____[*Amount in words]*.

NOW THIS AGREEMENT WITNESSETH as follows:

1. In this Agreement, words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.

2. The following documents shall be deemed to form and shall be read and construed as part of this Agreement i.e.

    (i) Letter of Acceptance

    (ii) Form of Tender

    (iii) Conditions of Contract Part I

    (iv) Conditions of Contract Part II and Appendix to Conditions of Contract

    (v) Specifications

    (vi) Drawings

    (vii) Priced Bills of Quantities

3. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy any defects therein in conformity in all respects with the provisions of the Contract.

4. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS whereof the parties thereto have caused this Agreement to be executed the day and year first before written.

The common Seal of _____

Was hereunto affixed in the presence of _____

Signed Sealed, and Delivered by the said _____

Binding Signature of Employer _____

Binding Signature of Contractor _____

In the presence of (i) Name_____

Address_____

Signature_____

[ii] Name _____

Address_____

Signature_____

FORM OF TENDER SECURITY

WHEREAS ……..(hereinafter called "the Tenderer") has submitted his tender dated …… for the construction of ……
…… *(name of Contract)*

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;
   (c) rejects a correction of an arithmetic error in the tender.

   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 up to and including thirty (30) days after the period of tender validity, and any demand in respect thereof should reach the Bank not later than the said date.

_____ _____
[date[*[signature of the Bank]*

_____ _____
[witness] *[seal]*

(Amend accordingly if provided by Insurance Company)

PERFORMANCE BANK GUARANTEE (UNCONDITIONAL)

To: _____(*Name of Employer*) _____*(Date)*
_____(*Address of Employer)*

Dear Sir,

WHEREAS _____(hereinafter called "the Contractor") has undertaken, in pursuance of Contract No. _____ dated _____ to execute _____ (hereinafter called "the Works");

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognised bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee:

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of Kshs. _____ (*amount of Guarantee in figures*) Kenya Shillings_____ (*amount of Guarantee in words*), and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of Kenya Shillings _____ (*amount of Guarantee in words*) as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change, addition or other modification of the terms of the Contract or of the Works to be performed thereunder or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this Guarantee, and we hereby waive notice of any change, addition, or modification.

This guarantee shall be valid until the date of issue of the Certificate of Completion.

SIGNATURE AND SEAL OF THE GUARANTOR _____

Name of Bank _____

Address _____

Date _____

(Amend accordingly if provided by Insurance Company)

BANK GUARANTEE FOR ADVANCE PAYMENT

To: _____ *[name of Employer]* _____*(Date)*
_____ *[address of Employer]*

Gentlemen,
Ref: _____*[name of Contract]*

In accordance with the provisions of the Conditions of Contract of the above-mentioned Contract, We,_____*[name and Address of Contractor]* (hereinafter called "the Contractor") shall deposit with _____*[name of Employer]* a bank guarantee to guarantee his proper and faithful performance under the said Contract in an amount of Kshs._____*[amount of Guarantee in figurers]* Kenya Shillings_____*[amount of Guarantee in words]*.

We, _____[*bank or financial institution*], as instructed by the Contractor, agree unconditionally and irrevocably to guarantee as primary obligator and not as Surety merely, the payment to _____[*name of Employer*] on his first demand without whatsoever right of objection on our part and without his first claim to the Contractor, in the amount not exceeding Kshs_____[*amount of Guarantee in figures*] Kenya Shillings _____[*amount of Guarantee in words*], such amount to be reduced periodically by the amounts recovered by you from the proceeds of the Contract.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed thereunder or of any of the Contract documents which may be made between _____[*name of Employer*] and the Contractor, shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

No drawing may be made by you under this guarantee until we have received notice in writing from you that an advance payment of the amount listed above has been paid to the Contractor pursuant to the Contract.

This guarantee shall remain valid and in full effect from the date of the advance payment under the Contract until _____(*name of Employer*) receives full payment of the same amount from the Contract.

Yours faithfully,

Signature and Seal _____

Name of the Bank or financial institution _____

Address _____

Date _____
Witness: Name: _____
Address: _____
Signature: _____
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 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

Make copy and deliver to:_____(*Name of Employer*)

ANTI – CORRUPTION POLICY IN THE PROCUREMENT PROCESS

UNDERTAKING BY BIDDER ON ANTI – CORRUPTION POLICY / CODE OF CONDUCT AND COMPLIANCE PROGRAMME

The governments of Kenya is committed to fighting corruption in all its forms and in all its institutions to ensure that all the government earned revenues are utilized prudently and for the purpose intended with a view to promoting economic development as the country work towards actualizing Vision 2030.

Here at Jaramogi Oginga Odinga University of Science and Technology and also being one of the government entities mandated under the government to provide quality education and transforming lives, on behalf of the government, we are highly committed to fighting any form of corruption in our organization to ensure that all the monies that the government entrust with us, is optimally and prudently utilized for the benefits of all the people we serve.

The following is a requirement that every Bidder wishing to do business with JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY must comply with:

(1) Each bidder must submit a statement, as part of the tender documents, in the format given and which must be signed personally by the Chief Executive Officer or other appropriate senior corporate officer of the bidding company and, where relevant, of its subsidiary in Kenya. If a tender is submitted by a subsidiary, a statement to this effect will also be required of the parent company, signed by its Chief Executive Officer or other appropriate senior corporate officer.

(2) Bidders will also be required to submit similar No-bribery commitments from their subcontractors and consortium partners; the bidder may cover the subcontractors and consortium partners in its own statement, provided the bidder assumes full responsibility.

(3) a) Payment to agents and other third parties shall be limited to appropriate compensation for legitimate services.

b) Each bidder will make full disclosure in the tender documentation of the beneficiaries and amounts of all payments made, or intended to be made, to agents or other third parties (including political parties or electoral candidates) relating to the tender and, if successful, the implementation of the contract.

c) The successful bidder will also make full disclosure [quarterly or semi- annually] of all payments to agents and other third parties during the execution of the contract.

d) Within six months of the completion of the performance of the contract, the successful bidder will formally certify that no bribes or other illicit commissions have been paid. The final accounting shall include brief details of the goods and services provided that are sufficient to establish the legitimacy of the payments made.

e) Statements required according to subparagraphs (b) and (d) of this paragraph will have to be certified by the company's Chief Executive Officer, or other appropriate senior corporate officer.

(4) Tenders which do not conform to these requirements shall not be considered.

(5) If the successful bidder fails to comply with its No-bribery commitment, significant sanctions will apply. The sanctions may include all or any of the following:

a) Cancellation of the contract;

b) Liability for damages to the public authority and/or the unsuccessful competitors in the bidding possibly in the form of a lump sum representing a pre-set percentage of the contract value (liquidated).

(6) Bidders shall make available, as part of their tender, copies of their anti-Bribery Policy/Code of Conduct, if any, and of their-general or project - specific - Compliance Program.

(7) The Government of Kenya through Ethics and Anti-Corruption Commission has made special arrangements for adequate oversight of the procurement process and the execution of the contract. Those charged with the oversight responsibility will have full access if need be to all documentation submitted by Bidders for this contract, and to which in turn all Bidders and other parties involved or affected by the project shall have full access (provided, however, that no proprietary information concerning a bidder may be disclosed to another bidder or to the public).

1. MEMORANDUM (FORMAT)

(Clause 46 of Kenya Public Procurement and Asset Disposal Act 2015)

This company _____*(name of company)* has issued, for the purposes of this tender, a Compliance Program copy attached -which includes all reasonable steps necessary to assure that the No-bribery commitment given in this statement will be complied with by its managers and employees, as well as by all third parties working with this company on the public sector projects or contract including agents, consultants, consortium partners, subcontractors and suppliers')"

Authorized Signature:_____

Name and Title of Signatory: _____

Name of Bidder: _____

Address: _____

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 2 (d) 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: K. pound.....

Name of your bankers.....

Branch.....

Part 2 (a) – Sole Proprietor

Your name in full..... Age.....

Nationality..... Country of Origin.....

*Citizenship details .....

Part 2 (b) – Partnership

Give details of partners as follows:

Name in full	*Nationality*	*Citizenship Details*	*Shares*
1.....			
2.....			
3.....			

Part 2(c) – Registered Company:

Private or public.....

State the nominal and issued capital 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 …… ……(*Name of Employer)* who has interest in this firm? Yes/No……(*Delete as necessary*)

I certify that the information given above is correct.

…… …… ……
(Title) *(Signature)* *(Date)*

* Attach proof of citizenship

STATEMENT OF FOREIGN CURRENCY REQUIREMENTS

(See Clause 60[5] of the Conditions of Contract)

In the event of our Tender for the execution of_____ _____(*name of Contract*) being accepted, we would require in accordance with Clause 21 of the Conditions of Contract, which is attached hereto, the following percentage:

(Figures)…… (Words)……

of the Contract Sum, (Less Fluctuations) to be paid in foreign currency.

Currency in which foreign exchange element is required:

……

Date: The …… Day of …… 20……

Enter 0% (zero percent) if no payment will be made in foreign currency.

Maximum foreign currency requirement shall be _____(percent) of the Contract Sum, less Fluctuations.

_____
(Signature of Tenderer)

SCHEDULE OF MATERIALS;-BASIC PRICES
(Ref: Clause 70 of Conditions of Contract)

MATERIAL	UNIT	ORIGIN AND PRICE			TRANSPORTATION COST FROM SOURCE OF ORIGIN	
		COUNTRY OF ORIGIN	SUPPLIER	PRICE	MODE	PRICE (KSHS)
Cement	Mg					
Lime	Mg					
Sand	Mg					
Aggregate	Mg					
Diesel	L					
Regular Petrol	L					
Super Petrol	L					
Kerosene	L					
Structural steel	Mg					
Gabion Mesh	M2					
Reinforcement Steel	Mg					
Explosives	Kg					
Oil and Lubricants	L					
Bitumen Emulsion A3	L					
Bitumen Emulsion A4	L					
Bitumen Emulsion K1	L					
Bitumen Emulsion K3	L					
Bitumen 80/100	Kg					
Bitumen MC 30	ML					
Bitumen MC 70	L					
Bitumen MC 3000	L					
Ammonium nitrate for blasting	Kg					

I certify that the above information is correct.

…… …… ……

(Title) *(Signature)* *(Date)*

The prices inserted above shall be those prevailing 30 days before the submission of Tenders and shall be quoted in Kenya Shillings using the exchange rates specified in the Appendix to Form of Tender.

Prices of imported materials to be quoted CIF Mombasa or Nairobi as appropriate depending on whether materials are imported by the tenderer directly or through a local agent.

Transportation costs for imported materials to be quoted from Mombasa or Nairobi as appropriate to _____(Contract Site) depending on whether materials are imported directly by the tenderer or through a local agent.

LETTER OF NOTIFICATION OF AWARD

Address of Procuring Entity
_____
_____

To:_____
_____
_____
_____

RE: Tender No._____

Tender Name_____

This is to notify that the contract/s stated below under the above mentioned tender have been awarded to you.

_____
_____

1. Please acknowledge receipt of this letter of notification signifying your acceptance.

2. The contract/contracts shall be signed by the parties within 30 days of the date of this letter but not earlier than 14 days from the date of the letter.

3. You may contact the officer(s) whose particulars appear below on the subject matter of this letter of notification of award.

   *(FULL PARTICULARS)*_____
   _____

SIGNED FOR ACCOUNTING OFFICER

ANTI – CORRUPTION POLICY IN THE PROCUREMENT PROCESS

UNDERTAKING BY BIDDER ON ANTI – CORRUPTION POLICY / CODE OF CONDUCT AND COMPLIANCE PROGRAMME

The governments of Kenya is committed to fighting corruption in all its forms and in all its institutions to ensure that all the government earned revenues are utilized prudently and for the purpose intended with a view to promoting economic development as the country work towards actualizing Vision 2030.

Here at Jaramogi Oginga Odinga University of Science and Technology and also being one of the government entities mandated under the government to provide quality education and transforming lives, on behalf of the government, we are highly committed to fighting any form of corruption in our organization to ensure that all the monies that the government entrust with us, is optimally and prudently utilized for the benefits of all the people we serve.

The following is a requirement that every Bidder wishing to do business with JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY must comply with:

(1) Each bidder must submit a statement, as part of the tender documents, in the format given and which must be signed personally by the Chief Executive Officer or other appropriate senior corporate officer of the bidding company and, where relevant, of its subsidiary in Kenya. If a tender is submitted by a subsidiary, a statement to this effect will also be required of the parent company, signed by its Chief Executive Officer or other appropriate senior corporate officer.

(2) Bidders will also be required to submit similar No-bribery commitments from their subcontractors and consortium partners; the bidder may cover the subcontractors and consortium partners in its own statement, provided the bidder assumes full responsibility.

(3) a) Payment to agents and other third parties shall be limited to appropriate compensation for legitimate services.

b) Each bidder will make full disclosure in the tender documentation of the beneficiaries and amounts of all payments made, or intended to be made, to agents or other third parties (including political parties or electoral candidates) relating to the tender and, if successful, the implementation of the contract.

c) The successful bidder will also make full disclosure [quarterly or semi- annually] of all payments to agents and other third parties during the execution of the contract.

d) Within six months of the completion of the performance of the contract, the successful bidder will formally certify that no bribes or other illicit commissions have been paid. The final accounting shall include brief details of the goods and services provided that are sufficient to establish the legitimacy of the payments made.

e) Statements required according to subparagraphs (b) and (d) of this paragraph will have to be certified by the company's Chief Executive Officer, or other appropriate senior corporate officer.

(4) Tenders which do not conform to these requirements shall not be considered.

(5) If the successful bidder fails to comply with its No-bribery commitment, significant sanctions will apply. The sanctions may include all or any of the following:

c) Cancellation of the contract;

d) Liability for damages to the public authority and/or the unsuccessful competitors in the bidding possibly in the form of a lump sum representing a pre-set percentage of the contract value (liquidated).

(6) Bidders shall make available, as part of their tender, copies of their anti-Bribery Policy/Code of Conduct, if any, and of their-general or project - specific - Compliance Program.

(7) The Government of Kenya through Ethics and Anti-Corruption Commission has made special arrangements for adequate oversight of the procurement process and the execution of the contract. Those charged with the oversight responsibility will have full access if need be to all documentation submitted by Bidders for this contract, and to which in turn all Bidders and other parties involved or affected by the project shall have full access (provided, however, that no proprietary information concerning a bidder may be disclosed to another bidder or to the public).

2. MEMORANDUM (FORMAT)

(Clause 46 of Kenya Public Procurement and Asset Disposal Act 2015)

This company _____*(name of company)* has issued, for the purposes of this tender, a Compliance Program copy attached -which includes all reasonable steps necessary to assure that the No-bribery commitment given in this statement will be complied with by its managers and employees, as well as by all third parties working with this company on the public sector projects or contract including agents, consultants, consortium partners, subcontractors and suppliers')"

Authorized Signature:_____

Name and Title of Signatory: _____

Name of Bidder: _____

Address: _____

NON-DEBARMENT STATEMENT

I/We/Messrs……

of .....Street/avenue, ...Building, P. O. Box……Code ...…, of ..... (Town),

.... (Nationality), Phone: ..... E-mail .....….

declare that I/We /Messrs

……

are not debarred from participating in public procurement by the Public Procurement Oversight Authority pursuant to section 115 of the Public Procurement and Disposal Act, 2005.

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

Authorized Signature.....Official Stamp .....

Name and Title of Signatory…….....

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, who can be perceived as an inducement to win this tender.

Signed: ……for and on behalf of the Tenderer

Date: ……..

Official Rubber Stamp: ……

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 .

FORM RB 1

REPUBLIC OF KENYA

PUBLIC PROCUREMENT ADMINISTRATIVE REVIEW BOARD

APPLICATION NO…….OF…….….20……...

BETWEEN

……..APPLICANT

AND

……RESPONDENT *(Procuring Entity*)

Request for review of the decision of the…… (*Name of the Procuring Entity)* of ……dated the…day of ……20…….in the matter of Tender No……...…of ……..20…

REQUEST FOR REVIEW

I/We……,the above named Applicant(s), of address: Physical address…….Fax No……Tel. No……..Email ……, hereby request the Public Procurement Administrative Review Board to review the whole/part of the above mentioned decision on the following grounds , namely:-

1.

2.

etc.

By this memorandum, the Applicant requests the Board for an order/orders that: -

1.

2.

etc

SIGNED …….(Applicant)

Dated on…….day of ……/…20…

FOR OFFICIAL USE ONLY

Lodged with the Secretary Public Procurement Administrative Review Board on …… day of ……....20….……

SIGNED
Board Secretary

EVALUATION CRITERIA

Technical Evaluation Form: The tenderer is expected to complete Part 1 and 3 of this form

Part A: General Information

Tenderer Name……..

Postal Address……...

Telephone (Office)……..Mobile……..

Physical Address……

Part B: Evaluation Stages

Stage 1: Mandatory Requirements

*Applicants **must** qualify in all the requirements below for them to proceed to the Evaluation Stage 2- Technical evaluation*

S/No	Mandatory requirement
1	Must provide National Construction Authority (NCA) Category 3 and above registration certificate under the category of Mechanical Installation. In the event of a joint venture, the certificate maybe submitted by any one of the members of the venture.
2	Must provide Copy of current annual contractors practicing license from National Construction Authority (NCA). In the event of a joint venture, the certificate will be submitted by the holder of the NCA registration certificate.
3	Must provide Detailed Company profile.
4	Must provide certified copy of Certificate of Incorporation. If joint venture, ALL member of the venture shall submit their respective certificates.
5	Must attach proof of certified Company Ownership (CR12).
6	Must attach certified copy of Single Business Permit for the year 2020
7	Must provide valid Certificate of Tax Compliance from Kenya Revenue Authority; (certified copy). If joint venture, ALL member of the venture shall submit their respective certificates.
8	Must Dully fill, sign and stamp the Form of Tender.
9	Must attach Certified Audited financial reports prepared by registered Auditors for the last three consecutive years for the years ended 2017, 2018 and 2019.
10	Must Dully fill, sign and stamp the Confidential Business Questionnaire
11	Must Provide Dully filled, signed and stamped Non-Debarment Declaration Form.
12	Must Provide Dully signed and signed/stamped Litigation Declaration Form.)
13	Site visit/ pre-tender conference is mandatory (as indicated in the advertisement)
14	Must provide a bid bond of 2% of the tender amount from a commercial bank recognized by CBK and must be valid for 120 days from the date of tender closing.
15	Must provide Manufacturers letter of Authority for the specified equipment
16	Must dully fill sign and stamp the Anti-corruption declaration form
17	Must Provide proof of Power of attorney of Tender Signatory in the event of a joint

Stage 2: Technical Evaluation

Award of points for the Technical Evaluation shall be as shown in Table 1 below:

Item	Description	Points Scored	Max Points	Total Points
1.	Key Personnel (Attach evidence)			
	a) Project Engineer qualification • Holder of Degree ---------- 5 marks • Holder of Diploma ---------- 3marks • Holder of Certificate --------- 0 marks		5	25
	b) Project Engineer's experience • Over ten (10) year relevant experience -- 5 marks • Five (5) to ten (10) years relevant experience --------- 4 marks • Under five (5) years relevant experience ---- 2 marks • No experience ---------- 0 marks		5	
	c) Works Inspector Qualification • Holder of Degree in electrical engineering ---------- 5 marks • Holder of Diploma in electrical engineering ---------- 3 marks • Holder of Certificate in relevant engineering ---------- 1 mark • No Qualification ---------- 0 marks		5	
	d) Works Inspector's Experience • Over 10 years' relevant experience---------- 5 marks • Five (5) to ten (10) years' relevant experience ---------- 3 marks • Under 5 years' relevant experience ---------- 1 marks • No experience ----------0 marks		5	
	e) Experience of Site Technicians with minimum of certificate qualification in relevant Engineering field • Over 10 years' relevant experience ---------- 5 marks • Five (5) to ten (10) relevant experience -------- 3marks • Under 5 years' relevant experience ------ 1mark • No relevant experience ---------- 0 marks		5	

Item	Description	Points Scored	Max Points	Total Points
2.	Contracts completed in the last five (5) years; a max of 5 No. projects (Attach evidence in form of completion certificates or letters from clients/consultants.) • Project of similar nature, complexity and magnitude of equal or higher value. ---------- 5 marks each • Project of similar nature and complexity but of lower magnitude than the one in consideration ------ 3 marks each • No completed project of similar nature ---- 0 marks		25	25
3	On-going projects (A max of 2 No. projects) (Attach evidence; Letters of Award/ Interim certificates/ Contracts) • Project of similar nature, complexity and magnitude ---------- 5 marks each • Project of similar nature, but of lower value than the one in consideration ---------- 2.5 marks each • No ongoing project of similar nature ---------- 0 marks		10	10
5.	Evidence of business physical address. (Offices/Workshops). Provide copies of ownership or lease agreement documents.		5	5
6.	Financial report Audited financial report (last three [3] years) - 2017-2019 • Average Annual Turnover equal or higher than to Kshs. 40.0 Million ---------- 15 Marks • Average Annual Turnover between Kshs. 20 Million and Kshs 39.9 Million ---------- 10 Marks • Average Annual Turnover between Kshs. 10 Million and Kshs 19.9 Million ---------- 5 Marks • Average Annual Turnover below Kshs 10 Million ---------- 0 Marks		15	15
7.	Evidence of financial resources (cash in hand, lines of credit, overdraft facility etc.) • Amount equivalent to or above 25% of submitted tender sum ---------- 20 Marks		20	20

Item	Description	Points Scored	Max Points	Total Points
	• Amount equivalent to 20% but below 25% of submitted tender sum ---------- 15 Marks • Amount equivalent to 15% but below 20% of submitted tender sum ---------- 10 Marks • Amount equivalent to 10% but below 15% of submitted tender sum ---------- 5 Marks • Amount below 10% of submitted tender sum -------- 0 Mark			
	TOTAL			100

Any tenderer who scores 70 points and above in this Technical Evaluation shall be considered for further evaluation.

Stage 3: Financial Evaluation

Only tenderer's who score 70% and above of the overall marks on the technical evaluation shall qualify for financial evaluation.

This will be carried out only for those tenders that have passed BOTH mandatory requirements and Technical evaluation. The client will;

1. Undertake price comparison and ranking of prices.
2. The prices shall be compared and checked for completeness including all local taxes.

Stage 4: Due Diligence and Recommendation for Award

Particulars of post – qualification if applicable. The Client may inspect the premises due diligence to seek further clarification/confirmation if necessary, to confirm authenticity/compliance of any condition of the tender/qualifications of the tenderer in line with Section 83 of the Public Procurement and Asset Disposal Act, 2015.

The tenderer shall not be awarded the Sub-Contract if they fail to pass the compliance test. The second lowest tenderer shall be considered for due diligence.

Award Criteria: The firm achieving the lowest evaluated price will be awarded the Sub-Contract in line with Section 86 of the Public Procurement and Disposal Act, 2015

Particulars of performance security; 10% of Sub-Contract sum.