



NAIROBI CITY WATER & SEWERAGE COMPANY LTD.

KAMPALA RD, P. O. Box 30656-00100, Nairobi, Kenya

Tel: +254 0703 080 000

Email: info@nairobiwater.co.ke

www.nairobiwater.co.ke

TENDER NO. NCWSC/23/2020

**CONSTRUCTION OF 20NO. WATER KIOSKS AND
WATER PIPELINE EXTENSION**

JANUARY, 2021

CLOSING DATE: Friday 22nd January, 2021

CLOSING TIME:12:00 NOON

Board of Directors:

*B.L.Okumu (Chairman), T.Muriuki (Vice-Chair), N.C.C. County Secretary, N.C.C. C.E.C.M. Finance &Economic Planning,
N.C.C. C.O. Water, Sanitation & Energy, M.Kuruga, E. Mukuhi, L.M.Kamba, K. Nyamu,
M.A Abdullahi , Eng. N. M. Muguna (Managing Director)*

SECTION I : INVITATION FOR TENDERS

NCWSC/23/2020 – CONSTRUCTION OF 20NO. WATER KIOSKS AND WATER PIPELINE EXTENSION.

Bids are open for eligible Contractors who meet the following criteria to bid for the above works: -

- a) Copies of certificates of registration, and principal place of business;
 - b) Must have complied with tax requirements and avail a current tax compliance certificate from KRA
 - c) Indicate the total monetary value of construction work performed for each of the last three years;
 - d) Has experience in works of a similar nature and size for each of the last three years, and clients who shall be contacted for further information on these contracts;
 - e) Indicate major items of construction equipment owned by bidder;
 - f) Indicate major items contractor intends to lease for this assignment;
 - g) Have qualified and experienced key site management and technical personnel proposed for the Contract; indicating their technical capability and must indicate the same including CV's and copy certificates
 - h) Must be an authorized Contractor registered with the National Construction Authority (NCA) at least NCA 6 for both water and building works and a certified copy of the registration certificate must be submitted with this bid.
 - i) Attach reports on the financial standing of the Bidder, such as profit and loss, balance sheet, statements and auditor's reports for the last two years or a letter from the bank stating available credit line (of not less than seven million) or a certificate of deposits etc.
 - j) Willing to give authority to the employer to seek references from the Bidders bankers and references.
 - k) Bidders shall not have been declared ineligible due to corruption and fraudulent practices.
 - l) Bidders who have worked for the company before shall demonstrate they have completed all the previous projects and that none of the contract(s) has been terminated or in the process of termination for non-performance.
- 1.2 Interested eligible candidates may obtain further information and inspect tender documents (and additional copies) at Supply Chain Manager's office, Nairobi City Water and Sewerage Company Ltd, on Kampala road off Enterprise road, Industrial Area during normal working hours.

- 1.3 A complete set of Bid documents may be obtained by interested candidates from the company's website; www.nairobiwater.co.ke Bidders MUST immediately email their name and contact details i.e. (company name, cell-phone number and email,) to: tenders.go.ke for records, communication of any tender clarifications and addenda.
- 1.4 Prices quoted should be net inclusive of all taxes, must be in Kenya shillings and shall remain valid for *150* days from the closing date of tender.
- 1.5 Completed Bid documents are to be enclosed in plain sealed envelopes marked with Bid reference number and be deposited in the Tender Box at Nairobi City Water and Sewerage Company Ltd, on the first floor, Administration Block, at the **Head Office, Kampala Road off Enterprise Road, Nairobi** or be addressed to Nairobi City Water & Sewerage Company Ltd, Kampala Road, off Enterprise Road, P O Box 30656-00100, Nairobi, Kenya so as to be received on or before **12.00 noon Friday 22nd January, 2021**.
- 1.6 Tenders will be opened immediately thereafter in the presence of the candidates or their representatives who choose to attend at Nairobi City Water and Sewerage Company Ltd, Kampala Road, Industrial Area
- 1.7 This tender is only open to those who meet the requirements for eligibility
- 1.8 All pages must be paginated by the bidder for each bid submitted

Managing Director

Nairobi City Water and Sewerage Company Ltd

P.O. BOX 30656 – 00100

NAIROBI

Tel. + 254 0703 080534/403

E-mail: tenders@nairobiwater.co.ke

Website: www.nairobiwater.co.ke

SECTION II - 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 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 Nairobi City Water and Sewerage Company Ltd.

2. Eligibility and Qualification Requirements

2.1 Eligibility requirements

This invitation to tender is open to all tenderers who are qualified as stated in the Invitation to Tender.

2.2 Qualification Requirements

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 provide the following information: -

- (a) Details of experience and past performance of the tenderer on the works of a similar nature 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 sub-contractors 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.

2.3 Joint Ventures

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

- (a) The tender, and in case of a successful tender, the Form of Agreement, shall be signed so as to be legally binding on all partners.
- (b) One of the partners shall be nominated as being in charge, and this authorization shall be evidenced by submitting a power of attorney signed by legally authorized signatories of all the partners.
- (c) The partner in charge shall be authorized to incur liabilities and receive instructions for and on behalf of any and all partners of the joint venture and the entire execution of the 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.

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.

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

4. Site Visit

- 4.1. A **mandatory site visit** shall be held on **Tuesday 12th January, 2021 at 09.00 am**. A representative of the Employer will be available to meet the intending tenderers at the Site. The representative will not be available at any other time for site inspection visits. Tenderers must provide their own transport.
- 4.2. The costs of visiting the Site shall be fully borne by the tenderer.
- 4.3. 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.

Tenderers shall meet at NCWSC Ltd - Procurement Office at 09.00am for guidance to the Site.

- 4.4. Each tenderer shall complete the Certificate of Tenderer's Visit to the Site.

TENDER DOCUMENTS

5 Tender Documents

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

- 5.2
- 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. Tender and Confidential Business Questionnaires

- h. Details of Sub contractors
- i. Schedules of Supplementary Information
- j. General Conditions of Contract – Part I
- k. Conditions of Particular Application – Part II
- l. Specifications
- m. Bills of Quantities
- n. Drawings
- o. Declaration Form

5.3 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.

5.4 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

A tenderer making an inquiry relating to the tender document may notify the Employer in writing or by e-mail 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.

6.1 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 e-mail 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 Bills of Quantities and Schedules
 - 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 **Indelible 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, taxes and other levies payable by the Contractor under the Contract, or for any other cause prior to the deadline for submission of tenders, shall be included in the rates and prices and the total Tender Price 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 basic unit rates for the supply of items listed in the Conditions of Contract clause 70 where appropriate. The Employer may require the tenderer to justify such rates so obtained from the suppliers or manufacturers.
- 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 70 of the Conditions of Contract Part II.
- 10.6 Contract price variations shall not be allowed within the first 12 months of the contract.
- 10.7 Where quantity contract variation is allowed, the variation shall not exceed 20% of the original contract quantity.
- 10.8 Price variation requests shall be processed by the procuring entity within 30 days of receiving the request.

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 the rates of exchange used for pricing the tender shall be the 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 one hundred and fifty (150) 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 valid at least thirty (30) days beyond the tender validity period.
- 13.3 Any tender not accompanied by an acceptable Tender Surety will be rejected by the Employer as non-responsive.
- 13.4 The Tender Sureties of unsuccessful tenderers will be returned as promptly as possible as but not later than twenty eight (28) days after expiration of the tender validity period. The Tender Surety of the successful tenderer will be returned upon the tenderer executing the Contract and furnishing the required Performance Security.
- a) The Tender Surety may be forfeited if: a tenderer withdraws his tender during the period of tender validity: or
 - b) in the case of a successful tenderer, if he fails, within the specified time limit
 - i. to sign the Agreement, or
 - ii. to furnish the necessary Performance Security
 - c) 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. A tenderer who submits or participates in more than one tender will be disqualified.
- 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 at the venue and time 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 e-mail, to reach the Employer not later than seven (7) 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) Nonattendance at the pre-bid 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 or persons signing the tender.

SUBMISSION OF TENDERS

17 Sealing and Marking of Tenders

- 17.1 The tenderer shall seal the original and copy of the tender in separate envelopes, duly marking the envelopes as “ORIGINAL” and “COPY”. The envelopes shall then be sealed in an outer separate 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 indicate the name and address of the tenderer to enable the tender to be returned unopened in case it is declared “late”, while the outer envelope shall bear no mark indicating the identity of the tenderer.
- 17.4 If the outer envelope is not sealed and marked as instructed above, the Employer will assume no responsibility for the misplacement or premature opening of the tender. A tender opened prematurely for this cause will be rejected by the Employer and returned to the tenderer.

18 Deadline for Submission of Tenders

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

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

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

- 18.2 The Employer may, at his discretion, extend the deadline for the submission of tenders through the issue of an Addendum in accordance with clause 7, in which case all rights and obligations of the Employer and the tenderers previously subject to the original deadline shall thereafter be subject to the new deadline as extended.
- 18.3 Any tender received by the Employer after the prescribed deadline for submission of tender will be returned unopened to the tenderer.

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 prescribe 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.
- 19.3 No tender may be modified subsequent to the deadline for submission of tenders.
- 19.4 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.
- 19.5 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 period 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 minutes of the tender opening including the information disclosed to those present.

20.5 Tenders not opened and read out at the 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 of 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 No Correction of Errors

The tender sum as submitted and read out during the tender opening shall be absolute and final and shall not be the subject of correction, adjustment or amendment in any way by any person or entity. Any arithmetic errors in the price schedule shall lead to disqualification at the preliminary stage.

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 seven (7) 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 Day works 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 In evaluating tenders, the Employer will determine for each tender the evaluated tender price in accordance to clause 24.
- 26.3 The Employer reserves the right to accept any variation, deviation or alternative offer. Variations, deviations, alternative offers and other factors which are in excess of the requirements of the tender documents or otherwise result in the accrual of unsolicited benefits to the Employer, shall not be taken into account in tender evaluation.
- 26.4 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.
- 26.5 If the lowest evaluated tender is seriously unbalanced or front loaded in relation to the Employer's estimate of the items of work to be performed under the Contract, the Employer may require the tenderer to produce detailed price analysis 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 analysis, 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.

- 26.6 A state organ or public entity shall give preferential treatment to the local agents before seeking the services of an international procurement agent.
- 26.7 The procuring entity may at any time terminate procurement proceedings before contract award and shall not be liable to any person for the termination.
- 26.8 The procuring entity shall give prompt notice of the termination to the tenderers and on request give its reasons for termination within 14 days of receiving the request from any tenderer.
- 26.9 A tenderer who gives false information in the tender document about its qualification or who refuses to enter into a contract after notification of contract award shall be considered for debarment from participating in future public procurement.
- 26.10 Poor past performance shall not be used as an evaluation criterion unless specifically provided for in the appendix.

27 AWARD OF CONTRACT

Award Criteria

- 27.1 Subject to Sub-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 as required in Sub-clause 2.1 and 2.2 here above.
- 27.2 The Employer reserves the right to accept or reject any tender, and to annul the tendering process and reject all tenders, at any time prior to award of Contract, without thereby incurring any liability to the affected tenderers.

28 Notification of Award

- 28.1 Prior to the expiration of the period of tender validity prescribed by the Employer, the Employer will notify the successful tenderer via e-mail / telephone 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.
- 28.2 At the same time that the Employer notifies the successful tenderer that his tender has been accepted, the Employer shall notify the other tenderers that the tenders have been unsuccessful.

- 29 The written contract shall be entered into within the period specified in the notification but not before fourteen days have elapsed following the giving of that notification provided that a contract shall be signed within the tender validity period.

30 Performance Guarantee

- 30.1 Within twenty-one [21] days of receipt of the notification of award from the Employer, the successful tenderer shall furnish the Employer with a Performance Security in the amount stated in the Appendix to Instructions to Tenderers and in the format stipulated in the Conditions of Contract.
- 30.2 The Performance Security to be provided by the successful tenderer shall be an unconditional Guarantee issued at the tenderer's option by a reputable Bank. 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

No works, goods or services contract shall be paid for before they are executed or delivered and accepted by the accounting officer of a procuring entity or an officer authorized by him or her in writing except where so specified in the tender documents and contract agreement. Such an advance payment shall not be paid before the contract is signed.

32 Corrupt or fraudulent practices

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

APPENDIX TO INSTRUCTIONS TO TENDERERS

Notes on the Appendix to Instructions to Tenderers

The following appendix to instructions to tenderers shall complement or amend the provisions of the instructions to tenderers (Section II). Wherever there is a conflict between the provisions of the instructions to tenderers and the provisions of the appendix, the provisions of the appendix herein shall prevail over those of the instructions to tenderers.

CLAUSE

14 Tender Security

Amount of Tender Security is Kshs. **500,000.00** valid for 180 days.

(i) The name and address of the Employer for the purposes of Submission of tenders is **Nairobi City Water and Sewerage Company Ltd. P.O. BOX 30656 – 00100 NAIROBI.**

(ii) The name of the proposed Works and where available the Contract Number is
**NCWSC/23/2020 - CONSTRUCTION OF 20no. WATER KIOSKS AND
PIPELINE EXTENSION.**

The tender opening date and time **12.00 noon on Friday 22nd January, 2021.**

APPENDIX TO TENDER

S/No	CONDITIONS OF CONTRACT	CLAUSE	AMOUNT
1	Tender Security		Kshs. 500,000.00 from a bank or insurance company approved by PPRA
2	Amount of Performance Security (Unconditional Bank Guarantee)	10.1	10% percent of contract price in the form of Unconditional Guarantee from a bank. Performance security from insurance company shall not be accepted.
3	Program to be submitted	14.1	Not later than 28 days after issuance of Order to Commence
4	Minimum amount of Third Party Insurance	23.2	Kshs.1,500,000
5	Period for commencement, from the Engineer's order to commence	41.1	14 days
6	Time for completion	43.1	2 calendar months
7	Amount of liquidated damages	47.1	Kshs. 10,000 per calendar day after expiry of contract period
8	Limit of liquidated damages	47.1	7.5 % of the contract amount
9	Defect Liability period	49.1	365 calendar days
10	Advance Payment	60.1	Not applicable in this contract
11	Percentage of Retention	60.5	10% of certified value
12	Limit of Retention	60.3	10 % of Contract Price
13	Minimum amount of interim certificates	60.2	10% of the tender sum
14	Time within which payment to be made after Interim Payment Certificate signed by Engineer	60.8	60 calendar days
15	Appointer of Arbitrator	67.3	Chairman of Institution of Engineers of Kenya
16	Notice to Employer and Engineer	68.2	The Employers address is: Managing Director, Nairobi City Water and Sewerage Co. Ltd, P.O. Box 30656 – 00100 <u>NAIROBI</u>
17	Submission of as built drawings		Within 6 months after substantial completion
18	Non-submission of as built drawings		Penalty of ksh. 200,000
19	Revision of program of works		Monthly
20	Penalty for failure to revise program of works		5,000 per day

EVALUATION CRITERIA:

The eligible Contractors **MUST** meet the following **MANDATORY CRITERIA** to be considered responsive:

PRELIMINARY EVALUATION (All Are Mandatory)

- i. Bidders shall prepare and submit two copies (marked clearly “**ORIGINAL BID**” and “**COPY BID**”).
- ii. Written confirmation on bidder’s letter head that the bidder has not been debarred as a supplier, service provider or consultant for goods, services or works in Kenya; and that the bidder is eligible to participate in Procurement and also a statement declaring that if selected, the bidder shall not be involved in corruption.
- iii. Offered Valid Bid Security from Bank or approved Insurance Company for Kes. **500,000.00**
- iv. Bid Security Valid for 180 Days from date of Bid Opening
- v. Attach Copy of Current Valid Tax Compliance Certificate
- vi. Form of Tender duly completed, signed, stamped and witnessed. Appendix to Form of Tender shall also be dully completed.
- vii. BOQ duly completed (Bidders are required to fill on the provided BOQ as a Mandatory requirement for Uniformity during Evaluation)
- viii. All Financial alterations if Any must be countersigned by the bidder
- ix. Confidential Business Questionnaire duly filled
- x. Attach of Copy of Valid Certificate of Incorporation/Registration. For companies, a valid (dated within the last 3 months) CR12 shall be submitted)/ ID for the owner of a business name).
- xi. Attach Copy of Current Valid Compliance Certificate to N.H.I.F
- xii. Attach Copy of Current Valid Compliance Certificate to N.S.S.F.
- xiii. Evidence of Financial Resources (lines/letter of credit) equal or above Ksh.1 Million from a bank or cash in account (Account statement to be certified as true copy by commissioner of oaths) OR Audited accounts for the last two years.
- xiv. Submit a written Power of Attorney (or duly fill the form provided in the Bid document)
- xv. Must attend the Mandatory Site visit and attach site visit certificate duly filled.
- xvi. Bidders must Stamp every Page of their document with Official Rubber Stamp for Ownership
- xvii. Pagination of the bid document up to the last page including and not limited to attachments, etc.
- xviii. Submit authority to seek references from the Bidders bankers and references.
- xix. Declaration of having/not having any past or current litigation or arbitration proceedings in which the Bidder is/was involved as one of the parties.
- xx. Further, the Original Bid Document issued by NCWSC shall be returned as part of the Tender Document. Bidders must submit all the pages of the Bid document as issued without altering the content therein.
- xxi. All required information shall be attached to the Original Tender document and neatly bound. Documents submitted as Loose papers will be rejected at Preliminary evaluation stage and shall not progress to Technical Evaluation Stage

A firm lacking in any of the above details **shall be dropped** at this stage and shall not be progressed to the Technical Evaluation stage.

TECHNICAL EVALUATION

1. Experience in works of a similar nature for any of the last five years, and clients (List and contacts) who may be contacted for further information on these contracts. (Have undertaken similar assignments in value and nature in the last five years. Evidence of this, letters of award and completion certificates from such authority, shall be submitted)
2. Evidence of items of construction equipment owned or to be leased. (Schedule of relevant Machines like excavator, concrete mixer, compressor, tipper, pick-up, compactor, concrete vibrator, water pump, level machine).
3. Qualifications and experience of key site management and technical personnel proposed for the Contract; indicating their technical capability. Attach CV's.
Site Manager – Higher Diploma in Building & Construction/ Civil Engineering or equivalent and five years' experience.
Land Surveyor – Higher Diploma in Survey or equivalent field and five years' experience.
4. Be a registered Contractor National Construction Authority (NCA) 6 for both water and building works or above issued by the NCA and copy of the current registration certificate must be submitted with this bid.
5. Must indicate Completion period of this assignment
6. Submit a draft program of works in the form of a bar chart.

N/B: Only bidders meeting all the above shall proceed to Financial Evaluation.

FINANCIAL EVALUATION

The lowest Evaluated bidder shall be awarded the contract.

NB; The tender sum as submitted and read out during the tender opening shall be absolute and final and shall not be subject of correction, adjustment or amendment in any way by any person or entity.

SECTION III
CONDITIONS OF CONTRACT, PART I – GENERAL CONDITIONS

The Conditions of Contract, Part I – General Conditions, shall be those forming Part I of the “Conditions of Contract for works of Civil Engineering Construction, Fourth Edition 1987, reprinted in 1992 with further 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 “Conditions of Contract, Part II - Conditions of Particular Application”.

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 Conditions of Particular Application or in the Appendix to Form of Tender.
- ii. The Conditions of Particular Application 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

SECTION IV
CONDITIONS OF CONTRACT PART II – CONDITIONS OF PARTICULAR APPLICATION

GENERAL

The Conditions of Contract Part II – Conditions of Particular Application, modify and compliment like-numbered clauses in the Conditions of Contract Part I – General Conditions. Both Parts shall be read together, with the Conditions of Particular Application prevailing in case of conflict or discrepancy. Clauses of the General Conditions not specifically modified and supplemented shall remain in effect.

Clause No.

Definitions and Interpretation

- 1.1 (a) (i) The said “Employer” shall be *Nairobi City Water and Sewerage Company Ltd* represented by *Managing Director*
- (ii) The said “Engineer” shall be *Technical Director* or any other competent person appointed by the Employer, and notified to the Contractor, to act in replacement of the Engineer.
- (b)(i) Insert in line 2 after “the Bills of Quantities”, the following, “the rates entered by the Contractor (whether or not such rate be employed in computation of the Contract Price)”.

Add the following sub-clause;

Engineer’s Duties and Authority

- 2.1 (b) The Engineer shall obtain specific approval of the Employer before taking any of the following actions specified in Part I:
- (i) Consenting to the sub-letting of any part of the Works under clause 4.
- (ii) Certifying additional cost determined under Clause 12
- (iii) Determining an extension of time under Clause 44
- (iv) Issuing a variation under Clause 51 except in an emergency situation as reasonably determined by the Engineer.
- (v) Fixing rates or prices under clause 52

4 Assignment and Subcontracting

4.1 Delete the second and third sentence and substitute:

No single subcontract may be for more than 10 percent of the Contract Price nor shall the sum of all subcontracts exceed 25 percent of the Contract price. No one subcontractor may be awarded subcontracts to a total value greater than 10 percent of the Contract Price. All subcontracts greater than 2 percent of the Contract Price are to have the prior consent of the Engineer. The Contractor shall however, not require such consent for purchases of materials or to place contracts for minor details or for any part of the Works of which the manufacturer of supplier is named in the Contract. Any such consent shall not relieve the Contractor from any liability or obligation under the Contract and he shall be responsible for the acts, defaults and neglects of any subcontractor, his agents, servants or workmen as fully as if they were the acts, defaults or neglects of the Contractor, his agents, servants or workmen.

5 Contract Documents

5.1 (a) The language governing this Contract shall be English.

The “Ruling Language” which shall be used to interpret this Contract shall be English. Communication between the Contractor and Engineer or Engineer’s representative shall be in English.

(b) The law applicable to this Contract shall be the laws of the Republic of Kenya. Except to the extent otherwise provided by the Contract, the Kenyan courts shall have exclusive jurisdiction to hear and to determine all actions and proceedings in connection with and arising out of the Contract, and the Contractor shall submit to the jurisdiction of Kenyan courts for the purpose of any such actions and proceedings.

5.2 Delete the documents listed 1-6 and substitute:

- (1) The Contract Agreement;
- (2) The Notification of Award;
- (3) Tender and Appendix to Form of Tender;
- (4) The Conditions of Contract Part II;
- (5) The Conditions of Contract Part I (FIDIC);
- (6) The Special Specifications;
- (7) The Standard Specifications for Road and Bridge Construction, MOTC – 1986;
- (8) Clarifications and rectifications accepted by the Employer; and
- (9) The Drawings;
- (10) The priced Bills of Quantities; and
- (11) Schedules and other documents forming part of the Contract.

8.1 Add to sub clause 8.1 the following:

(a) Within 28 days after receipt of the Engineer’s order to commence the Works, the Contractor shall establish an office at the Site duly equipped for the Contractor’s representative and his supervisory personnel.

The Contractor shall maintain this office throughout the Contract period. The said office shall be the legal domicile of the Contractor, and all correspondence sent to this office shall be deemed to have been sent to the Contractor's head office.

- (b) A foreign Contractor or a Kenya-foreign joint venture, if not registered in Kenya under the applicable laws of Kenya, shall undertake registration upon receipt of the letter of acceptance and prior to signing of the Contract.

10.1 Performance Security

In lines 1, 2 and 3 delete the words "If the Contract... within 28 days" and substitute "The Contractor shall obtain a Performance Security within 28 days"

Add the following at the end of this Sub-Clause: -

The Performance Security shall be issued by a Bank incorporated in Kenya. The amount of guarantee shall be as stated in the Appendix to Form of Tender.

The bank guarantee, shall be issued either

- (a) by an established and reputable bank approved by the Employer and located in Kenya or a foreign bank through a correspondent established and reputable bank located in Kenya and approved by the Employer or
- (b) Directly by a foreign bank acceptable to the Employer. The performance security shall normally be in the currency or currencies requested for payment by the Contractor and in the same proportions as those requested for payment in the Contract.

The performance security may, subject to the approval of the Engineer, be adjusted at the end of each period of 12 months to reflect the residual value of the Contract Works.

- 10.2 The performance guarantee shall be valid until a date 28 days after the date of issue of the Taking-Over Certificate. The security shall be returned to the Contractor within 28 days of the expiration.

10.2.1 Delete sub-clause 10.3

11.1 Inspection of Site

Add the words "and the Contractor shall be deemed to have based his tender on all the aforementioned" after the words "affect his tender".

Delete the last paragraph completely and replace with the following:

“The Employer in no way guarantees completeness nor accuracy of the soil, materials, subsurface and hydrological information made available to the Contractor at the time of tendering or at any other time during the period of the Contract, and the Contractor shall be responsible for ascertaining for himself all information as aforesaid for the execution of Works and his tender shall be deemed to have been priced accordingly.

14.1 **Programme to be Submitted**

The time within which the Programme shall be submitted shall be twenty eight (28) days. This detailed Programme shall be based upon the programme submitted by the Contractor as part of his tender and shall, in no material manner, deviate from the said programme.

The Contractor shall allow in his Programme for the following 10 public holidays per calendar year in Kenya upon which the Contractor shall not be permitted to work

New Year’s Day	(1st January)
Good Friday	
Easter Monday	
Labour Day	(1 st May)
Madaraka Day	(1 st June)
Idd-UI-Fitr	
Mashujaa Day	(20 th October)
Jamhuri Day	(12 th December)
Christmas Day	(25 th December)
Boxing Day	(26 th December)

The Contractor should also allow per calendar year for a further 2 unspecified public holidays which may be announced by the Government of Kenya with no prior notification, and upon which he shall not be permitted to work.

14.2 Add the following at the end of this sub clause: -

The Employer shall have the right to withhold payment at any time if the Contractor fails to submit the contractual construction programmes in accordance with sub clause 14.1 above or revise construction programmes due to his negligence, failure or omission.

14.3 **Cash Flow Estimate to be Submitted**

The time limit within which a detailed cash flow estimate is to be submitted shall be twenty eight (28) days.

In preparing the estimates, the Contractor shall make provision for Advance payment, repayment of advance, retention, payment for services provided by the Employer and timing implications of sub clause 60 – Certificates and Payments.

15 Contractor's Superintendence

Add the following at the end of the first paragraph of sub-clause 15.1:

- 15.1 The Contractor shall, within seven (7) days of receipt of the Engineer's order to commence the Works, inform the Engineer in writing, the name of the Contractor's representative and the anticipated date of his arrival on Site.

Add the following sub-clause 15.2:

- 15.2 The Contractor's agent or representative on the Site shall be an Engineer registered by the Engineers Board of Kenya in accordance with the Laws of Kenya, Engineers Act, 2011 or have equivalent status approved by the Engineer Board of Kenya and shall be able to read, write and speak English fluently.

16.2 Engineer at Liberty to object

At the end of this clause add "by a competent substitute approved by the Engineer at the Contractor's own expense".

The Contractor is encouraged to the extent practicable and reasonable, to employ staff and labour with appropriate qualifications who are Kenyan citizens.

Safety, Security and Protection of the Environment

- 19.1 Add at the end of sub clause 19.1 the following: -

The formulation and enforcement of an adequate safety program shall be the obligation of the Contractor with respect to all the Works under this Contract, regardless of whether performed by the Contractor or his subcontractors. The Contractor shall, within 14 days after commencement of the Works, meet the Engineer to present and discuss his plan for the establishment of such safety measures as may be necessary to provide against accidents, unsafe acts and so forth. Within 28 days after commencement of the Works, the Contractor shall submit a written safety program to the Engineer covering the overall Works and based on the laws and regulations of Kenya. In addition, he shall prepare special safety programs for blasting and handling of explosives as stipulated in the General and Special Specifications.

Notwithstanding the foregoing, the Contractor shall observe the following measures with a view to reducing or eliminating adverse environmental effects by the Site Works:

- (i) All queries and borrow pits shall be filled and landscaped to their original state after extraction of construction material
- (ii) Soil erosion due to surface runoff or water from culverts or other drainage structures should be avoided by putting in place proper erosion control measures that shall include, but not limited to grassing, planting of trees, gabions etc.

- (iii) Long traffic diversion roads shall be avoided so as to minimize the effect of dust on the surrounding environment. In any case all diversions shall be kept damp and dust free at the Contractor's expense.
- (iv) Spillage of oils, fuels and lubricants shall be avoided and if spilt, shall be collected and disposed of in such a way as not to adversely affect the environment.
- (v) Rock blasting near settlement areas shall be properly coordinated with the relevant officers of the Government so as to minimize noise pollution and community interference.
- (vi) Dumping shall be done only at designated dumping areas and not haphazardly on surroundings.

Insurance of Works & Contractor's Equipment

- 21.1 (a) Delete the first sentence of this clause and replace with the following:
- “Prior to commencement of the Works the Contractor shall, without limiting his or the Employer's obligations and responsibilities under Clause 20, insure to the satisfaction of the Employer.”
- (b) Add the following words at the end of sub - paragraph (a) and immediately before the last word in (b)
- “it being understood the insurance shall provide for compensation to be payable in the types and proportions of the currencies required to rectify the loss or damage incurred.”
- In sub clause 21.1(b), delete the words “or as may be specified in Part II of these Conditions”.
- 21.2 (a) Delete the words “from the start of Work at the Site” and substitute with the words “from the first working day after the commencement date”
- (c) Add the following sub-clause: “It shall be the responsibility of the Contractor to notify the insurance company of any change in the nature and extent of the Works and to ensure the adequacy of the insurance coverage at all times during the period of the Contract”.

23.1 Third Party Insurance

Add the following at the beginning of this sub-clause: -

“Prior to commencement of the Works

23.2 Minimum Amount of Insurance

Add the following at the end of this sub-clause: -

“..... with no limits to the number of occurrences.”

- 25.1 Insert the words “as soon as practicable after the respective insurances have been taken out but in any case” before the words “Prior to the start of Work at the Site”

Add the following sub-clauses 25.5 to 25.7

25.5 **Insurance Notices**

Each policy of insurance effected by the Contractor for the purpose of the Contract shall include a provision to the effect that the Insurer shall have a duty to give notice in writing to the Contractor and Employer of the date when a premium becomes payable not more than thirty (30) days after the giving of such notice.

25.6 **Re-insurance in Kenya**

The risks against which the Contractor is obliged to insure under the Contract shall be insured through established and reputable companies approved by the Employer and located in Kenya and any cover against risks which the Contractor may enjoy shall be reinsured in Kenya by an approved Kenyan Insurance Company In respect of the Contractor’s obligations under the Contract.

- 25.7 It shall be the responsibility of the Contractor to notify the insurers under any of the insurances referred or event which by the terms of such insurances are required to be so notified and the Contractor shall indemnify and keep indemnified the Employer against all losses, claims, demands, proceedings, costs, charges and expenses whatsoever arising out of or in consequence of any default by the Contractor in complying with the requirements of this sub clause whether as a result of avoidance of such insurance or otherwise.

26. **Compliance with Statutes, Regulations**

Add the following sub-clause 26.2; -

The Employer will repay or allow to the Contractor all such sums as the Engineer shall certify to have been properly payable and paid by the Contractor in respect of such fees. Provided always that, without prejudice to sub clause, nothing contained in this clause shall be deemed to render the Employer liable to all claims which may be considered to fall within the provisions of clause 22.1.

Royalties

- 28.2 Add the following at the end of this sub-clause;

“The Contractor shall also be liable for all payments or compensation, if any, that are levied in connection with the dumping of part or all of any such material.”

Interference with Traffic and Adjoining Properties

- 29.2 Add new sub-clause 29.2;

The Contractor shall reinstate all properties whether public or private which are damaged in consequence of the construction and maintenance of the Works to a condition at least equal to that prevailing before his first entry on them.

If in the opinion of the Engineer the Contractor shall have failed to take reasonable and prompt action to discharge his obligations in the matter of reinstatement, the Engineer will inform the Contractor in writing of his opinion, in which circumstances the Employer reserves the right to employ others to do the necessary work of reinstatement and to deduct the cost thereof from any money due or to become due to the Contractor.

The Contractor shall promptly refer to the Employer all claims, which may be considered to fall within the provisions of Clause 22.1.

LABOUR

34.2 Conditions of Employment of Labour

The Contractor shall be responsible for making all arrangements for and shall bear all costs relating to recruitment, obtaining of all necessary visas, permits or other official permission for movements of staff and labour.

34.3 Fair Wages

The Contractor shall, in respect of all persons employed anywhere by him in the execution of the Contract, observe and fulfill the following conditions:

- (a) The Contractor shall pay the rates of wages, observe hours of labour and provide conditions, housing amenities and facilities not less favorable than those required by the Regulation of wages (Building and Construction Industry) Order 1998, and any subsequent amendments thereto, or in any ministry of labour or other government department in consultation with the district whose general circumstances in the trade or industry in which the Contractor is engaged are similar. The Contractor shall at all times during the continuation of the Contract display, for the information of his employees, a notice setting out the general rates of wages, hours and conditions of labour of his employees and a copy of this clause.
- (b) In the absence of any rates for wages, hours or conditions of labour so established, the Contractor shall pay rates or wages and observe hours and conditions for labour which are not less favourable than the general circumstances in the trade or industry in which the Contractor is engaged.
- (c) Where the absence of established rates of wages, hours and conditions of labour or the dissimilarity of the general circumstances in the trade or industry in which the Contractor is engaged prevent the Contractor from observing rates of wages, hours and conditions of labour ascertained under sub-paragraph (a) or (b) above, the Contractor in fixing the rates of wages, hours and conditions of labour of his employees shall be guided by the advice of the labour department.
- (d) The Contractor shall recognize the freedom of his employees to be members of trade unions.
- (e) The Contractor shall maintain records of the times worked by, and the wages paid to his employees. The Contractor shall furnish to the Employer, if called upon so to do, particulars of the rates of wages, hours and conditions of labour as the employer may direct.

- (f) The Contractor shall be responsible for observance by his sub-Contractors of the foregoing provisions.
- 34.4 **Breach of Fair Wages Clause**
Should a claim be made to the Employer alleging the Contractor's default in payment of fair wages to any workman employed on the Contract and if proof thereof satisfactory to the Employer is furnished by the labour department, the Employer may, failing payment by the Contractor, pay the claims out of any monies due or which may become due to the Contractor under the Contract.
- 34.5 **Recruitment of Unskilled Labour**
Any additional unskilled labour which may be required by the Contractor for the Works and which is not in his employ at the time of the acceptance of the tender shall be recruited by the Contractor from the labour office nearest to the Site of the Works.
- 34.6 **Compensation for injury**
The Contractor shall, in accordance with the Workman's Compensation Act Chapter 236 of the laws of Kenya and any other regulations in force from time to time in Kenya, pay compensation for loss or damage suffered in consequence of any accident or injury or disease resulting from his work to any workman or other person in the employment of the Contractor or any sub-contractor.
- 34.7 **Labour Standards**
- a) The Contractor shall comply with the existing local labour laws, regulations and labour standards.
 - b) The Contractor shall formulate and enforce an adequate safety program with respect to all Work under this Contract, whether performed by the Contractor or his sub-contractors. The Contractor has assurance from the Employer of cooperation where the implementation of these safety measures requires joint cooperation.
 - c) Upon written request of the Employer the Contractor will remove or replace any of his employees employed under this Contract.
- 34.8 **Recruitment**
The Contractor shall not induce personnel of the employer or the Engineer to leave their regular employment and shall not, without the prior consent in writing of the Employer, employ personnel who have resigned from such service within the preceding twelve months.
- 35 **Add the following sub clauses 35.2 and 35.3: -**
- 35.2 The Contractor shall maintain such records and make such reports concerning safety, health and welfare of persons and damage to property as the Engineer may from time to time prescribe.
- 35.3 The Contractor shall report to the Engineer details of any accident as soon as possible after its occurrence. In the case of any fatality or serious accident, the Contractor shall, in

addition, notify the Engineer immediately by the quickest available means. The Contractor shall also notify the relevant authority(s) whenever such report is required by the law.

41.1 **Commencement and Delays**

Insert immediately after the word Works----- “on Site within 28 days” and before the word -----after

41.2 **Definition of Commencement**

For the purposes of this clause, the Works shall be deemed to have commenced when all of the following conditions are satisfied;

- a) The approved competent and authorized agent or representative of the Contractor is resident in the project area and is giving his whole time to the superintendence of the Works.
- b) The provision by the Contractor of evidence that all insurances required by the Contract are in force.
- c) The Contractor has an established office in the project area with postal address for receipt of correspondence.
- d) The principal items of constructional plant have been brought to Site and put to work in the execution of the permanent Works.

42.4 **Possession of Site and Access Thereto**

Add the following to this clause 42.4;

The Contractor shall not enter any part of the Site until he has requested and received permission to do so from the Employer or the Engineer.

The Contractor shall not use any portion of the Site for any purpose not connected with the Works.

44.1 Add at the end of sub-clause 44.1 the following:

Neither rains falling between 1st November and 31st December (inclusive) and between 1st February and 31st May (inclusive) nor floods caused by such rains shall be deemed exceptional weather conditions such as may fairly entitle the Contractor to an extension of time for the completion of the Work.

45 **Working Hours**

Delete sub-clause 45.1 and substitute:

“subject to any provision to the contrary contained in the Contract, the Contractor shall have the option to work continuously by day and by night and on locally recognized days of rest.

If the Contractor requests for permission to work by day and night and if the Engineer shall grant such permission, the Contractor shall not be entitled to any additional payment for so

doing. All such work at night shall be carried out without unreasonable noise or other disturbance and the Contractor shall indemnify the Employer from and against any liability for damages on account of noise or other disturbance created while or in carrying out night work and from and against all claims, demands, proceedings, costs, charges and expenses whatsoever in regard or in relation to such liability. In addition, the Contractor shall be required to provide, for any work carried out by night or recognized days of rest, adequate lighting and other facilities so that the Work is carried out safely and properly. In the event of the Engineer granting permission to the Contractor to work double or rotary shifts or on Sundays, the Contractor shall be required to meet any additional costs to the Employer in the administration and supervision of the Contract arising from the granting of this permission.

47.2 **Reduction of Liquidated Damages**

There shall be no reduction in the amount of liquidated damages in the event that a part or a section of the Works within the Contract is certified as completed before the whole of the Works comprising that Contract.

No bonus for early completion of the Works shall be paid to the Contractor by the Employer.

The sum stated in the Appendix to Form of Tender as liquidated damages shall be increased by a sum equivalent to any amount payable by the Employer to the Contractor under clause 70.1 in respect of an increase in costs in such period that would not have been incurred by the Contractor if the Works had been completed by the due date for completion prescribed by clause 43.

Defects Liability

49.2 Add at the end of this sub-clause the following sentence: -

Any work ordered to be executed under this clause shall be done at a time and in a manner as directed by the Engineer so as to interfere as little as possible with the operations of the Employer or of other contractors and no extension(s) of the defects liability period will be allowed for the execution of this Work.

52 **Variations**

52.1 Add the following final sentence to this sub clause: -

The agreement, fixing or determination of any rates or prices as aforesaid shall include any foreign currency and the proportion thereof.

52.4 **Dayworks**

Add the following at the end of this sub-clause:

The Work so ordered shall immediately become part of the Works under the Contract. The Contractor shall, as soon as practicable after receiving the Daywork Order from the Engineer undertake the necessary steps for due execution of such Work. Prior to commencement of any work to be done on a Daywork basis, the Contractor shall give a notice to the Engineer stating the exact time of such commencement.

54 **Plant, Temporary Works and Materials**

Delete Sub-Clauses 54.3 to 54.4 entirely.

For the purpose of these Clauses, the term “Equipment” shall be read as “Contractor’s Equipment” where the context so requires.

- 54.1 Line 5: - Add “written” between “the” and “consent”.

Quantities

- 55.1 Delete sub-clause 55.1 and substitute with the following;

The quality and quantity of the Work included in the Contract Price shall be deemed to be that which is set out in the Contract Bills. The Bills, 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.

Any error in description or in quantity or any omission of items from the Contract Bills or Specifications shall not vitiate this Contract but shall be corrected and deemed to be a variation required by the Engineer. Subject to the foregoing, any error whether arithmetical or not in the computation of the Contract Price shall be deemed to have been accepted by the parties hereto.

The Contract Price shall not be adjusted or altered in any way whatsoever otherwise than in accordance with the express provisions of these Conditions.

- 55.2 Add as a new sub-clause:

“Items of Work described in the Bills of Quantities for which no rate or price has been entered in the Contract shall be considered as included in other rates and prices in the Contract and will not be paid for separately by the Employer.

Measurement

- 56.1 Delete sub clause 56.1 and replace with the following: -

The Contractor shall prepare and submit to the Engineer all necessary field notes and other records taken and computations made for the purpose of quantity measurements, of which the forms shall be approved by the Engineer, for the monthly progress payment under clause 60. The measurement of work quantities made by the Contractor shall be verified and certified by the Engineer based on the above-mentioned documents.

The Contractor shall furnish all personnel, equipment and materials to make such surveys and computations as necessary to determine the quantities of work performed. Unless otherwise prescribed in the specifications or the drawings, all measurements for payment shall be made by the dimensions, lines and grades as shown on the drawings or by direct survey of which the methods shall be approved by the Engineer.

The documents submitted for measurement and payment shall become the property of the Employer and shall be used to the extent necessary to determine the monthly progress payment to be made to the Contractor under the Contract. Direct survey, if done, shall be subject to checking and verification by the Engineer and all errors in the said survey work and related computations as found during such checking shall be immediately corrected by the Contractor.

57.1 Delete sub clause 57.1 and substitute with the following: -
The Works shall be measured net with deductions made in accordance with the principles of the latest edition of the Civil Engineering Standard Method of Measurement. All measurements shall be given in metric (SI) units.

Provisional Sums

58.4 **Prime Cost sum**

Wherever an item in the Bills of Quantities has been referred to as a “P.C. Sum” (Prime Cost Sum), that item shall be construed as a Provisional sum and the provisions of Sub-clauses 58.1 to 58.3 will apply.

59.5 Add the following paragraph at the end of sub clause 59.5: -

If the Engineer desires to secure final payment to any nominated sub-contractor before final payment is due to the Contractor and if such sub-contractor has satisfactorily indemnified the Contractor against any latent defects, the Engineer may, in an interim certificate, include an amount to cover the said final payment, and thereupon the Contractor shall pay to such nominated sub-contractor the amount so certified. Upon such final payment, the amount named in the Appendix to Form of Tender as Limit of Retention Money shall be reduced by the sum which bears the same ratio to the amount as does the subcontract and sub-contractor shall be discharged from all liability for the Work, materials or goods executed or supplied by such subcontractor under the Contract to which the payment relates.

Certificates and Payment

Delete Sub-clauses 60.1 to 60.10 entirely and substitute with the following: -

60.1 **Advance Payment**

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

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

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

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

Where:

R = the amount to be reimbursed

A = the amount of the advance which has been granted

X¹ = the amount of proposed cumulative payments as a percentage of the original amount of the Contract. This figure will exceed 20% but not exceed 80%.

X¹¹ = the amount of the previous cumulative payments as a percentage of the original amount of the Contract. This figure will be below 80% but not less than 20%.

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

60.2 **Interim Payment Certificate**

The Contractor shall submit to the Engineer, in the manner required by the Engineer after the end of each month a statement showing the estimated total value of permanent Work properly executed and materials or goods for permanent works brought to Site up to the end of the previous month (if the value shall justify the issue of an interim certificate) together with any adjustments under clause 70 and any outstanding claims and sums the Contractor considers may be due to him. The Contractor shall amend or correct his estimate as directed by the Engineer and the latter shall not accept it until he is satisfied that it is fair and reasonable. With respect to the said materials and goods, no payment for them shall be made unless; -

- (i) The materials are in accordance with the specifications for the Works;
- (ii) The materials have been delivered to Site and are properly stored and protected against loss, damage or deterioration;
- (iii) The Contractor's record of the requirements, orders, receipts and use of materials are kept in a form approved by the Engineer, and such records are available for inspection by the Engineer;
- (iv) The Contractor has submitted a statement of his cost of acquiring and delivering the materials and goods to the Site, together with such documents as may be required for the purpose of evidencing such cost;
- (v) The materials are to be used within a reasonable time.

The Contractor will be paid on the certificate of the Engineer the amount due to him on account of the estimated total value of the permanent Work executed up to the end of the previous month together with such amount (not exceeding 75% of the value) as the Engineer may consider proper on account of materials and goods for permanent Work delivered by the Contractor on Site and in addition, such amount as the Engineer may consider fair and reasonable for any Temporary Works for which separate amounts are provided in the Bill of Quantities, all of which shall be subject to a retention of the percentage named in the Appendix to Form of Tender until the amount retained (hereinafter and in all Contract documents called the "Retention Money") shall reach the "Limit of Retention Money" named in the said Appendix. Provided always that no interim certificate shall be issued for a sum (such sum always being the net amount thereof after all deductions for retention etc.) less than that named in the Appendix to Form of Tender as "Minimum Amount of Interim Certificate" at one time.

Within 14 days after receiving a statement from the Contractor as aforesaid, and subject to the Contractor having made such further amendments and corrections as the Engineer may require, the Engineer shall issue a Certificate of Payment to the Employer showing the amount due, with a copy to the Contractor.

The Engineer shall not unreasonably withhold certifying an Interim Payment Certificate and where there is a dispute regarding an item for payment, the Engineer may delete this disputed item from the Interim Payment Certificate and certify the remainder for payment provided the said payment is in accordance with the preceding paragraph. In cases of difference in opinion as to the value of any item, the Engineer's view shall prevail.

60.3 **Final Account and Final Payment Certificate**

As soon as possible after the issue of Taking - Over Certificate or the termination of the Contract and not later than the time of issue of Defects Liability Certificate, the Contractor shall prepare and submit to the Engineer (with a copy to the Employer), a Statement of Final Account showing in detail the total value of work done in accordance with the Contract together with all sums paid in previous payments. Within thirty(30) after receipt of such further information as may be reasonably required from the Contractor for its verification, the Engineer shall check the said statement, prepare and submit a Final Payment Certificate to the Employer (with a copy to the Contractor).

The Final Payment Certificate shall state;

- (a) The (final) total value of all Work done in accordance with the Contract;
- (b) After giving credit to the Employer for all amounts previously paid to the Contractor, the balance, if any, due from the Employer to the Contractor or the Contractor to the Employer, as the case may be.

Unless the Contractor notifies the Engineer of his objection to the Final Payment Certificate within twenty eight [28] days of delivery thereof, he shall be deemed to have agreed that he accepts the total Contract Price as set out in the Final Payment Certificate as full settlement for all work done under the Contract including any claims, variations and omissions thereof.

However, a Final Certificate of Payment shall not be conclusive:

- a) to the extent that fraud or dishonesty relates to or affects any matter dealt with in the Certificate, or
- b) if any arbitration or court proceedings under the Contract have been commenced by either party before the expiry of 84 days after the issue of the Final Certificate of Payment.

60.4 Payment of Certificates

Payment upon each of the Engineer's Certificates for Interim Payments shall be made by the Employer within the time stated in the Appendix to Form of Tender from the date of issue of each Certificate of Payment.

Payment upon the Engineer's Final Payment Certificate shall be made by the Employer within the time stated in the Appendix to Form of Tender from the date of issue of the Final Certificate of Payment signed by the Engineer and countersigned by the Contractor or his authorized agent or representative.

Making of a payment by the Employer shall be considered to have been duly executed on the day that the Employer has issued a cheque.

60.5 Payment of Retention Money

One half of the retention money shall become due upon the issue of a Taking – Over Certificate and shall be paid to the Contractor when the Engineer shall certify in writing that the last section of the whole of the Works has been substantially completed and the other half shall be paid to the Contractor after the expiration of the Defects Liability Period and the issue of a Certificate under Clause 62. Provided always that if such time there shall remain to be executed by the Contractor any Works ordered during such period pursuant to Clauses 49 and 50 thereof, the Employer shall be entitled to withhold payment [until the completion of such Works] of so much of the second half of the Retention Money as shall in the opinion of the Engineer represent the Costs of the Works so remaining to be executed. Provided further that in the event of different Defects Liability Periods having become applicable to different parts of the Works pursuant to clause 48 hereof the expression “expiration of the Defect Liability Period” shall for the purpose of this Sub-clause be deemed to mean the expiration of the latest of such periods.

60.6 Currency of Payment

The Contract price shall be stated in Kenya Shillings. All payments to the Contractor shall be made in Kenya shillings and foreign currency(s) in the proportion indicated in the tender, or agreed prior to the execution of the Contract Agreement and indicated therein. The rate[s] of exchange for the calculation of the amount of foreign currency payment[s] shall be the rate of exchange indicated in the Tender. If the Contractor indicated foreign currencies for payment other than the currencies of the countries of origin of related goods and services, the Employer reserves the right to pay the equivalent at the time of payment in the currencies of the countries of such goods and services. The Employer and the Engineer shall be notified promptly by the Contractor of any changes in the expected

foreign currency requirements of the Contractor during the execution of the Works as indicated in the Statement of Foreign Currency Requirements and the foreign and local currency portions of the balance of the Contract Price shall then be amended by agreement between Employer and the Contractor in order to reflect appropriately such changes.

60.7 Overdue Payments

Unless otherwise stated in the appendix interest shall be paid on the overdue amounts and the interest to be paid shall be in accordance with prevailing commercial bank rates.

60.8 Correcting and With-holding

The Engineer may by any interim certificate or through the final account make any correction or modification to any previous certified sum and shall have authority, if any work or part thereof is not being carried out to his satisfaction, to omit or reduce the value of such work in any Interim Payment Certificate.

60.9 Completion by Sections.

If a Taking-Over Certificate shall be issued for any section or part of the Works separately, the payments herein provided for on or after issue of such a Certificate shall be made in respect of such section or part and references to the Contract Price shall mean such part of the Contract Price as shall in the absence of agreement be apportioned thereto by the Engineer.

60.10 Proportion of Foreign Currency

Subject to the provision of sub clause 60.5 the proportion of foreign currency in any amount due to the Contractor or Employer shall be determined in the following manner:-

- a) For all measured Work, the percentages of foreign currency for the appropriate section of the Bill of Quantities as stated in the schedule of foreign currency requirements shall be applied.
- b) Variations in the cost of imported materials shall be paid in foreign currency.
- c) Variations in the cost of locally purchased materials and those due to changes of legislation shall be paid in local currency.
- d) For Day works labour and plant, the respective percentages of foreign currency stated in the schedule shall be applied.
- e) For Day works materials and materials on site, payment in foreign currency will only be made for imported materials.
- f) The provisions for the deduction and release of Retention Money and the payment of interest shall be applied similarly to both the local and foreign portions.
- g) The advance mobilization loan, its repayment thereof and liquidated damages shall all be apportioned on the basis of the ration between local and foreign currency indicated in the Contract Price.

- h) In the event that the payment is for an item not covered in the foregoing paragraphs, the Engineer shall determine the proportion of foreign and local currency based on the information given in the Schedule of Foreign Currency Requirements, together with any additional information he may request the Contractor to provide.

60.11 Statement at Completion

Not later than 14 days after the issue of the Taking-Over Certificate in respect of the whole of the works, the Contractor shall submit to the Engineer a statement at completion showing in detail, in a form approved by the Engineer;

- (a) The final value of all work done in accordance with the Contract up to the date stated in such Taking-Over Certificate.
- (b) Any further sums which the Contractor considers to be due; and
- (c) An estimate of amounts, which the Contractor considers, will become due to him under the Contract.

Estimate amounts shall be shown separately in the Statement at Completion. The Contractor shall amend and correct the Statement as directed by the Engineer who shall issue a Certificate at Completion to be processed in accordance with sub-clause 60.4.

60.12 Final Statement

Not later than 56 days after the issue of the Defects Liability Certificate, the Contractor shall submit to the Engineer for consideration a draft final statement with supporting documents showing in detail, in the form approved by the Engineer;

- (a) The final value of all work done in accordance with the Contract;
- (b) Any further sums which the Contractor considers to be due to him.

If the Engineer disagrees with or cannot verify any part of the draft final statement, the Contractor shall submit such further information as the Engineer may reasonable require and shall make such changes in the draft as may be required.

60.13 Discharge

Upon submission of the Final Statement, the Contractor shall give to the Employer, with a copy to the Engineer, a written discharge confirming that the total of the Final Statement represents full and final settlement of all monies due to the Contractor arising out of or in respect of the Contract. Provided that such discharge shall become effective only after payment under the Final Payment Certificate issued pursuant to Sub-clause 60.14 has been made and the Performance Security referred to in Sub-clause 10.1 has been returned to the Contractor.

60.14 Final Payment Certificate

Upon acceptance of the Final Statement as given in Sub-clause 60.12, the Engineer shall prepare a Final Payment Certificate which shall be delivered to the Contractor’s authorized agent or representative for his signature. The Final Payment Certificate shall state:

- (a) The final value of all work done in accordance with the Contract;
- (b) After giving credit to the Employer for all amounts previously paid by the Employer, the balance, if any, due from the Employer to the Contractor or the Contractor to the Employer as the case may be

Final Certificate shall be issued for any sum due to the Contractor even if such is less than the sum said named in the Appendix to the Form of Tender.

60.15 Cessation of Employer’s Liability

Unless the Contractor notifies the Engineer of his objection to the Final Certificate within fourteen days of delivery thereof he shall be deemed to have agreed that he accepts the total Contract Price as set out in the Final Certificate as full settlement for all work done under the Contract including any variations and omissions thereof.

62.1 Defects Liability Certificate

Delete the last sentence of this Sub-Clause beginning “Provided that the issue.....in Sub-Clause 60.3”.

Remedies

63.4 Assignment of Benefit of Agreement

Add the following at the end of this sub-clause: -

“But on the terms that a supplier or sub-contractor shall be entitled to make any reasonable objection to any further assignment thereof by the Employer and the Employer may pay the supplier or sub-contractor for any such materials supplied or Works executed under such agreement, whether the same be assigned as aforesaid or not, before or after the said determination, the amount due by such arrangement in so far as it has not already been paid by the Contractor”.

65 Special Risks

Add sub clause 65.9 as follows:

- (a) In the event of the Employer unilaterally ordering the final cessation of performance of the Contract for reasons not specified elsewhere in the Conditions of Contract the Contract shall be considered to be frustrated and the Contractor shall be indemnified as provided for under clause 65.1.
- (b) In the event of the Employer ordering the adjournment of the Contract before or after commencement of the Works for reasons not specified elsewhere in the Conditions of Contract, the Contractor shall be entitled to indemnity for any injury which he may have suffered as a

consequence of such adjournment. The Engineer shall award the Contractor payment of such sum as in his opinion shall be reasonable giving regard to all material and relevant factors including the Contractor's on costs and overheads, and the nature of the instruction to adjourn the Contract.

Settlement of Disputes

67.3 **Arbitration**

For the purposes of this Clause, the Arbitrator shall be a person to be agreed between the parties or failing agreement, the Arbitrator shall be appointed by the appointer designated in the Appendix to the Form of Tender.

Add the following paragraph after the last paragraph of sub-clause 67.3:
Arbitration shall take place in Nairobi, Kenya. The language of all arbitration proceedings shall be in English. The cost of arbitration shall be apportioned by the Arbitrator according to his findings.

Notices

68.1 Add the following at the end of this sub clause: -

Notwithstanding the foregoing, the Contractor shall either maintain an address close to the Works or appoint an agent residing close to the Works for the purpose of receiving notices to be given to the Contractor under the terms of the Contract. This obligation shall be terminated upon the issue of the Certificate of Completion.

68.2 Delete the words "nominated for that purpose in Part II of these Conditions" in this sub-clause.

Default of Employer

69.1 **Default of Employer**

In paragraph (a) of this Sub-Clause, delete the words "within 28 days of expiry of the time stated in Sub-clause 60.10" and insert "within 56 days after the expiry of the time stated in Sub-Clause 60.4".

69.4 **Contractor's Entitlement to Suspend Work**

Delete the first four lines of this Sub-Clause and replace with the following:-

"Without prejudice to the Contractor's entitlement to interest under Sub-clause 60.7 and to terminate his employment under Sub-Clause 69.1, the Contractor may, if the Employer fails to pay the Contractor the amount due under any certificate of the Engineer within 56 days after the expiry of the time stated in Sub-Clause 60.4...."

Delete sub-clause 69.4 (b) and substitute with the following----"the amount of such cost, which shall be added to the Contract Price. However, the costs due to idle time for plant, equipment and labour shall not be included in the said costs and shall be borne by the Contractor.

70.1 Delete the sub-clause 70.1 in its entirety and substitute with the following: -

“The Contract Price shall be deemed to have been calculated in the matter set below and shall be subject to the adjustment in the event specified hereunder:

- (a) The rates contained in the priced Bill of Quantities are based upon the rates of wages and other emoluments and expenses applicable at the site and the date of tender pricing (as defined in sub-clause 70.4 hereinafter);
- (b) If the said rates of wages and other emoluments and expenses shall be increased or decreased by act, statute, decree, regulation and the like after the said date of tender pricing then the net amount of increase the emoluments and expenses shall, as the case may be, paid to or allowed by Contractor;
- (c) The rates contained in the price Bill of Quantities are based upon the rates of the Contractor’s compulsory contributions payable at the date of tender under or by virtue of any Act, Statute, Regulations and the like applicable at the site;
- (d) If any of the said rates of contribution becomes payable after that date then the net amount of new statutory contribution becomes payable after that date then the net amount of increase or decrease of the emoluments and expenses shall, as the case may be, be paid to or allowed by the Contractor. Difference between what the Contractor actually pays in respect of work people engaged upon or in connection with the works and what he would have paid in respect of such person had any of the said rates not been increased or decreased or had a new contribution not become payable as aforesaid, shall as the case may be, be paid to or allowed by the Contractor. Provided always that the Engineer and the Contractor may agree a sum, which shall be deemed to be the net amount of the aforesaid difference, and such sum shall be deemed for the purpose of this Contract to be, that which is to be paid to or allowed by the Contractor by the virtue of this sub-paragraph;
- (e) If the market price or any materials or goods specified as aforesaid shall be increased or decreased after the said Date of Tender Pricing, then the net amount of difference between the basic price and the market price payable by the Contractor and current when any such goods and materials are bought shall, as the case may be, be paid to or allowed by the Contractor. Orders for materials and goods listed as aforesaid shall have been placed within a reasonable time after the date at which sufficient information is available for the placing of such orders, and the placing of orders at that time shall be a condition precedent to any payments being made to the Contractor in respect of increased market prices.”

Substitute and add the following sub-clauses:

- 70.2 (a) If the Contractor shall decide subject to Clause 4 thereof to sub-let any portion of the work he shall incorporate in the sub-contract provisions to the like effect as those contained in sub-clause (1) of this Clause;
- (c) If the price payable under a sub-contract as aforesaid is increased above or decreased below the price in such sub-contract by reason of the operation of the incorporated

provisions of sub-clause (1) of this clause then the net amount of such increase or decrease shall as the case may be, be paid to or allowed by the Contractor under this Contract.

70.3 The expression “the date of tender pricing” as used in this Clause means the date 28 days prior to the final date for submission of Tenders as determined by the Employer in the Tender documents.

70.4 For imported materials, the supplier’s/manufacturer’s Prime costs shall be C.I.F. cost at point of entry by the same means of transport as determined by the Contractor’s Basic Rate.

For locally produced materials, the supplier’s or manufacturer’s prime costs shall be at their nearest depot or the nearest railway station relevant to the works.

For materials, which are subject to Government Price Control, payments for price variations will be determined from the difference between the control price in force at a date 28 days prior to date for submission of Tenders and the price in force on the date of purchase.

70.5 The materials to which this Variation Clause applies are:

- ◆ All bitumen material
- ◆ Fuels, oils and lubricant
- ◆ Cement
- ◆ Lime
- ◆ Flex beam guardrail
- ◆ Explosives
- ◆ Gabion mesh
- ◆ Reinforcing steel

70.6 The Contractor shall not change the supplier or manufacturer during the Contract without the approval of the Engineer.

70.7 No payments will be made for price variation related to expenses incurred by the Contractor in his Head Office in Kenya, or overseas.

70.8 All payments made pursuant to Clause 70 shall be in Kenya Shillings.

70.9 No payments will be made for the cost of preparing V.O.P. claims.

70.10 Add the following at the end of this clause.

“Notwithstanding the foregoing, such additional or reduced cost shall not be separately paid or credited as aforesaid if the same shall already have been taken

into account in accordance with the provisions of sub-clause 70.1”.**ADDITIONAL CLAUSES**

Clause 73 Declaration against Waiver

The condoning by the Employer of any breach or breaches by the Contractor or any authorized sub-contractor of any of the stipulations and Conditions contained in the Contract shall in no way prejudice or affect or be construed as a waiver of the Employer’s rights, powers and remedies under the Contract in respect of any breach or breaches as aforesaid.

Clause 74 Bribery and Collusion

The Employer shall be entitled to determine the Contract and recover from the Contractor the amount of any loss resulting from such determination if the Contractor shall have offered or given or agreed to give any person any gift or consideration of any kind as an inducement of regard for doing or fore bearing to do or for having done or fore borne to do any action in relation to obtaining or the execution of the Contract or any other contract with the Employer or if any of the like acts shall have been done by any person employed by the Contractor or acting on his behalf (whether with or without the knowledge of the Contractor) or if the Contractor shall have come to any agreement with another contractor or number of contractors whereby an agreed quotation or estimate shall be tendered to the Employer by one or more contractors.

Clause 75 Contract Confidential

The Contractor shall treat the Contract and everything in connection therewith as private and confidential. In particular, the Contractor shall not publish any information, drawings or photographs concerning the Works in any trade or technical paper etc, and shall not use the Site for the purpose of advertising except with the written consent of the Engineer and subject to such conditions as the Engineer may prescribe.

Clause 76 Employer’s Officials etc., Not Personally Liable

No official of the Employer or the Engineer or the Engineer’s Representative or anyone of their respective staffs or their employees shall be in any way personally bound or liable for the acts or obligations of the Employer under the Contract or answerable for default or omission in the observance or performance of any of the acts, matters or things which are herein contained.

Clause 77 Taxes and Duties

(1) The Contractor shall list in his tender the plant and vehicles which he intends to import for the execution of the Works. The Engineer will consider the list in the context of the program of the Works and will give his approval subject to any modifications that he may see fit to make. No appeal against the Engineer’s decision shall be permitted.

The Contractor will be permitted to import approved plant and vehicles required for the execution of the Works on the basis of temporary admission into Kenya and re-export thereafter upon completion of the Contract without payment of customs duties and Value Added Tax for them. If the plant and equipment shall not be re-exported, duties and taxes shall then be paid based upon their residual value at the date of completion of the Contract, or the date of withdrawal from the Works, if earlier. Plant and vehicles so imported shall not be utilized on other works not associated with the Contract unless specifically authorized by the Engineer.

- (2) The Contractor will be permitted to import approved spare parts, tires and tubes without payment of customs duty and Value Added Tax for maintenance of any imported vehicles and plant as provided in sub-clause 77.1 above, within a financial limit indicated by himself. However, this limit will not exceed 15% of the Contract Price excluding Contingencies.
- (3) All materials approved by the Engineer to be incorporated into the Works or temporary works, and whose importation into Kenya is agreed to be essential shall be free of customs duties and Value Added Tax. The Contractor shall submit a list of such materials required with the tender. The Contractor shall be required to satisfy the Engineer that such materials have actually been incorporated into the Works.

Items produced in Kenya will not be permitted to be imported without payment of customs duty and Value Added Tax.

Items produced in Kenya shall mean commercially recognized goods or products that are either mined, grown, manufactured, processed or assembled (whether the components are imported or not) in Kenya.

Clause 78 Joint Ventures

- 78.1 If the Contractor is a joint venture, all partners of the joint venture shall be jointly and severally liable to the Employer for the execution of the entire Contract in accordance with its terms and Conditions.

V) SPECIFICATIONS

SECTION 1. GENERAL REQUIREMENTS

101 Climatic Conditions

Due to its location on the slopes of the Aberdare Range, the climate and temperatures within the project are influenced by altitude with cooler coffee zone areas located North of project area, while the more arid zones are located to the South. Rainfall is bimodal with long rains occurring from March to June, and the short rains from October to December. The mean annual rainfall is 1068 mm, as recorded at the Ruiru Jacaranda Meteorological Station (No. 91.36/084) between Years 1943 - 1980. The same station has recorded mean annual minimum and maximum temperatures as 13.0°C and 25.1°C.

As project area is situated close to the equator, the timing of sunrise and sunset do not vary tremendously throughout the year.

102 Quality and Approvals

The materials and workmanship shall be the best of their respective kinds and to the approval of the Engineer. The words “to the approval of the Engineer” shall be deemed to be included in the description of all items relating to design, construction, installation and materials and workmanship for the due execution of the Works.

The Contractor shall submit all data, details and samples as necessary and as reasonably requested by the Engineer of all materials that the Contractor proposes to use in the Works. Method statements which adequately demonstrate the Contractor’s proposed method of working, methods of maintaining safety and compliance with the programme shall be submitted for the Engineer’s approval prior to the commencement of work on any area of the Site.

Where the Contractor is responsible for the preparation of Construction Documents to describe the permanent works such Construction, the Documents shall be approved prior to the procurement of any materials or commencement of any work to which the documents relate.

No materials, Plant or equipment shall be procured for the Contract and no work, permanent or temporary, shall commence without first obtaining the Engineer’s approval. All materials, Plant and equipment supplied shall be designed for operation under the above described conditions.

103 Construction Documents

Drawings and Documents which are to be submitted by the Contractor to describe the Permanent Works shall become Construction Documents upon their approval.

All drawings, technical specifications, bill of quantities, schedules, cost estimates; programme and other information to be submitted by the contractor shall be in English and shall be submitted for approval in triplicate. Following approval, the contractor shall supply a further five copies to the Engineer. Construction Documents shall not be departed from without the approval of the Engineer.

All drawings and documents submitted by the Contractor shall have been checked, signed and be ready for issue and shall bear:

- Title of the drawing or document;
- Scale;
- Date;
- Work item reference number complying with an approved numbering system;
- Name and references of the Contractor;
- Names of the employer and the Engineer;
- Date of approval by the Contractor and the signature of the person responsible for approval.

Drawings and documents submitted for approval shall be delivered to the Engineer's office as designated by the Engineer.

Unless otherwise specified the Contractor shall allow a minimum of 21 days, after the date of receipt by the Engineer for approval of drawings and documents by the Engineer.

104 Operation and Maintenance Manuals

The Contractor shall submit to the Engineer for approval six copies of the Operation and Maintenance (O&M) Manuals as described in Clause 4.1 of the Particular Conditions of Contract.

The Contractor shall supply the final version of the O&M Manuals prior to the issue of the Taking-Over Certificate for either the whole of the Works or the respective Section or part of the Works. Each set shall be bound together in a stout plastic or other approved cover.

O&M Manuals shall be supplied written in English language, all parts and equipment listings shall be in English.

105 Level Datum

Before the commencement of constructional work, the Contractor shall establish, in a position to the approval of the Engineer, steel datum pegs which shall be securely concreted in. The level of these pegs shall be established and agreed with the Engineer and all levels used in the construction of the Works shall be referred to these established datum points. The correctness of this datum shall be checked at regular intervals during the construction period as agreed with the Engineer.

Where possible construction drawings and all levels used for construction shall be referred to the national height datum as defined by the Survey of Kenya. The Contractor shall be responsible for obtaining the location and values of the permanent bench marks. In cases where such bench marks do not exist, the site datum shall be agreed with the Engineer.

106 Setting Out of the Works

The site layout drawings show indicative site layouts. Prior to commencing construction, the Engineer will agree with the Contractor the basic information supplementary to that shown on the

Drawings such as the position of manholes, chambers, centre-lines and base-lines sufficient for the Contractor to locate the Works.

The Contractor shall prepare detailed setting out drawings and data sheets as necessary and submit them to the Engineer in triplicate for approval. Any modifications to the setting out drawings or data sheets required by the Engineer shall be made by the Contractor and resubmitted for final approval. Should it be necessary during setting out or during construction for the approved setting out details to be amended, the Contractor shall amend the drawings or data sheets or make new ones for approval as required by the Engineer.

For pipelines, the Contractor shall in the presence of the Engineer set-out the pipeline alignments in accordance with the indicative alignments shown on the drawings taking into account physical features on the ground, any existing services, any requirements of relevant Authorities and any changes deemed necessary by the Engineer, confirming the locations of all valves, air valves, washouts, hydrants and bends.

The Contractor shall prepare and submit to the Engineer, at an approved scale, plans of the pipeline route and profiles of ground levels after any initial clearing of the way leave or easement showing the proposed pipe invert levels and precise chainages for all valves and fittings for approval. Following approval, the Contractor shall submit to the Engineer two copies of the agreed alignment and profiles.

107 Boundaries of Works

The Employer shall provide the Site upon which the Permanent Works are to be constructed. Where a drain or pipeline is to be within an existing road or track reservation or is otherwise located in land designated Public Domain the Site width will be restricted to the limit of the public land. The existing boundary fences and walls shall not be disturbed without prior approval of the Engineer and, unless road diversions and closure notices are approved and posted, carriageways shall be left available for the safe passage of traffic.

The Contractor shall not enter upon or occupy with men, tools, equipment or materials any land other than the site without the written consent of the owner of such land.

On occupation of the Site or other land the Contractor shall provide such fencing, as required.

108 Work through Private Land

In order that the necessary parts of the Site which are on private land may be obtained the Contractor shall supply the Engineer with full information of his programme sufficiently in advance of the dates upon which the Contractor proposes to enter upon each areas of the Site. The Contractor shall where required, in consultation with the Engineer, programme the Works to designate the areas of the Site to which the Contractor is to be given possession and the sequence of taking possession.

The Contractor shall obtain written approval before entering upon any private land or cutting through ditch, bank, hedge, wall, fence or any other form of boundary marking and he shall carry out all reasonable requirements as approved by the Engineer in the matter of reinstatement.

109 Public Utility Mains and Services

Where the Contract indicates the positions of existing services or apparatus the positions shown are believed to be correct but no warranty is given as to the accuracy or completeness of the information.

It shall be the responsibility of the Contractor to obtain all information available from the Public Utility Authorities regarding the position of existing mains and services and he shall copy this information to the Engineer as soon as he obtains it.

The Contractor shall carry out excavation works in a manner which safeguards any existing services, including hand excavation as necessary and shall be responsible for the cost of any repair work necessitated by damage caused by him to any main or service and for any costs arising from the disruption.

The Contractor shall obtain all information and assistance from the Public Utility Authorities for the locating of the mains and services and shall agree with the Engineer any trial excavation which may be necessary to confirm or establish these locations.

The Contractor shall be responsible for locating all existing services, whether known to the Public Utility Authorities or not, and shall conduct his own survey as necessary to accurately locate all services. All efforts to identify these existing services shall be carried out in advance of conducting excavation for the permanent works.

Any temporary or permanent diversion of mains and services shall be agreed with the appropriate Authority.

110 Safeguards to Existing Pipes, Cables, Structures

It shall be the Contractor's responsibility to safeguard by means of temporary or permanent supports or otherwise all existing sewers, pipes, cables, structures or other things which would be liable to suffer damage if such precautionary measures were not taken.

Safeguards shall be to the approval of the Engineer and of the undertaker or owner concerned.

111 Record Drawings

At all sites and any locations where the Contractor executes work under the Contract, including locations where the Contractor undertakes repair or rehabilitation work, the Contractor shall record the location and nature of all water supply and wastewater works including their ancillaries and any associated services.

Where instructed by the Engineer for the purpose of producing Record Drawings, the Contractor shall undertake such surveys and investigations to determine the location of existing services. Such surveys and investigations shall be additional to those surveys and investigations undertaken by the Contractor for the purpose of determining the location of services prior to excavation.

The Contractor shall where necessary utilize appropriate equipment and where instructed by the Engineer excavate trial pits to confirm the location and determine the size and nature of the buried services.

For sites where the Contractor undertakes permanent works Record Drawings shall be submitted to the Engineer, for approval, in the form of as Built Drawings. In the case of repairs and rehabilitation the Record Drawings shall be submitted for approval within a period of 21 days following execution of the work.

Record Drawings shall be prepared to an approved format, and scale in line with the construction drawing.

112 Connections to Existing Pipes, Cables and Equipment

The Contractor shall be responsible for joining up and making connections between pipes and cables laid by him and existing pipes and cables. The Contractor shall submit to the Engineer a drawing showing the details of the connection, and shall state the date on which the particular connection is required, and the work shall not proceed until the Engineer's approval has been given.

The Contractor shall be responsible for ensuring the compatibility of new pipes and cables with existing pipe work, cables, tubing and equipment.

113 Lighting, Watching and Traffic Control

Where necessary for safety of the public or where required by the Engineer, the Works shall be properly fenced and signed. In addition, the Works shall be lighted from half an hour before sunset until half-an-hour after sunrise and at other times when visibility is poor. The position and number of the lamps shall be such that the extent and position of the Works are clearly defined. Each Site shall be provided with watchmen as required.

114 Contractor's Offices

The Contractor shall provide and maintain offices for the use of his representative and staff to which written instructions by the Engineer can be delivered. Any instructions delivered to such offices shall be deemed to have been delivered to the Contractor.

Offices shall be located to give convenient access to the Works and shall be subject to the approval of the Engineer. The Contractor shall be responsible for obtaining the land on which to establish any temporary site offices.

117 Contractor's Yards, Stores and Accommodation for Workmen

The Contractor shall be responsible for obtaining the land and for the provision of all temporary yards, stores, workshops, offices, mess rooms, shelters and for all services in connection therewith. The location of all such facilities shall be agreed beforehand with the Engineer and shall be such as to avoid obstruction and nuisance to the public.

The Contractor shall construct secure storage compounds and storage building where he shall store at his own risk all equipment and Plant awaiting erection. The Contractor shall also provide secure covered storage for all samples submitted to the Engineer for approval. Storage building shall be weatherproof and shall be of sufficient size to accommodate all items requiring covered storage.

The Contractor shall provide and maintain suitable and sufficient shelters and mess rooms for his workmen and supervisory staff as are customary and necessary. The Contractor shall provide sufficient closets or latrines to the satisfaction of the relevant authority. They shall be properly

screened and maintained in a clean and sanitary state at all times. The Contractor shall be responsible for making all arrangements for the proper disposal of waste.

118 Water and Electricity Supplies

The Contractor shall make all arrangements for and provide adequate supply of potable water to each site as necessary for the execution and testing of the Works and for use by his workmen.

The Contractor shall make arrangements for and provide any electricity supply required for the execution of the Works, including the Tests on Completion.

119 Contractor's Staff and Workmen

The Contractor shall agree to employ Kenyan workers to the maximum extent possible. The Contractor shall provide a competent Site Agent to the approval of the Engineer to be in charge of the work who shall not be changed except with the consent of the Engineer.

The Contractor agrees that his workmen and employees shall be considered for all purposes in his direct pay and employ and under his supervision and control. He shall be directly and personally responsible for discharging all obligations, financial or other, which may be or becoming owing to any such workman or employee or to his successors, assignees or personal representatives. There shall be no contractual or legal relations of any kind whatsoever between the Employer and any such workman, employee or any person employed in the performance of the Contractor's obligations under this Contract.

The Engineer may request and the Contractor agrees to accept the request for the immediate removal from the site of any employee or worker of the Contractor adjudged by the Engineer to be incompetent, disorderly, and unreliable or of bad character. Such employee shall not again be employed on the Works.

120 Training of Employers Workmen

The Contractor shall make provision for the on-site training of up to 3 of the Employer's staff.

121 Project Management

121.1 Project Control

The Contractor shall provide within his site organization a project management capability to advice and be directly responsible to the Site Agent. (Contractor's chief site representative) The duties of the section shall include the following:

- a) Planning and programme preparation particularly in relation to the requirements of the Employer and the public authorities, and the requirements to maintain water supply and waste water disposal services where careful detailed arrangements have to be made and adhered to.
- b) Planning the execution of the Works in a manner which minimizes disruption to the water supply system and will permit the efficient and effective commissioning of the water supply system and their respective components.

- c) Ensuring adequate potable water supplies and wastewater disposal services are maintained to all consumers.
- d) Continuous surveillance of progress and anticipation of factors likely to affect the timely performance of the Contract.
- e) Making proposal for modification to forward planning and to the programme at an early stage in the light of factors resulting from (d) above.
- f) Continuous appraisal of the Contractor's methods and routines particularly as to their effect on the community and property.
- g) Forward planning for resource requirements taking due account of possible shortages and delays in the arrival on site of materials, equipment, plant and personnel and their mobilization for effective usage.
- h) Acquisition and process of up-to-date information for progress meetings with the Engineer. The preparation of monthly progress reports including an update of the detailed programme and cash flow forecast which shall include progress photographs as directed by the Engineer.

The Contractor's project management staff shall be of adequate ability and experience. Programmes shall be based upon Critical Path Management (CPM) networks in precedence format and shall be prepared using a suitable PC-based project management software package approved by the Engineer.

Reporting shall be in a manner compatible with the Employers project management procedures and shall use the Earned Value (EV) Technique and shall monitor the actual gross value of work completed against the predicted value.

121.2 Monthly Statements and Certificates

Monthly statements and certificates shall be submitted in an approved manner and format. In addition to the statements submitted in hard copy the Contractor shall submit a computer copy using data base software as prescribed by the Engineer. The statements and certificates shall detail the measured value of the work completed on each item of the Works in such detail that the Engineer can identify location and measurement of each item. A location shall constitute a single structure such as a reservoir, pump station or section of a pipeline or a component of a system such as a pipeline valve complex.

Each item shall be uniquely identified in accordance with the numbering system as instructed by the Engineer.

121.3 Progress Meetings

The Contractor shall provide a suitable venue, near the vicinity of the Site, and arrange progress review meetings to be chaired by the Engineer at monthly intervals to coincide with submission of monthly progress submissions. The Contractor shall allow for attendance by the Engineer and up to 4 representatives of the Engineer's or Employer. The meetings shall be attended by the Contractor's senior representatives, Site Agent and other members of his senior staff as may be deemed necessary.

122 Equipment for the Employer

The Contractor shall hand over to the Employer on completion of the Works a complete set of tools and equipment together with spare parts and fittings to facilitate the maintenance and operation of the installed works.

123 Facilities for Survey and Inspection by the Engineer

The Contractor shall make available technicians and such labour, materials and safety equipment as the Engineer may require for inspections and survey work in connection with the Works. The Contractor shall provide all necessary tackle, test equipment, access, labour, staff and any other thing the Engineer may reasonably require in order that he may safely, conveniently and quickly carry out such inspections as he deems necessary at any time during the execution of the Works and during the Defects Liability Period. The Engineer, his representative and assistants, shall not inspect any area of the Works where they deem the safety provision to be inadequate and the Contractor shall undertake any work required by the Engineer in order to make it safe.

124 Inspections by the Engineer during Defects Liability Period

The Engineer will give the Contractor due notice of his intention to carry out any inspections during the Defects Liability Period and the Contractor shall thereupon arrange for a responsible representative to be present at the times and dates named by the Engineer. This representative shall render all necessary assistance and shall record all matters and things to which his attention is directed by the Engineer.

125 Protective Clothing and Safety Equipment

The Contractor shall provide for the Engineer, his Representative and assistants any additional protective clothing and safety equipment necessary for the proper discharge of their duties on the Site.

The Contractor shall provide any necessary protective clothing and safety equipment for the use of authorized visitors to the site including the Employer and his staff and representatives and those of any relevant authority who have reason to visit the Site.

126 Notice Boards

The Contractor shall provide and erect sign boards at the Sites where works are being executed, giving information to the public on the Project and the Employer and further details as will be prescribed by the Employer. The location of the sign boards at the sites will be indicated by the Engineer. The Contractor shall maintain, alter, move or adapt the sign boards from time to time as may be instructed by the Engineer. The display of any named Sub-contractors or any other information associated with the Works shall be to the approval of the Engineer.

127 Language of Correspondence and Records

All communications from the Contractor to the Engineer shall be in the English language. All books, timesheets, records, notes, drawings, documents, specifications and manufacturers' literature shall be in the English language. If any of the aforementioned is in another language a certified translation in English shall be submitted to the Engineer.

128 Standards and Regulations

Each and every part of the Works shall be designed, constructed, manufactured, tested and installed in accordance with an internationally recognized standard, Code of Practice, or Regulation applicable to that part of the Works.

Such standards and codes shall include:

- a) British Standard Specification last published.
- b) International Electromechanical Commission, where available (IEC).
- c) International Organization for Standardization (ISO).

The Contractor shall provide and keep permanently on site copies of such standards as may be directed by the Engineer and shall make them available to the Engineer as required.

129 Equivalency of Standards and Codes

Wherever reference is made in the Contract, including Specifications, Drawings and Bill of Quantities, to specific standards and codes to be met by the goods and materials to be furnished, and work performed or tested, the provisions of the latest current edition or revision of the relevant standards and codes in effect shall apply, unless otherwise stated in the Contract. Where such standards and codes are national, or relate to a particular country or region, other authoritative standards that ensure a substantially equal or higher quality than the standards and codes specified will be accepted subject to the Engineer's prior review and written consent. In the event the Engineer determines that such proposed deviations do not ensure substantially equal or higher quality, the Contractor shall comply with the standards specified in the Contract.

130 Quality Control

The Contractor shall be responsible for his own quality control and shall provide sufficient competent personnel for supervising the Works, taking and preparing samples and for carrying out all necessary tests.

131 Units

The International System of (metric) Units as set out in ASTM E380 shall be used throughout the Contract except where otherwise provided.

132 Inspection and Testing during Manufacture

The performance of each item of Plant or Pipe shall be tested in accordance with the Specification to the requirements of the Engineer.

Test certificates in triplicate shall be submitted by the Contractor to the Engineer within 2 weeks of the date of the tests. Type tests are not acceptable. Test certificates shall be supplied for tests carried out on the actual Plant being supplied.

Plant shall not be dispatched from the manufacturer's works until it has passed the specified tests and approval been given by the Engineer.

The Engineer shall at his discretion witness tests of individual items of Plant at the manufacturer's works. The Engineer shall be given three weeks' notice in writing before such tests are to take place.

The acceptance by the Engineer of any item of Plant or equipment after testing at the manufacturer's works shall in no way relieve the Contractor of his responsibility for the correct performance.

SECTION 2 - EARTHWORKS, BACKFILLING AND RESTORATION

201 Conditions of Site

Before carrying out work on any Site, the Site shall be inspected by the Contractor in conjunction with the Engineer to establish its general condition which shall be agreed and recorded in writing and by means of digital photography.

Details recorded shall include the location of all boundary and survey beacons, the condition of buildings, surface, terracing (if any), ditches, watercourses, roads, tracks, fences and other information relating to the Site and elsewhere which may be affected by the works.

In the case of way leaves for pipelines the boundaries of the way leave will be defined by the Employer and the contractor shall where directed provide erect and maintain in position, from commencement to the final completion of the Works, in every section substantial timber stakes or similar approved markers not less than 1.5 m high indicating the position of the boundary at 100m or other such intervals as the Engineer may direct. In the event of any boundary or survey mark established for the purpose of land title being disturbed or displaced the Contractor shall forthwith replace the beacon. Where necessary the Contractor shall employ the services of an approved licensed surveyor for the purpose of setting out boundaries.

202 Site Clearance and Topsoil Removal

Site clearance shall be carried out over the areas to be occupied by the Permanent Works before beginning excavation or filling or other work, and shall include the clearance of all trees, stumps, bushes and other vegetation and the removal of all boulders between 0.01 and 0.2m³ volumes. Boulders located within 1m of any pipe centerline shall be removed where directed by the Engineer.

Before beginning clearance in any area the Contractor shall give seven days' written notice of his intention to the Engineer who will determine the extent and limits of such clearance.

Topsoil shall mean the surface layer of soil which by its humus content supports vegetation and is unsuitable, as a formation to roads and concrete structures or as a backfill or bedding material. The extent and depth of topsoil that needs removal shall be agreed with the Engineer. Topsoil shall be set aside for re-use or disposal as directed by the Engineer.

Trees to be removed shall be uprooted or cut down as near to the ground level as possible. Bushes, undergrowth, small trees stumps and tree roots shall, where directed by the Engineer, be grubbed out. All holes left by the stumps or roots shall be backfilled with suitable material in a manner approved by the Engineer.

The Engineer may require that individual trees, shrubs and hedges are preserved; the Contractor shall take all necessary precautions to prevent their damage.

In the case of way leaves for pipelines and the like, the Contractor shall preserve as far as practicable all grass and other vegetation outside the limits of trenches and permanent works and shall not necessarily destroy crops or any vegetation whose removal would not be essential to his operations.

203 Erosion

The Contractor shall take care at all times to prevent erosion on every site and elsewhere on land which may be affected by his operations and the Engineer may impose such reasonable limitations and restrictions upon the method of clearance and upon the timing and season of the year when clearance is carried out as the circumstances warrant.

204 Ground Levels

Before commencement of any earthworks or demolition the sites shall be surveyed, as necessary, in conjunction with the Engineer to establish existing ground levels. These agreed ground levels shall form the basis for the calculation of any subsequent excavation and filling.

205 Trial Holes

The Contractor shall excavate refill and restore in advance of his programme such trial holes as he may require for determining the nature of the subsoil and the location of existing underground services and obstructions.

206 Excavation Generally

Excavations shall be made in open cutting unless tunneling or heading is specified or approved by the Engineer and shall be taken out as nearly as possible to exact dimensions and levels so that minimum of infilling will afterwards be necessary. The Contractor shall ensure the stability and safety of excavations and shall take all measures necessary to ensure that no collapse or subsidence occurs.

Except where described in the Contract or permitted under the Contract excavation shall not be battered. The sides of all excavations shall be kept true and shall where necessary be adequately supported by means of timber, steel or other type struts, walling, poling boards, sheeting, bracing and the like.

Excavations shall be kept free from water and it shall be the Contractor's responsibility to construct and maintain temporary diversion and drainage works and to carry out pumping and to take all measures necessary to comply with this requirement.

In the event of soft or otherwise unsuitable ground being encountered at formation level or if the formation is damaged or allowed to deteriorate the Contractor shall forthwith inform the Engineer, shall excavate to such extra depth and refill with compacted granular or other approved fill or C15 concrete (minimum compressor strength 15N/mm²) as the Engineer may require. With respect to the side face of any excavation against which concrete or other work will be in contact the Engineer may require that the net dimensions of the work be increased.

The Contractor shall be responsible for the disposal of Surplus excavated material off site, which shall be to a location approved by the Engineer. No excavated material suitable for re-use shall be removed without the approval of the Engineer.

The Contractor shall not deposit excavated materials on public or private land except where directed by the Engineer or with the consent in writing of the relevant authority or of the owner or responsible representative of the owner of such land and only then in those places and under such conditions as the relevant authority, owner or responsible representative may prescribe.

207 Excavation in Excess

If any part of any excavation is in error excavated deeper and/or wider than is required the extra depth and/or width shall be filled with Grade C15P concrete or compacted granular or other approved fill to the original formation level and/or dimensions as the Engineer directs.

In pipe trenches where the pipe is not bedded on or surrounded with concrete, excess excavation shall be filled with compacted granular material. Excess excavation in rock trenches shall be filled with concrete (15N/mm² compressive strength) up to 150mm below the pipe invert.

208 Mechanical Excavation

Mechanical excavation shall be employed only if the subsoil is suitable and only in such manner which will allow adequate support of the excavations. The Contractor shall ensure that there are no pipes, cables, mains or other services or property which may be disturbed or damaged by its use.

209 Excavation for Pipe laying

The width of trench excavation shall be the minimum required for efficient working after allowance has been made for any timbering and strutting, and shall not exceed the widths described in the Contract. At any one spread the maximum length of open trench shall not, without the prior approval of the Engineer, exceed 100 metres.

Trenches in rock for pipes up to 100mm bore shall be excavated to provide a minimum clearance of 100 mm and a maximum of 300 mm around the outside of the pipe and joints. For pipes exceeding 100mm bore the minimum clearance shall be increased to 150mm and a maximum of 400mm; and the Contractor's rates for excavations in the bill of quantities shall be deemed to include excavations in excess of the above minimum and maximum clearance threshold.

Where the trench is in rock or rocky ground the Contractor shall excavate the pipe trench to a depth of 150mm below the invert of the pipe and refill with compacted granular fill.

The materials for re-use excavated from trenches shall be stockpiled at the sides of the trench except where this would obstruct any road or footpath and prevent the passage of traffic or pedestrians. In such cases the Contractor shall excavate the trench in such lengths and stockpile the excavated materials at such places as the Engineer may require.

Where excavation for pipe laying is carried out behind thrust blocks on existing pipelines the Contractor shall provide adequate support arrangements to transfer thrusts to the surrounding ground.

210 Headings

Excavation for pipes in heading shall be carried out to the approval of the Engineer and to dimensions which will permit a proper inspection to be made. The heading shall be properly and

securely timbered. The pipe shall be laid on a minimum thickness of 150mm of concrete. After the pipe has been laid, jointed and tested the heading shall be filled in short lengths not exceeding 1 metre with Grade C15P concrete or as directed. The heading shall be completely filled with concrete and hard filling shall then be rammed into the concrete at the crown of the heading. Special precautions shall be taken to prevent a slump in the concrete and to ensure that no slips or falls of the heading or in the ground above or in the shafts can take place.

211 Excavation for Foundations of Structures

The Contractor shall give sufficient notice to the Engineer to enable him to inspect and approve foundations in advance of placement of the permanent works. The Engineer may withdraw his approval if work is not commenced within 48 hours or the formation is subsequently allowed to deteriorate.

If the Engineer directs a bottom layer of excavation of not less than 75mm thickness shall be left undisturbed and subsequently taken out by hand immediately before concrete or other work is placed.

Formations which are to receive concrete blinding or a drainage layer shall be covered with such blinding or layer immediately the excavation has been completed, inspected and approved by the Engineer.

Surfaces against which permanent works are to be placed shall be kept free of oil, water, mud or any material.

No concrete or other materials shall be placed until formations have been approved. Adequate notice shall be given to the Engineer to enable him to examine the formation.

212 Rock Surfaces under Concrete Structures

212.1 Concrete Placed Directly on Rock

Rock under concrete structures shall be prepared by picking, barring and wedging or other methods which will leave the rock in as sound a condition as may reasonably be expected according to the rock quality.

Rock surfaces shall be thoroughly cleaned by compressed air and water jet or such means as the Engineer may direct before concrete is placed.

212.2 Concrete Placed on Capping Layer

Where instructed the rock excavation shall be taken down to a depth of 1.0m below the underside of the structure and the excavation backfilled with capping materials to the required formation level. Capping material shall be granular material. The material shall be compacted in 150mm layers to achieve a density of not less than 95% maximum dry density at optimum moisture content + 5% to 2% as determined by the BS heavy compaction tests to BS 1377.

213 Explosives

The Contractor shall at all times take every possible precaution and comply with the Explosives Laws of Kenya and regulations relating to the handling, transportation, storage and use of explosives and shall at all times when engaged in blasting operations post sufficient warning flagmen to the full satisfaction of the Engineer's Representative.

The Contractor shall also provide a special proper store for explosives in accordance with local regulations and shall provide experienced men with valid blasting licenses, for handling explosives to the satisfaction of the Engineer and the authorities concerned.

The Contractor shall at all times make full liaison with and inform well in advance and obtain such supervision and permission as is required from the Police and all Government Authorities, public bodies and private parties whosoever concerned or affected by blasting operations.

Blasting shall only be carried out on those sections of the Works for which permission in writing shall have been given by the Engineer and the relevant authorities and shall be restricted to such hours and conditions as may be prescribed. Blasting within 10 metres of existing water mains will not be permitted.

Blasting shall be carried out so as not to weaken existing structures or the foundations or ground adjacent to the existing and proposed works. The Contractor shall take all necessary precautions to prevent loss, injury or accident to persons or property and shall be entirely liable for any accident or damage that may result from the use of explosives.

The Contractor shall submit to the Engineer for his approval a method statement including details of the intended drilling patterns, depths of holes, the amounts of explosives at each location and the method or sequence of setting off that he proposes to use.

214 Excavated Materials Suitable for Re-use

In so far as they are suitable and comply with the Specification, materials arising from excavations shall be re-used in the Works.

During excavation, the Contractor shall ensure that all material suitable for re-use are kept separate and set aside and protected as necessary to prevent loss or deterioration.

The materials forming the surface and foundations of roads, road verges, tracks and footways shall when excavated, and if required for further use, be carefully separated. All hard materials shall be kept free from soil or other excavated materials.

During excavation of pipe trenches the Contractor shall ensure that all granular or other approved material suitable for filling around and over pipes shall be kept separate and re-used for this purpose.

Paving slabs, bricks and similar surfaces shall be carefully removed and stacked. Prior to the commencement of excavation the number of badly broken and unsuitable paving slabs, bricks etc. on the line of the excavations shall be agreed with the Engineer.

In verges and other grass surfaces the grass and top soil shall be stripped and separately stacked.

215 Backfilling of Excavations

Backfilling shall be thoroughly compacted in layers not exceeding 150mm compacted thickness and by means which will not damage the Works.

Backfilling of reinforced concrete structures shall be with suitable material approved by the Engineer.

“Granular material” as backfill is defined as unconsolidated quarry dust, gravel, sand or similar in which the clay or silt content is not predominant. The use of angular crushed stone shall not be permitted.

216 Pipe Beddings

Unless otherwise specified granular material for beddings shall consist of aggregate to BS EN 12620 and shall conform to the following grading.

Pipe Nominal Diameter (mm)	Max Size (mm)	Grading (mm)
<50	Sand	N/A
50	10	10 single-size
80	10	10 single-size
100	10	10 single-size
150	15	10 or 14 single-size or 14 to 5 graded
200 to 500	20	10, 14 or 20 single-sized or 14 to 5 graded or 20 to 5 graded
<500	40	10, 14 20 or single-size crushed rock or 14 to 5 graded or 20 to 5 graded or 40 to 5 graded

Granular bedding material where specified shall have a Compaction Fraction not greater than 0.3 as ascertained by the test method described below.

Aggregates for flexible pipes shall consist of sub-rounded or rounded material which will not cause damage to or penetrate the pipe material.

Sand bedding material shall consist of approved local sand which material shall have a Compaction Fraction ascertained by the test method described below of not greater than 0.3.

Class A bedding shall consist of Grade C15P concrete bed and surround.

Class A1 bedding shall comprise a 120 degrees cradle of Grade C15P in situ un-reinforced concrete under the pipe with selected backfill material to a depth of 300mm above the crown of the pipe.

Class B bedding shall comprise a 180 degrees bed of single-size granular material in accordance with the above table, with selected backfill material to a depth of 300mm above the crown of the pipe.

Class S bedding shall comprise a complete surround of granular material in accordance with the above table to a depth of 150mm above the crown of the pipe.

Class D bedding shall comprise a hand-trimmed natural bottom to the trench with selected backfill material placed around and over the pipe to a depth of 300mm above the crown of the pipe.

Granular bedding and selected backfill material, placed around and to a thickness of 300mm above the crown of the pipes shall be placed simultaneously on both sides of the pipe in layers not exceeding 150mm thickness and compacted by the use of hand rammers taking particular care to compact the material under barrel of the pipe and around joints.

In trenches where there is a continuous accumulation of groundwater, the trench shall after obtaining the approval of the Engineer, be over-excavated by 150mm and shall be backfilled using compacted granular material in accordance with the above table.

If the quantity of suitable material which can be obtained from the excavations is insufficient, the Contractor shall either screen the excavated material or transport suitable material from other excavated or borrow pits on the Site. In cases where insufficient material exists on the Site, the Contractor shall import suitable material after obtaining the written approval of the Engineer.

217 Compaction Fraction Test

217.1 Apparatus required:

- 1) Open-ended cylinder 250 mm long and 150mm \pm 5mm internal diameter (150mm diameter pipe is suitable);
- 2) Metal hammer with striking face 38 mm diameter and weighing 1 kg.
- 3) Rule.

217.2 Method

Obtain a representative sample, more than sufficient to fill the cylinder (viz. about 10kg). It is important that the moisture content of the sample should not differ from that of the main body of material at the time of its use in the trench.

Place the cylinder on a firm flat surface and gently pour the sample material into it, loosely and without tamping. Strike off the top surface level with the top of the cylinder and remove all surplus material. Lift the cylinder up clear of its contents and place on a fresh area of flat surface. Place about one quarter of the material back in the cylinder and tamp vigorously until no further compaction can be obtained. Repeat with the second quarter, tamping as before, and so on for the third and fourth quarters, tamping the final surface as level as possible.

Measure down from the top of the cylinder to the surface of the compacted material. This distance in millimetres divided by the height of the cylinder (250mm) is the Compaction Fraction of the material under test.

To obtain a representative sample about 50kg of the proposed material should be heaped on a clear surface and divided with the spade down the middle into two halves. One of these should then be similarly divided, and so on until the required weight sample is left.

218 Selected Backfill Material

Backfill in contact with the pipes shall be selected material and shall not contain large stones, rocks, tree roots or similar objects which through impact or by concentrating imposed loads might damage the pipes. The material shall be capable of being compacted without the use of heavy rammers and should be free of clay lumps or other material larger than 75mm or stones larger than the maximum particle size specified for pipe bedding.

219 Backfilling of Pipe Trenches

The trench above pipe bedding level (300mm above the crown of the pipe) shall be filled with the approved back fill material obtained from the trench excavations, free from clay lumps, boulders and rock fragments larger than 150mm.

If the quantity of material which can be obtained from the pipe trench excavation is insufficient, the Contractor shall either screen the excavated material or transport suitable material from other excavations or borrow pits on the Site. In cases where insufficient material exists on the Site, the Contractor shall import suitable material after obtaining the written approval of the Engineer.

The material shall be placed in layers not exceeding 150mm thickness and compacted by the use of rammers to achieve a density of not less than 95% maximum density at optimum moisture content +5% to -2% as determined by the BS Heavy Compaction Test to BS 1377.

For trenches in fields and open areas where agreed by the Engineer the trench backfill shall be compacted to obtain a density of not less than 85% maximum dry density at optimum moisture content +5% to -2% as determined by the BS Heavy Compaction Test to BS 1377.

The density of the compacted fill shall be determined by the Contractor using the “sand replacement” method as directed by the Engineer.

Before backfilling trenches the Contractor shall obtain approval from the Engineer of the methods he proposes to use and shall demonstrate by means of tests that the specified compaction can be achieved. The method of compaction shall at all times be to the approval of the Engineer.

Where ground water conditions are such that the bedding material would be likely to act as a carrier for ground water from higher or lower ground, the Engineer may instruct flow barriers of suitable selected earth or concrete to be inserted in lieu of bedding material. Such barriers to be erected at reasonable intervals close to flexible joints in the pipe.

220 Making Good Subsidence after Backfilling

Backfilling, whether in foundations or in pipe trenches, shall be thoroughly compacted by ramming and any subsidence due to consolidation shall be made up with extra compacted material. Should subsidence occur after any surface reinstatement has been completed the surface reinstatement shall first be removed, the hollows made up, and then the surface reinstatement re-laid.

Any subsidence that occurs adjacent to the Site of the Works which is attributable to the Contractor’s activities shall be reinstated to the full satisfaction of the Engineer.

221 Removal of Timbering from Excavations

Timbering shall be removed from the excavations before or during the process of backfilling except in so far as this removal of timber would be likely to cause damage to adjacent property, structures or structure foundations in which event the Contractor shall leave in the excavation such timbering as he considers necessary or as may be ordered by the Engineer.

222 Reinstatement of Surfaces

All surfaces whether public or private that are affected by the Works shall be reinstated temporarily in the first instance and when the ground has consolidated fully the Contractor shall reinstate the surfaces permanently.

Temporary reinstatement and permanent reinstatement of all surfaces, affected by the operations of the Contractor shall be carried out and maintained to the satisfaction of the Engineer and the responsible authority or owner.

Temporary reinstatement shall be carried out immediately the trenches are backfilled. Permanent reinstatement shall not be carried out until the ground has consolidated completely. The Contractor shall inform the Engineer before carrying out this work. In the event of further settlement occurring after completion of the permanent reinstatement the Contractor shall forthwith make good the reinstatement to the approval of the Engineer or responsible authority.

For the purpose of temporary and permanent reinstatement in bitumen and surfaced roads the surface width of trenches shall be increased by 150mm on each side of the trench for a depth of 75mm to provide a solid abutment for the surfacing material.

Reinstatement of surfaced roads shall be carried out to the approval of the relevant authority. The responsible authority shall have the right to carry out permanent reinstatement at the Contractor's expense. Trenches in open ground shall be reinstated to the condition in which the ground was before excavation was commenced. The final surface of the trench shall be flush with the surrounding ground.

In verges and other grass surfaces and after the backfilling had been thoroughly consolidated the topsoil shall be re-laid rolled and planted with grass or other vegetation as directed by the Engineer as may be necessary and watered until the grass has become well established. Should the planting fail it shall be replanted as required until satisfactory growth is obtained. If at any time any reinstatement deteriorates the Contractor shall restore it to a proper condition immediately.

Should the Contractor not remedy the defect to the Engineer's satisfaction forthwith any remedial work considered necessary may be undertaken by the Employer and/or the responsible authority at the Contractor's expense.

All trees, shrubs and plants shall be carefully transplanted and shall be returned to their original location after the refilling of the excavations. Return of old or mature trees may be waived in cases where the age of the tree makes return impracticable, and approved tree seedlings shall be planted in their place. Topsoil shall be carefully set aside and replaced at the surface of the backfilling.

The trenches shall be refilled and rammed solid as specified in the Contract and shall not be topped up above the original surface level to allow settlement.

If any trench becomes dangerous the Engineer may call upon the Contractor for its reinstatement at three hours' notice and failing this to have the work done by others at the Contractor's expense.

In the case of footpaths the trench shall be refilled and rammed as specified to within 125mm of the surface. A foundation layer of 100mm compacted thickness of approved crushed limestone shall then be laid and compacted. The surface shall be cleaned and primed and the footpath surfacing shall be temporarily reinstated with 25mm compacted thickness of 14 mm nominal size dense wearing course macadam laid and compacted so as to achieve a dense, smooth and even course surface using a roller of 750 to 3000kg mass. Any kerbs shall be reinstated to their original condition.

The trench surface shall be thus maintained until the end of the Period of Maintenance or permanent reinstatement is ordered by the Engineer. Where permanent reinstatement is ordered by the Engineer the temporary surface and part of the foundation shall be removed to 50mm depth to

permit the construction of a tiled or paved surface to match the original surface. An approved tiled or paved surface shall then be laid and bedded on sand or mortar to an even finish.

223 Safety of Excavations in Roads

Where the surface of the road (other than that which lies immediately above the trench) is damaged either by the concentration of traffic caused by an open trench, by subsidence or other causes arising from the operations of the Contractor, he shall permanently reinstate the whole of the surface so damaged to its original condition.

The Contractor shall ensure that trenches and reinstatement are maintained in a safe condition and shall take immediate action to remedy any deterioration which renders the works unsafe. If in the opinion of the Engineer any excavation or reinstatement is in a dangerous condition the Contractor shall immediately remedy the defect. Should the Contractor fail to carry out the reinstatement promptly the work any be carried out by others at the Contractor's expense.

224 Temporary Reinstatement of Asphalted Roads

In all asphalted or bitumen sprayed roads the trenches shall be refilled and compacted to the underside of the original road surface. A sub-base layer shall then be laid consisting of approved free drainage granular material conforming to the following grading limits:

- 100% by weight passing 50mm sieve
- 75-95 by weight passing 25.4mm sieve
- 40-75 by weight passing 9.51mm sieve
- 30-60 by weight passing 4.75mm sieve
- 20-45 by weight passing 2.0mm sieve
- 15-30 by weight passing 425mm sieve
- 5-15 by weight passing 72mm sieve.

A base layer shall then be laid consisting of approved crushed limestone material conforming to the following grading limits.

100%	by weight	passing 50mm sieve
60% - 80%	by weight	passing 20mm sieve
25% - 40%	by weight	passing 5mm sieve

The materials shall have a plasticity index of not exceeding 6%. The materials forming the sub-base and foundation shall be laid in layers, brought to optimum moisture content and compacted to 95% of the maximum dry density as determined by Part 4 Clauses 3.3/3.4 BS 1377:1990.

Prior to application of the temporary reinstatement the surface of the road foundation shall be cleared of all dust, debris and other deleterious matter and shall then be primed with one application of prime coat MC-70 or similar approved. All joints with adjacent road surfacing shall be cut straight and vertical and primed.

The road surfacing shall be temporarily reinstated with 25mm finished thickness of asphaltic concrete. The asphaltic concrete shall be laid and compacted so as to achieve a dense smooth and even surface using a roller of not less than 12 tonne mass.

The surface shall be maintained until the end of the period of Maintenance or until instructions are given for the permanent reinstatement to be carried out. The surface shall not be topped up above the original surface level to allow for settlement.

225 Temporary Reinstatement of Unmade Roads

In all unmade roads the trenches shall be refilled and compacted as specified in the Contract to within 150mm of the surface.

The trench shall be surfaced with 150mm compacted thickness of base layer material as specified above.

The surface shall be maintained until the end of the Period of Maintenance and shall not be topped up above the level of the original surface to allow for settlement.

226 Permanent Reinstatement of Asphaltic Roads

Where instructions are given that permanent reinstatement is to be carried out then the temporary asphaltic concrete surface and part of the foundation layer shall be removed to a minimum depth of 200mm and the surface of the foundation shall be rolled, all dust and debris removed, joints cut straight and vertical.

The permanent reinstatement shall comprise crushed limestone material to a total compacted thickness of 150mm and the wearing course 50mm compacted thickness of 14 mm nominal size dense wearing course asphaltic concrete. The laying and finishing of the coated macadam shall be carried out so as to achieve a dense, smooth and even surface using a roller of not less than 12 tonnes mass.

227 Forming Banks and Filled Areas

The filling to be used in the embankments and filled areas shall be material selected from that arising from surplus excavation (unless otherwise defined in the Particular Specification), the material being placed according to its nature as shall be directed by the Engineer. The fill shall be placed in layers not exceeding 150mm thick, each layer being thoroughly compacted by an approved roller to the satisfaction of the Engineer.

228 Restoration of Borrow Areas, Spoil Tips and Quarries

Any spoil tips, quarries or other borrow area developed by the Contractor for the purpose of the Works shall be finished to safe and fair slopes to the approval of the Engineer.

229 Top soiling and Grassing

Where required surfaces shall be soiled with fine sifted soil or silt not less than 100 mm compacted thickness which shall be raked and brought to a fine tilth.

Surfaces required to be grassed shall be planted with approved local grass at a spacing of 200mm x 200mm. The grassed area shall be replanted if the first or subsequent operation is unfruitful or if for any reason the grass is destroyed. Grassed areas shall be watered and attended until the grass has become well established.

The soiling and planting of the grass in slopes shall be carried out immediately the slope is formed and the grass shall be kept weeded and cut until the work is accepted at the time of the Certificate of Completion.

The Contractor shall supply attendance during the Defects Liability Period to ensure that all planted grass is kept weeded and cut, and if necessary watered.

230 Free Draining Fill

Free draining fill for use as backing to wall shall consist of sound hard stone or broken rock or concrete derived from demolition of structures. The particles shall be roughly cubiform and shall be between 75mm and 25mm in size. All smaller particles, Dust, rubbish and organic matter shall be excluded.

231 Hardcore

Hardcore shall consist of sound hard stone or broken rock or concrete derived from excavations or demolition of structures and shall be graded from 150mm to 50mm in size, except that sufficient but not excessive blinding materials of smaller sizes may be permitted at the discretion of the Engineer.

SECTION 3. CONCRETE WORKS – GENERAL

301 Scope

This Specification applies to structural concrete in small structures such as manholes, chambers and superstructure elements of small building works. This specification also applies to concrete in thrust blocks, blinding, supports, fill etc

302 Concrete

302.1 Classes

This Specification includes 4 grades of concrete

Grade CI5

Grade C20

Grade C25

Grade C30

The grade refers to the 28 day characteristic strength in N/mm²

302.2 Composition

The concrete composition shall generally conform to the requirements of the prescribed mix design, as set out in BS 5328 Tables I and 2. Small quantities of concrete may with the approval of the Engineer be batched in accordance with the Table 3.1 of Nominal Mixes

Table 3.1 Nominal Mixes

Grade of concrete	Approx. volume of Aggregate m ³ per m ³ concrete		Approx. cement per m ³ finished concrete in bags (each 50 kg)	Remarks
	Fine	Coarse		
CI5	0.450	0.900	5	Aggregate max. size to be 20 mm. Fine aggregate to Zone M of BS 882 Water not to exceed 28 litres per 50kg of Cement
C20	0.400	0.875	6	
C25	0.375	0.825	8	
C30	0.350	0.725	11	

302.3 Structural Concrete

Structural concrete shall be Grade C20, C25 or C30, as shown on the drawings. The cement content shall not be less than 320 kg per cubic metre and the water/cement ratio shall not exceed 0.55 (27.5 litres per 50 kg of cement). The slump shall be 50 mm +/- 15mm when tested to BS 1881.

Unless otherwise approved by the Engineer, the fine aggregate shall comply with Zone M or Zone F of BS 882. Coarse aggregate shall be 20 mm max size. The proportions of the mix shall be approximately as shown in the Tables 1 and 2 of BS 5328 but these proportions may be varied to obtain the specified strength requirements. Admixtures may not be used in ordinary structural concrete. A trial mix of the concrete to be used shall be made in the presence of the Engineer's Representative sufficiently in advance of the commencement of concreting to permit the 28 day compression test result of the cubes taken from the mix to be approved by the Engineer's Representatives. 28 day compression cube tests shall be carried out taking one sample for each 20 m³ of concrete placed with a minimum of one sample per day. Three cubes are to be cast from each sample. If more than 5% of test results fall below the specified characteristic strength when

tested to BS 1881, adjustments to the mix shall be made in order to obtain the strength required and the Engineer may require concrete already placed to be made good as described in this Specification.

302.4 Cement

Cement for normal concrete shall be Ordinary Portland or Rapid Hardening cement to BS 12 or shall be CEMI-32.5, CEMII-32.5 or CEMIV-32.5 or higher strength grade in accordance with Kenya Standard KS 1725 Part 1 and Part 2. Cement for Sulphate resisting concrete shall be Sulphate resisting cement to BS 4027. Cement which is not fresh and dry before mixing shall not be used in the Works.

302.5 Water

Water shall be potable

302.6 Aggregates

Fine aggregate shall be clean natural sand. Coarse aggregate shall be crushed stone, washed gravel or other inert granular material as approved by the Engineer.

All aggregates shall comply with the requirements of BS 882 and grading curves shall be provided for all aggregates used.

303 Reinforcement

Reinforcement shall comply with BS 4449 and shall be bent in accordance with BS 4466. Fabric reinforcement shall be made from cold-drawn high tensile steel and shall comply with BS 4483. Reinforcement which is rusted shall be wire brushed before use to remove mill scale.

304 Formwork

304.1 Requirements

Formwork shall be accurately formed and shall be of sufficient strength and rigidity as to carry the weights and pressures of the concrete without deformation. It shall be tight so as to avoid the loss of grout and shall be clean and free from damage.

"Rough Finish Formwork" shall consist of sawn boards or sheet metal panels and shall only be used where specified in the Bill to produce a rough finish.

"Fair Finish Formwork" shall produce a high standard of finish. Where not otherwise specified in the Bill of Quantities this formwork shall be used throughout the Works. It shall consist of wrought timber boarding 40 mm thick tongued and grooved, or framed plywood, and arranged in a uniform pattern.

304.2 Striking and Removal of Formwork

Striking of formwork shall be carried out having regard for the climatic conditions prevailing, and shall be 'undertaken at the sole risk of the Contractor. Where premature removal of formwork takes place and deformation is apparent, with or without distress in the concrete, the work shall be made good as described in this Specification. The following striking' times are included as a guide for normal conditions and shall be treated as a minimum requirement:

Suspended Slabs	(props left under)	5 days
Ditto	(props removed)	10 days
Beam soffits	(props left under)	9 days
Ditto	(props removed)	19 days
Sides of beams, walls and columns		1 day

All exposed concrete arrises are to have 20mm x 20mm chamfer unless otherwise shown on the drawings.

305 Concreting

305.1 Requirements

The finished concrete shall be dense durable and free from cracks and honeycombing.

305.2 Mixing, Transporting and Placing

All concrete shall be made in a mechanical mixer. Concrete shall be placed within 30 minutes of completing the mixing or agitation. Mixing may be continued in the mixer or agitator up to a maximum period of 90 minutes and for not less than the period required to achieve an even consistency of the mix. All concrete shall be compacted by a mechanical vibrator and a slump test shall be carried out on each batch mixed, unless otherwise approved by the Engineer's Representative.

305.3 Concreting in difficult weather conditions

Concreting during hot or cold weather conditions shall comply with the established requirements of good practice. During wet weather adequate covering shall be provided to both materials and concrete.

305.4 Curing

All concrete shall be properly cured for 7 days, by wetting or by use of an approved curing membrane.

305.5 Finishes to Concrete

All exposed faces of concrete shall be hard, smooth and free from honeycombing and other blemishes. All projections shall be rubbed down with carborundum stone. The normal finish to slabs and screeds, unless otherwise specified, shall be formed by wood floating the accurately leveled or screeded surface.

305.6 Making Good

Any section of the work which, in the opinion of the Engineer, does not conform to the requirements or clear intent of this Specification, or to the requirements of established good practice, shall be made good or removed and replaced as directed by the Engineer at the expense of the Contractor.

306 Ready Mixed Concrete

Ready mixed concrete shall comply with the requirements of this Specification and to those other requirements of BS 5328 which do not conflict with the Specification.

307 Granolithic Concrete

Granolithic concrete shall conform to the recommendations laid down in the "Specification for Granolithic floor toppings laid on in-situ concrete" as published by the Cement and Concrete Association with special reference to monolithic construction.

308 Concrete Benching

Concrete benching shall consist of structural concrete, as herein specified, placed to a low workability and finished while still green with 50 mm Grade C25 fine concrete using a maximum aggregate size of 10 mm and steel trowelled to a smooth dense finish to the concrete contours.

309 Precast Concrete Units

309.1 Requirements

Precast concrete units, unless otherwise stated, shall be obtained from an approved manufacturer and shall be true to dimension and shape with true arrisses and with perfectly smooth exposed faces free from surface blemishes, air holes, crazing and other defects, whether developed before or after building-in. They shall comply with the appropriate BS. In addition, the following requirements particular to the various units shall be complied with:

309.2 Kerbs

Precast concrete kerb shall conform to BS 340, except that coarse aggregate shall conform to BS 882. Fine aggregate shall consist of sand resulting from the natural disintegration of rock.

Approved air-entraining agents may be permitted to be used providing that approved adjustments are made to the mix with regard to water and fine aggregate proportions. In such cases the moisture absorption limits set out in BS 340 may be neglected subject to the concrete satisfying an approved freeze-thaw test based on thirty cycles of exposure.

309.3 Flags

Flags shall conform to BS 368

309.4 Other Blocks

Blocks used for building work shall conform to BS 6073/2028.

SECTION 4 PIPELINES, PIPEWORK

Section 4A. Materials

401 General

401.1 Equivalency of Goods, Materials and Plant

Wherever reference is made in the Contract, including Specifications, Drawings and Bill of Quantities, to specified manufacturers or suppliers for the supply of goods, materials and plant for the Works, goods, materials and plant from no alternative manufacturers and suppliers will be permitted, unless otherwise expressly stated in the Contract, providing these other goods, materials and plant are substantially equal or of a higher quality than those of the specified manufacturer or supplier and are approved in writing by the Engineer. Differences between the specified goods, materials or plant and the proposed alternative shall be described in writing by the Contractor and submitted to the Engineer, together with such manufacturer's or supplier's technical literature and samples as the Engineer may reasonably require. At least 28 days prior to the date when the Contractor desires the Engineer's consent. In the event the Engineer determines that such proposed alternative goods, materials or plant do not ensure substantially equal or higher quality, the

Contractor shall obtain the goods, materials or plant from the manufacturer or supplier specified in the Contract.

401.2 Materials

Any material which will come into contact with potable water or water to be used for potable supply shall comply with the UK regulations on the use of materials for potable water supply. Water Supply (Water Quality) Regulations 1989 and 15th Statement of the Department of Environment Committee on Chemical and Materials of Construction for use in public water supplies and swimming pools, published by the Department of the Environment, UK or national standards adopted for use in Kenya.

401.3 Approval

As soon as possible after commencement of the Contract, the Contractor shall submit to the Engineer for his approval a list of his proposed suppliers, sources of materials and proposed standards. No materials, plant or equipment shall be procured for the Contract without first obtaining the Engineer's approval. Samples of materials shall be submitted to the Engineer for approval as required by the Engineer. Materials subsequently supplied shall conform to the quality of the samples which have been approved by the Engineer. No standards, method of manufacture or specification shall be changed without the approval of the Engineer. Where possible, plant shall be supplied to the same standards or to compatible standards.

The Contractor shall provide secure storage for all samples submitted to the Engineer.

401.4 Dimensions

Plant and materials shall be supplied to the general arrangements and dimension, or to suit the dimensions, shown on the Drawings or otherwise indicated in the Contract. Where no such dimensions are shown the Contractor shall be responsible for sizing the Plant. Any redesign, extra design, additional construction or any other costs resulting from the use of Plant to other arrangements or to other dimensions shall be the responsibility of the Contractor.

401.5 Packaging and Protections

All items shall be adequately crated or packaged to withstand damage and prevent deterioration due to shipping, handling and storage. The methods of protection and shipping shall be to the approval of the Engineer.

401.6 Marking

All Plant shall be marked in accordance with Clause 5 of BS EN 545 and Clause 37 of BS 5163. Before shipping, all items shall be clearly marked. Crates or packages shall be marked on two sides with indelible paint with the name of the project, the Employer and the Contract number shall bear marks indicating the contents.

401.7 Receipt, Storage, Handling and Transportation

Plant, equipment and materials shall be stored in such a manner as to preserve its quality and condition to the standards required by the Contract. The Engineer shall refuse to accept or shall reject any materials of Plant that in his opinion is defective or otherwise fails to comply with the standards required by the Contract. All such defective items shall be removed from the Site as directed by the Engineer. Repairs shall be carried out in accordance with procedures approved by the Engineer and shall be completed to the Engineer's satisfaction.

401.8 Manufacturer's Certificates

The Contractor shall furnish the Engineer with a manufacturer's certificate conforming compliance to the specification in respect of all items of Plant, equipment and materials. The original and one copy of the manufacturer's certificate shall be delivered to the Engineer not later than 14 days prior to the intended date of delivery of the item to Site.

401.9 Proprietary Materials

Proprietary materials shall be supplied in suitable containers and in appropriate batch sizes for the work to be undertaken. The containers shall be marked with the following information:

- i. Storage instructions
- ii. The manufacturer's name
- iii. Shelf life and dates of manufacture
- iv. Material identification
- v. Batch reference number
- vi. Net weight
- vii. Mixing instructions
- viii. Any warnings or precautions concerning the contents and their safe use.

The Contractor shall supply with each consignment of proprietary material delivered to the Site, certificates furnished by the manufacturer or his agent stating:

- i. The manufacturer's name and address
- ii. The agent's name and address where applicable
- iii. Material identification
- iv. Batch reference numbers, size of each batch and the number of containers in the consignment
- v. Date of manufacture.

401.10 Rejected Materials

Should any item of plant, materials or manufactured articles be in the judgment of the Engineer, unsound or of inferior quality or in any way unsuited for the purpose in which it is proposed to employ them, such items, materials or manufactured articles shall not be used upon the Works but shall be branded, if in the opinion of the Engineer this is necessary, and shall forthwith be removed from the Site.

402 Samples and Storage of Materials

Where required by the Engineer the Contractor shall submit to the Engineer for approval samples of pipes, fittings and materials prior to procurement. The Contractor shall only store pipe, fittings and other material at places approved by the Engineer and shall at all times provide adequate supervision and watchmen to prevent theft or damage. Any loss or damage incurred will be the Contractor's responsibility.

Pipes shall not be stacked higher than recommended by the manufacturer. The area on which the pipes are to be stacked shall be free draining, the grass or other vegetation shall be kept cut and suitable timber cradles shall be provided on which the pipes shall be laid. End stops to all stacks shall be provided.

Fittings and valves shall not be stacked more than one tier high and they shall be supported off the ground by suitable timbers.

Air valves, rubber joint rings, gaskets, bolts and similar fittings and materials shall be kept in approved locked premises and such fittings and materials shall not be distributed to the trench side until immediately prior to laying, fitting, jointing or assemble thereof. All rubber joint rings and gaskets must be stored in a cool damp location and all fittings and materials shall at all times be stored in the shade under cover and protected from the weather to the satisfaction of the Engineer.

403 Flanges

Flanges shall be faced and drilled to conform to the dimensions specified in BS 4504. Flanges shall be compatible with the pressure rating of the adjacent pipe work or as stated on the drawings. Bolts, nuts and washers (two washers per bolt) shall be to BS EN 1092-3; 2003. No bolt shall project less than two full threads beyond its nut after tightening. In no circumstances shall the shortening of excessively long bolts by cutting be allowed.

Gaskets shall comply with replaced by BS EN 1514 (1997) and replaced by BS EN 681-2 (200) and BS 681-1 (1996) Type W. Flanges shall be painted with two coats of epoxy resin paint. Puddle flanges shall be fitted to all pipe work passing through water-retaining structures and manholes greater than 2.5m deep.

404 Mechanical Couplings

Unless otherwise specified or shown in the Drawings pipes and fittings shall be supplied with flexible joints. Mechanical couplings shall be of the Dresser, Viking Johnson type without a centre register. Joints rings used shall be of the ethylene propylene rubber (EPDM) or other material approved by the Engineer. All mechanical couplings and flange adapters including nuts, bolts and washers shall be supplied with 'Rilsan' nylon thermoplastic polyamide applied by fluidized bed dipping or similar approved.

405 Materials for the Assembly of Flexible Joints

Lubricant shall be of a kind not conducive to the growth of bacteria and shall have no deleterious effects on either the joint rings or pipes. Lubricants for water supply shall not impart to water, taste, colour, or any effect known to be injurious to health.

406 Ductile Iron Pipes

406.1 General

Ductile iron pipes and fittings for water supply shall comply with BS EN 545 (1995). Pipes and fittings shall have spigot and socket joints unless otherwise specified. Pipes shall be class K9. Spigot and socket flexible joints shall be of the push-fit type with gaskets of ethylene propylene rubber (EPDM). The Contractor shall supply 5% of the straight pipes suitable for cutting on site and these shall be clearly marked.

406.2 Corrosion Protection

Pipes and fittings shall be protected externally with an extruded polyethylene or polyurethane coating complying with DIN 30674 Part 1. Pipes and fittings shall be lined internally with centrifugally applied cement mortar and complying with DIN 30674. Joint areas shall be coated with epoxy or polyurethane to DIN 30674. All lining and coating materials shall be approved for

contact with potable water by an internationally recognized body like the Drinking Water Inspectorate of UK.

407 Galvanised Steel Pipes

Galvanized steel pipes shall be medium duty manufactured to BS 1387.

408 Steel Pipes

408.1 General

Steel pipes shall be manufactured to BS EN 10224 or AWWA C200 and shall be suitable for the pressure ratings required by the Contract. Fittings shall conform dimensionally to BS EN 10224, AWWA 208-59 or AWWA M11. Unless otherwise specified or necessary to meet the requirements of the Contract steel pipes shall be manufactured as follows:

- a) DN300mm and below shall be manufactured to minimum of Grade L235 or API 5L Grade B
- b) DN350mm and above shall be manufactured to a minimum of Grade L275 or API 5L Grade X42.

The pipes and fittings of diameter 600mm or less shall be supplied with push-fit spigot and socket type joints with integral gasket of EPDM rubber or similar to BS EN 10224 or BS CP 2010. Pipes greater than 600mm shall be supplied with ends cut square suitable for use with flexible couplings and the external weld ground back sufficiently.

The Contractor shall supply 5% of the straight pipes as half length pipes (not exceeding 6m). Each pipe shall be supplied complete with a coupling for jointing.

408.2 Corrosion Protection

Steel pipes and fittings shall be protected externally at the manufacturer's works with fusion bonded epoxy resin in accordance with AWWA C213. Pipes greater than 600mm and all fittings shall also be lined internally with fusion bonded epoxy to AWWA C213. Pipes 600mm or less shall be lined with cement mortar to AWWA C205 or BS EN 10298. All lining and coating materials shall be approved for contact with potable water by an internationally recognized body like the Drinking Water Inspectorate of UK.

Where required by the Bills of Quantities, the Supplier shall also price for the provision of an alternative 3LPE coating to DIN 30670 or AWWA C215 of a triple wrap system of fusion bonded or sprayed epoxy primer, an intermediate polymer adhesive layer and an extruded high density polyethylene coating in general conformance with ISO/DIS 21809-1 Class B as appropriate.

409 Glass Reinforced Plastic (GRP) Pipes and Fittings

Glass reinforced plastic (GRP) pipes and fittings for sewers shall be high stiffness and shall comply with the relevant provision of BS 5480. The minimum pipe stiffness shall be 5,000 N/m².

Pipes and fittings shall be marked in accordance with Clause II g. BS 5480.

Pipes shall only be cut by techniques which can be shown not to impair the pipes pressure regression performance. Where any pipe is cut the exposed fibres at the cut pipe end shall be resealed to prevent potential long term degradation. Methods of cutting and resealing exposed fibres shall be submitted to the Engineer for Approval. Elastomeric sealing rings and foils shall comply with BS EN 681.

On delivery to site and immediately prior to installation each pipe shall be visually inspected both externally, and where possible, internally for damage such as star cracking of the gel coat layer. Where any damage extends through the pipe wall the pipe shall be rejected or the damaged section cut out and replaced in accordance with repair methods approved by the Engineer. If in the Engineer's opinion the pipe is not suitable of repair it shall be rejected and removed from site.

410 uPVC Sewers and Pressure Pipes and Fittings

Unplasticised PVC pipes and fittings for water supply pressure pipes shall comply with British Standards 3505 current but also superseded by BS EN 1452 and 4346. They shall be obtained from an approved manufacturer and shall be minimum pressure rated (14 bars) unless otherwise stated.

Unplasticised PVC pipes and fittings for gravity sewers and drains shall comply with British Standards 4660 or 5481 and shall be obtained from an approved manufacturer. Restrained rubber ring type push fit flexible joints shall be used unless otherwise stated. Solvent weld joints will not normally be permitted. Pipes and fittings shall be protected from the direct rays of the sun at all times by means of reflective cover sheets.

411 Concrete Pipes, Bends and Junctions

Concrete pipes, bends and junctions for use in sewers shall be made with Sulphate-resisting cement. Pipes, bends and junctions shall conform to the requirements of BS 5911 for the particular class of pipe required to be used. The internal dimensions shall be true and regular and the internal surface smooth and free from surface blemish. The actual diameter of the pipe shall be not less than the nominal diameter. All joints shall be of the gasket type with flexible spigot and socket approved by the Engineer. Gaskets shall be Elastomeric complying with BS EN 681.

The main pipe and branches of all junctions shall be of the same strength classification and shall have the same internal dimensions as the pipes with which they are to be used.

The pipes, bends and junctions delivered to the Site shall be certified by the pipe manufacturer to have complied with BS 5911, or other approved standard and one copy of the certificate shall be delivered to the Engineer before the goods are unloaded.

Unless otherwise specified pipes are required to be of Extra Strength; they may, unless otherwise specifically called for, be reinforced either with cast-in steel or by an external wrapping of Fibre glass and resin, applied by an approved manufacturer.

The Contractor shall provide all facilities for and shall carry out jointly with the Engineer (if so required) a full visual inspection of all pipes, bends and junctions for manufacturer's defects and other faults or damage. Before any pipe, bend or junction is laid it shall again be carefully examined and sounded with a wooden mallet. Any pipe found to be cracked or otherwise defective shall not be used on the Works.

Concrete pipes shall be internally coated with a 100 percent solids coal tar epoxy lining 70 percent minimum epoxy content. Coat thickness 300 micron minimum.

412 Polyethylene Pipes and Fittings

412.1 General

Polyethylene pipes up to nominal size 63mm for below ground use shall be coloured blue and comply with the relevant provisions of BS 6572. Polyethylene pipes for use in nominal diameters greater than 63mm shall be coloured blue High Density Polyethylene (HDPE) suitable for a working pressure of 14 bars.

The pipes shall be clearly and indelibly marked to show the name of the manufacturer, diameter, pressure class and date of manufacture.

House connection pipe work downstream of the manifold shall be PE80; all other HDPE pipe work shall be PE100.

412.2 Joints

Unless otherwise specified or approved by the Engineer polyethylene pipes shall be electrofusion welded. Joints between polyethylene pipes supplied from different manufactures or not manufactured from the same grade of polymer shall only be jointed by electrofusion or by push fit mechanical couplings. Mechanical couplers and compression type fittings shall incorporate a serrated internal liner to support the pipe against compression loads exerted by the fitting and to prevent pullout under axial load.

Butt or socket fusion joint techniques shall only be applied between pipes supplied from single source and manufactured from the same grade of base polymer. Fusion welding of polyethylene pipes shall only be undertaken by skilled operatives using appropriate specialized tooling. Pipes to be jointed shall be free from contamination and care shall be used to protect fusion jointing operations from wind and against the effects of inclement weather. Mechanical jigs or other approved methods shall be used to ensure correct alignment of the pipe when making butt fusion joints. Details of fusion welding procedures including details of tools, operatives, materials and method statements shall be submitted to the Engineer for approval prior to any jointing.

Steel and iron pipe fittings shall comply with the relevant provision of BS EN 545 (1995) replaced by BS EN 10224 but also current.

413 Gate Valves

413.1 General

Valves for normal duty on water pipelines with pressure ratings up to PN25 shall be key operated cast iron flanged gate valves for waterworks purposes generally complying with the requirements of BS 5163 (Type B). All Gate Valves shall be supplied with a 10 year manufacturer's warranty.

Cast iron gate valves for pressure ratings to PN14 shall be cast iron flanged valves complying with BS 5150 replaced by BS EN 1171 (both BS 5150 and BS 5151) or cast iron parallel slide valves complying with BS 5151.

Butterfly valves for pressure ratings of up to PN14 shall be double flanged wafer type butterfly valves complying with BS 5155.

Unless otherwise specified valves for use on steel pipes shall be flanged, where butt-weld ends are specified valves shall comply with BS EN 1984, or BS EN 13709.

A bypass with gate valve forming an integral part of the valve shall be provided to all high pressure lines.

413.2 Wedge Gate Valves for Manual Operation

Valves up to and including DN 300 shall be of the resilient seal type and valves larger than DN 300 shall have metal seals.

Spindles shall be of the non-rising type and screwed so as to close the valves when rotated in the clockwise direction. The direction of closing shall be clearly cast on the valve cap or hand wheel as appropriate. The valves shall be constructed of the following materials:

body	-	cast iron;
spindle	-	forged bronze or stainless steel;
metal faces and seal	-	gunmetal.

The valves shall be suitable for the unbalanced head as specified or indicated in the schedules.

Suitable gearing and anti-friction devices such as ball bearing thrust collars shall be provided as necessary to enable opening and closing by manual operation at the pressure stated, using an effort no greater than 26kg on the tee key or hand wheel supplied. Hand wheels shall not exceed 500mm diameter. A bypass with gate valve forming an integral part of the valve shall be provided where recommended by the valve manufacturer for the pressures specified.

Gearing on valves of DN 300 and less shall be enclosed in a sealed gearbox suitable for buried installation and operated with a tee key. Except where shown in the Drawings, all valves exceeding DN 300 shall be provided with bevel gearing and hand wheels. Valves to be used for washouts and isolating air valves shall have screwed seats.

Extension spindles shall be galvanized or stainless steel adequately supported with cast iron brackets, and of sufficient diameter to prevent any whiplash effect through twisting when being used to operate the valves. The spindles shall be capped for key operation. Valve caps shall be fitted with hexagonal set screws.

Valves shall be coated with an approved epoxy complying with DIN 30674. Keys for valve operation shall be of sufficient length so that the valves can be operated by a man standing, but shall not exceed 1.2m in length, and shall have a detachable cross bar.

414 Butterfly Valves

414.1 General

Butterfly valves shall conform to BS EN 593. All Butterfly Valves shall be supplied with a 10 year manufacturer's warranty.

414.2 Construction

Butterfly valves shall have a high grade cast iron body to BS EN 1561 designed to the specified working and test pressures. The pressure rating valve shall be cast in the valve body. The disc shall be of high grade cast iron to BS EN 1561 or nodular cast iron to BS 2789 to the defined working and test pressures. It shall have a convex shape designed to achieve low head loss characteristics. The valve shafts shall be of stainless steel operating in self lubricating bushes in the body.

The valve seat shall be of gunmetal to BS 1400. The sealing ring shall be a renewable Ethylene Propylene Diene Monomer (EPDM) rubber attached to the disc edge by a sectional bronze retaining ring to form a resilient and durable seal.

The valves shall be fitted with hand wheel actuators not exceeding 500mm diameter incorporating gearing to allow opening and closing by manual operation at the pressure stated using an effort no greater than 36kg on the hand wheel supplied.

In all cases the gearing shall be designed to close the valve, from fully open to fully closed in a period of not less than ten minutes with this effort. Actuators shall be designed so as to close the valves when the hand wheel is turned in a clockwise direction; the direction of closing shall be clearly cast on the hand wheel. Position indicators shall be fitted to all actuators.

Where required valves shall be electrically actuated with a manual override. Remote actuation shall be provided with a visual indication of valve open, valve closed and percentage opening together with fault indication.

414.3 Valve Performance

A performance curve, relating percentage valve travel, open area and discharge coefficient shall be submitted to the Engineer. The head loss coefficient with valve fully open shall be defined.

414.4 Testing

All valves shall be tested in accordance with BS EN 593 and pressure and material test certificates shall be submitted to the Engineer for approval.

415 Air Valves

Air valves shall be either:

- a. Single (small) orifice valves (SAV), for the discharge of air during the normal operation of the pipeline.
- b. Double orifice valves (DAV), consisting of a large orifice and a small orifice. These shall permit the bulk discharge of air from the main during filling and air inflow when emptying in addition to the discharge of small quantities of air during normal operating conditions.

Air valves shall be supplied with an independent isolating butterfly valve (DAV) or cock (SAV) which permits the complete removal of the air valve from the main, without affecting the flow of water in the main.

Each air valve assembly shall be suitable for connection to a flange on the pipeline.

At the connection between the air valve and its isolating valve a BSP tapping shall be made suitable for fitting of a pressure gauge. All tapings shall be sealed by a brass plug and copper compression ring gasket.

Air valves shall operate automatically and be constructed so that the operating mechanism will not jam in either the open or closed positions.

416 Non-Return Valves

416.1 Swing Check Valves

Non-return valves shall be suitable for waterworks purposes and shall be manufactured to comply with the general requirements of BS EN 12334. They shall be double flanged type, non-slamming and recoilless on flow reversal.

Valves of DN 700 and larger shall be of the multi-disc type or tilting disc type. The valves shall have a high grade cast iron body and cover to BS EN 1561 Grade 220/260 with gun metal nickel bronze alloy door seating. The hinge pin shall be of stainless steel carried on non-corrodible bearings.

416.2 Nozzle Check Valves

Nozzle check valves shall be slam free closing with a streamlined cross section as manufactured by Mannesmann Demag or similar.

417 Flow Control Valves

Flow controls unless otherwise specified shall be butterfly valves. They shall be installed complete with a headstock and position indicator showing the degree of opening.

418 Pressure Reducing Valves

Pressure reducing valves shall automatically reduce a higher inlet pressure to a steady lower downstream pressure regardless of changing flow rate or varying inlet pressure. The valve shall be a hydraulically operated pilot controlled diaphragm type, globe or angle valve. The Kv loss factor of the standard valve throttled to 5% opening should be less than 3% of the Kv factor of the fully open valve. This data should be backed by a hydraulic test report. All valve components shall be accessible and serviceable without removing the valve from the pipeline. stainless steel nuts and bolts shall be used in assembly of the PRV for corrosion protection.

The critical cavitation coefficient of the PRV will be Less than 1.5. The minimal upstream opening pressure should be at least 5 m pressure. The minimal pressure differential for valve closure should be less than 2 m pressure.

The downstream pressure in steady-state conditions should have an accuracy of +0.5 m pressure (0.05 bars) of the set-value at high, as well as near-zero demand flow rates.

The valve should regulate to a steady, pre-set downstream pressure, regardless of flow or supply pressure variations. The gain of the valve in low travel should be so that the $K_n/K_v < T_n/T_o$ (K_n is the K_v at travel T_n . T_o is the complete valve travel). The main valve shall have a single removable seat and a resilient disc.

419 Ball Float Valves

Ball float valves which are to be installed within reservoirs shall be the delayed action type to eliminate inflow at small valve openings. They shall be fitted with a stilling chamber, auxiliary float valve and inlet bellmouth with regulating valve. The main valve shall be fitted with a long actuating lever to provide a long float travel for slow valve closure.

Valves shall be of the right angle pattern type with flanged inlet and have a resilient synthetic rubber disc which forms a drop tight seal against a removable seat insert. Valves shall be free of cavitation and vibration under the specified working conditions. Flanged tapers shall be provided on the inlets as necessary to suit the size of valves proposed.

Valves shall be capable of withstanding the maximum static pressure and of passing the maximum flow rate shown. Orifice plates shall be provided as necessary to absorb excess working pressure at the initial flow rates indicated.

The pressure rating of the valve shall be cast into the body of the valve.

420 Constant Flow Valves

Constant flow valves shall maintain a constant rate of flow regardless of fluctuations in upstream pressure.

Valves shall be hydraulically operated, diaphragm actuated globe pattern. They shall have a resilient synthetic rubber disc which forms a drop tight seal against a removable seat insert. The diaphragm assembly and valve stem shall be fully guided at both ends by bearings in the valve cover and valve seat. The diaphragm shall consist of nylon fabric bonded with synthetic rubber. Packing glands and stuffing boxes are not permitted and there shall be no pistons operating the valve or pilot controls.

The pilot control shall be direct acting diaphragm valve designed to close when the actuating differential increases beyond the spring setting. The actuating differential pressure shall be produced by a thin edged orifice plate installed in an orifices flange downstream of the valve. Any necessary repairs to the valve shall be accomplished without removing the valve from the main.

Valves shall be sized to pass the maximum continuous flow stated on the drawings at the working pressure given. The pressure rating of the valve shall be cast into the body of the valve.

421 Surface Boxes and Chamber Covers

Surface boxes and chamber covers shall be either Reinforced Concrete or Polyresin.

Surface boxes over gate valves shall be hinged and chained and shall generally comply with BS 5834.

In roads, tracks, verges: Heavy duty with 150 x 150mm nominal clear opening.

In fields and areas subjected to light wheeled or pedestrian traffic: Medium duty with 150 x 150 mm nominal clear opening.

Surface boxes for hydrant chambers shall have a 150 x 150mm clear opening and shall comply with BS 750 and shall be suitable for heavy traffic loading.

Covers to air valve and other chambers shall be to the dimensions and loading requirements shown on the Drawings or as stated in the Bill of Quantities.

Covers shall be suitable for the following maximum safe centre static loads:

Light duty	- 250kg
Medium duty	- 1500kg
Heavy duty	- 5000kg

Where applicable, covers shall comply with BS EN 124 or other appropriate Standard.

Lifting keys shall be provided for each type surface box or cover supplies. One set of keys shall be provided for every ten surface boxes or covers subject to a minimum of ten sets of keys or the actual number of covers if less than ten.

422 Gully Gratings and Frames

Road gully gratings and frames shall be of approved type and manufacture in cast Grey Ductile Iron and shall be of Heavy Duty Non-rocking Pattern designed for wheel load of 11.5 tonne and generally in accordance with BS EN 124. Single gullies of nominal size 1050mm x 750mm. Inlet gratings of other plan dimensions shall have a minimum water way area of 49% of the total inlet grating area.

Gully frames shall be set in cement mortar and haunched with Class C25 concrete. It shall be the Contractor's responsibility to establish the finished road levels from the appropriate authority and fix the gratings accordingly.

423 Manhole Safety Chains

Mild steel chain shall be 8 mm nominal size Grade M (4) non-calibrated chain, Type 1, complying with BS withdrawn. After manufacture, mild steel safety chains shall be hot dip galvanized in accordance with BS EN 124.

424 Manhole and Chamber Access Covers

The manhole and chamber access covers shall comply with BS 497 Part 1 and be obtained from an approved manufacturer and shall be to the internal minimum clear opening as detailed in the Contract.

All manhole and chamber access covers in road shall be to an approved Heavy Duty pattern and in footpaths shall be medium/heavy duty unless otherwise specified. The frame and lid shall have key holes formed with sealed pockets underneath to prevent ingress of sand, grit and surface water and shall be of an approved non-rocking pattern. The covers and frames shall have accurate seating faces to prevent rocking and the ingress of sand or water, and it shall be tight fitting to resist overflow conditions or unauthorized removal. The seating faces shall be coated with graphite grease before installation of the cover.

A supply of keys for use with every type of manhole cover and surface box shall be handed over by the Contractor at the completion of the Contract on the basis of one set of keys for each 50 covers or part thereof.

Manhole and chamber cover frames shall be set in cement mortar and haunched with Class C30/10 concrete and shall be set to the camber or fall of the finished road surface. It shall be the Contractor's responsibility to establish the finished road surface levels from the appropriate authority and to fix the covers accordingly.

425 Manhole Step Irons

Manhole step irons shall be of galvanized malleable iron and shall conform in all particulars to BS EN 13101.

SECTION 4B. PIPELINE CONSTRUCTION

426 General

This section covers the installation of all types of gravity flow pipelines. The pipelines shall be constructed in accordance with BSCP 2010

4.02 Pipes and Fittings

Pipes and fittings shall be of the type shown on the Drawings and shall comply with the following standards and requirements:

426.1 Concrete and Clayware and Fittings

Concrete and Clayware pipes and fittings shall comply with the appropriate standards listed below:-

BS65	Clay drain and sewer pipes and fittings
BS 1194	Concrete porous pipes for under drainage
BS 1196	Clayware field drain pipes
BS 5178	Prestressed concrete pipes for drainage and sewerage
	Concrete cylindrical pipes and fittings
BS 5911	

426.2 Asbestos Cement Pipes and Fittings

Asbestos cement pipes and fittings shall comply with BS 3656

426.3 Steel, cast Iron and Ductile Iron Pipes and Fittings

Steel and ductile iron pipes and fittings shall comply with the following standards:

BS 437	Cast iron and socket pipes and fittings
BS 534	Steel pipes and specials for water and sewerage

Steel pipes which are to be welded shall have the ends prepared by the manufacturer to suit the type of welded joint to be used.

426.4 Unplasticised PVC and GRP Pipes and Fittings

Unplasticised PVC pipes shall comply with BS 4660 or BS 5481 as applicable for drain pipes. GRP pipes and fittings shall comply with BS 5480.

427 Topographic Surveys

Topographic surveys along pipeline routes shall be either:-

- Plan and profile surveys, or
- Line and level traverse surveys,

As instructed by the Engineer.

Plan and profile surveys shall cover a strip of 10.0m wide centrally on the proposed centre line of the pipeline. The survey shall be carried out in accordance with the specification detailed in Clause 106.

Line and level surveys shall comprise a traverse line along the centre line of the pipeline as established by the Engineer.

428 Handling and Transport of Pipes and Fittings

The loading, transporting, unloading and handling of pipes and fittings shall be carried out such that no damage is caused, all in accordance with the recommendations of the manufacturer and to the approval of the Engineer. The use of lifting hooks is not permitted. Pillows shall be provided between lashing (ropes, wires or chains) and the pipes. All cradles and lashings shall be of such widths as to prevent damage to the coating of the pipe, or distortion of the pipes.

Valves and fittings shall be transported in timber packing and where possible in the manufacturer's original packaging.

Protective cover and other protective materials provided by the manufacturer shall not be permanently removed until immediately prior to installation.

In the event of any damage being caused to a pipe, the Engineer shall determine whether damaged piece shall be replaced or repaired. Repair to coating only shall be allowed and shall be as directed by the Engineer.

In all instances when along trench sides, ferrous pipes shall be supported within 1 metre of either end on sand filled bags such that no part of the wall of the pipe touches the ground, and in the case of pipes over 6 metres long with additional central sand bags.

When pipes are being loaded into vehicles care shall be taken to avoid their coming into contact with any sharp corners such as cope irons, loose nail heads, etc. Whilst in transit, pipes shall be

well secured over their entire length and not allowed to project unsecured over the tailboard of the lorry.

Pipes may not be offloaded from lorries by rolling them, suitable carnage shall be used. Pipes shall not be rolled or dragged along the ground.

429 Stringing and Examination of Pipes Prior to Laying

All DI and Steel Pipes and their coatings and linings shall be carefully inspected on Site prior to laying.

Inspection of the pipe will be made by the Engineer after delivery and again immediately prior to laying. Any pipe shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though pipes may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery shall be marked for identification and shall immediately be removed from the site.

All pipe or fittings shall be examined before lying and no piece shall be installed which is found to be defective. Any damage to the pipe linings or coatings shall be repaired as directed by the Engineer. Handling and lying of pipe and fittings shall be in accordance with the Manufacturer's written instructions and as specified herein.

Before lowering into the trench or placing in position each ductile iron pipe or casting shall be slung and sounded with a mallet to test for hair cracks. Pipes that do not ring true will be discarded.

All cement mortar linings shall be visually inspected for defects such as cracking or spalling and crack widths shall be measured to confirm that width is such that natural re-sealing will occur once put into service; otherwise cracks as well as any spalling shall be made good before laying in accordance with the manufacturer's written instructions.

All epoxy linings and all coatings shall be subjected to holiday detection tests, in accordance with NACE RP 0490, the voltage of the holiday detector being selected appropriate for the material and its thickness. No pipe shall be laid having failed the holiday tests until the defective area is made good in accordance with the manufacturer's written instructions and retested satisfactorily before use.

All pipe and fittings shall be thoroughly cleaned before laying, and shall be kept clean until they are used in the work, and when laid, shall conform to the lines and grades required. Pipe shall not be laid unless the trench is free of water and in a satisfactory condition. Ductile iron pipe and fittings shall be installed in accordance with the requirements of AWWA C600 except as otherwise provided herein. If any defective pipe is discovered after it has been laid, it shall be removed and replaced with a sound pipe in a satisfactory manner by the Contractor, at his own expense.

When laying is not in progress, including any work break exceeding 30 minutes, the open ends of the pipe shall be closed by watertight plugs or other approved means. Good alignment shall be preserved in laying. The deflection at joints shall not exceed that recommended by the Manufacturer. End caps shall not be removed until such time as the pipe is to be inspected and laid.

Where the pipeline crosses roads, tracks or any other access or where directed by the Engineer, the Contractor shall place the pipes so that access to the public is not in any way prohibited.

Shortly before laying or fixing any valve, pipe or fitting, the Contractor shall examine each valve, pipe and fitting to ascertain that there is no damage or defect. The Contractor shall give the Engineer not less than 48 hours' notice of his intention to undertake such examination. The Contractor shall not lay such pipes and fittings until he has received approval from the Engineer.

Linings shall be inspected prior to laying and any defect made good.

430 Laying Pipes

Immediately before any pipe is lowered into the trench the plug shall be removed from the end of the last pipe laid and the new pipe shall be carefully lowered into the trench.

Each pipe and fitting shall be laid true to alignment curve and gradient in accordance with the Drawings or as directed by the Engineer. The minimum gradient shall not be flatter than 1 in 500. Pipes shall be boned to gradient and sight rails shall be provided for this purpose at intervals not exceeding 50m and at all changes in grade. No dips or summits shall be permitted other than as shown on the Drawings.

430.1 Embedment and Compaction

All ductile iron and steel pipes shall be embedded using a sand or coarse grained soil with less than 12% fines, which if necessary shall be imported if excavated material is found to be unsuitable:

In areas prone to water logging or where specifically called for on the Drawings or in the Bills of Quantities a single size or graded gravel shall be used as a special lower bedding, with grading as indicated below.

Nominal Pipe Diameter (mm)	Grading for Special Lower Bedding [to ASTM Sieve Sizes]	
	Single size Gravel	Graded gravels
< 200	10 or 14 single-size gravel	14 to 5 graded
200 to 500	10, 14 or 20 single-size gravel	14 to 5 graded or 20 to 5 graded
> 500	10, 14, 20 single-size crushed rock, or gravel	14 to 5 graded or 20 to 5 graded

The suitability of as-dug trench material as an embedment material and where imported, the source shall be approved by the Engineer. Any delays as a result of not seeking this approval in good time shall be entirely to the Contractor's account

All layers of the embedment shall be thoroughly compacted, and shall not exceed 150 mm and be raised evenly on both sides of the pipe as it is placed. A minimum compaction of 90% MPD shall be achieved at all times, this being confirmed by sampling and testing at intervals on different levels of embedment at intervals of not more than 50 m with testing in accordance with BS 1377 or ISO 22476 using the "sand replacement" method.

Should any results fail to achieve this absolute minimum level, then the pipes, embedment material and layer shall be removed for an equal distance on either side of the failed test, the total distance being equal to the length between adjacent sampling locations, and re-laid appropriately but with compacted layer thickness halved. In addition the distance between sampling and testing shall also be halved until in the opinion of the Engineer's Representative a sufficient number of consecutive

passes allows both individual layer thickness and the distance between sampling and testing to be returned to the previous thickness and spacing.

All backfill soil above the embedment shall be free from clay lumps, boulders and rock fragments greater than 50 mm and as far as practicable, given the nature of the soil, 90 % MPD shall be attained. However, this requirement may be relaxed to 85% MPD by the Engineer's Representative if he considers the circumstance warrant it.

430.2 Pipes Laid in Trench

Pipes and fittings laid in trench shall have at least the minimum cover stated in the Drawings.

Long radius curves in buried pipelines shall be negotiated by deflections taken up in the joints of one or more pipes. The deflection at joints shall not exceed 75% of the manufacturer's maximum specified limits. Designs have been based upon the use of 6m long pipes. If the Contractor provides longer pipes sufficient short lengths shall be provided to enable the proposed pipe curvature without additional bends or deep excavation.

Pipes shall not be dragged along the trench bottom. Pipes laid in trenches shall be laid and firmly bedded on an even and uniform bed. Where pipes are not laid on a granular bed, the bottom of the trench shall be smooth and free from stones or other projections.

Joint holes shall be excavated below the trench bottom and shall be as small as possible and shall be filled in and compacted after the pipes are laid and before the refilling of the trench is commenced.

430.3 Pipe Bedding and Surround

For polyethylene, uPVC and GRP pipelines, Class S bedding shall be used where the cover is equal to or greater than 1.0m. Where there is less than 0.6m cover, Class A concrete surround shall be used. In between the Engineer shall decide upon the bedding type dependent upon the assessed risk of damage to the pipe.

430.4 Pipes Laid Above Ground

Pipelines to be laid above ground shall be constructed of flanged ductile iron pipes with mechanical type expansion joints. Supports shall be provided at a maximum spacing of one pipe length and adjacent to the flanged joints.

The expansion joints shall compensate for a variation of ambient temperature between zero and 40° C on the adjoining pipeline. Anchorages shall be provided immediately uphill of each expansion joint and at each change in vertical and horizontal alignment. The ground/rock surface under the pipeline shall be re-graded as necessary to allow a satisfactory vertical alignment of the pipeline.

The Contractor may propose, as an alternative to the use of mechanical expansion joints, either of the following methods for accommodating thermal expansion:

- (1) A zigzag pipeline alignment whereby the thermal movement is accommodated by deflection of the bends.
- (2) A rigid form of construction with the thermal movement being constrained within the pipe walls by the use of substantial anchor blocks.

Joints shall be made in compliance with the manufacturer's instructions as approved by the Engineer. Care shall be taken to ensure the absolute cleanliness of the pipe ends and joint components. Only the recommended approved lubricants shall be used.

Jointing shall only be carried out by experienced personnel under close supervision by the Contractor.

The Contractor shall ensure that no dirty water or other extraneous matter is allowed to enter the pipes during or after laying. In the event of dirty water or extraneous matter entering the pipes the Contractor shall immediately carry out cleaning and disinfection as directed by the Engineer.

Except when necessary for jointing, the end of the last pipe laid shall be kept plugged to the satisfaction of the Engineer to prevent the ingress of dust, dirt, rocks and other debris.

The Contractor shall be liable for any damage caused to the Employer's Plant and apparatus or other equipment as a result of foreign matter of any kind not having been cleared out of pipelines before Taking-Over.

Pipe trenches shall not be backfilled until approved by the Engineer. Once approved trenches shall be backfilled without delay to at least the minimum extent required for pressure testing.

431 Cutting Pipes

The edges of the cut pipes shall be clean, true and square. Ductile iron pipes shall only be cut with an approved mechanical pipe cutter in conformity with the pipe manufacturer's recommendations. The use of oxyacetylene flame cutter will not be permitted. The edges of the cut together with those parts of the pipes from which the coating has been removed shall be given two coats of bituminous paint and the internal lining repaired. When the cut pipe is to be inserted in a "Tyton" type joint it shall be bevelled for 10mm at 30° to pipe the axis.

Asbestos Cement, HDPE, uPVC and GRP pipes shall be cut with an approved mechanical pipe cutter and in conformity with the pipe manufacturer's recommendations. Where the cut end of the pipe is to be incorporated in a joint the pipe shall be turned down to the correct diameter required for forming the joint by an approved mechanical turning machine. The length of turning shall be accurately bevelled by mechanical means to the dimensions specified in the manufacturer's recommendations.

Steel pipes shall be cut by using a mechanical pipe cutter approved by the Engineer. The use of an oxyacetylene flame cutter will not be permitted. The edges of the cut shall be given two coatings of liquid epoxy compatible with the original coating. The external coating and the internal lining shall be repaired to the approval of the Engineer. The cut end shall be bevelled as required to suit the form of joint used. The cost of all cutting, trimming, chamfering, threading, etc, shall be included in the rates for laying and jointing the pipes.

432 Proprietary Joints and Couplings

Proprietary joints and couplings shall be assembled in accordance with the manufacturer's instruction as approved by the Engineer. Where pipes are laid above ground and jointed with bolted couplings the joint shall be protected against vandalism by sheathing with an approved heat-shrink moulding as manufactured by Raychem of Swindon UK or similar approved.

433 Flanged Joints

Flanged joints shall be made with two washers per bolt, one under the bolt head and the other under the nut. The tightening of the bolts shall be carried out in the sequence and to the torque recommended by the manufacturer. A torque wrench shall be used.

Buried flange joints shall be protected by painting with approved bitumen paint and by wrapping using 'Denso' paste, mastic tape and outer wrap, or similar approved materials all in accordance with the manufacturer's instructions as approved by the Engineer, unless supplied with epoxy coating and galvanized bolts.

Flanged adaptors and mechanical couplings shall have a RILSAN nylon coating applied by the manufacturer.

434 Steel Pipelines Welded Joints

If specifically required under the contract pipes shall not be welded. If permitted by the Engineer for particular conditions the Contractor shall submit to the Engineer a detailed method statement for constructing the pipeline using welded joints which shall include, but not be limited, to:

- (i) details of the Contractor's skilled labour and supervision staff who have direct experience in the construction of welded steel pipe;
- (ii) details of the Contractor's plant to be deployed;
- (iii) details of temporary staging, access and craneage;
- (iv) procedure for construction of supports and anchorages, and welding joints;
- (v) quality assurance proposals for testing the integrity of the welds.

These details shall be submitted to the Engineer for his approval not later than 21 days before the Contractor wishes to commence pipe laying.

All field welds shall be inspected visually with special attention given to the line up and down the root run or stringer beads. Nondestructive testing of the completed weld shall be carried out using radiographic methods with procedures in accordance with BS 2910.

On completion and inspection of joint welding, remedial works shall be carried out on the internal lining and external coating. No more than five pipe joints shall be welded without completion of remedial works to joints.

435 Fixing Valves and Penstocks

Valves, penstocks and other fittings shall be securely fixed. Extension spindles and headstocks shall be properly aligned and fixed in a vertical position and valve caps shall be fixed securely using the locking nut.

436 Thrust and Anchor Blocks

Concrete thrust and anchor blocks shall be formed at bends tees and valves in accordance with the details shown on the Drawings or as directed by the Engineer. Excavation shall be made after pipe laying and the blocks concreted immediately after excavation. The back supports and blocks shall abut in to solid undisturbed ground with all loose material being removed before concreting.

No pressure shall be applied in any section of main until the concrete has achieved adequate strength and at least three day's curing.

Flexible joints shall not normally be cast in. Where the size of the block does not make this possible, additional flexible joints shall be provided no greater than half a pipe diameter beyond each face of the block.

437 Concrete Surround to Pipes

Where pipelines pass under streams and rivers or where directed by the Engineer, the pipeline shall be surrounded with concrete as shown on the Drawings.

Concrete surround shall be “broken” at all pipe joints to retain flexibility in the pipeline. No joints shall be concreted in without the prior approval of the Engineer.

438 Flotation of Pipelines

The Contractor shall ensure that flotation of the pipeline does not occur during construction. Sufficient backfill shall be placed over each pipe after laying and before testing to prevent flotation.

439 Pressure Rating

The pressure rating of pipes shall be as indicated on the drawing or Bill of Quantities or if not indicated then selected such that the maximum pressure in the pipeline inclusive of surge pressures shall not exceed the maximum allowable sustained working pressure rating of the pipe;

The surge pressure amplitude (the difference between maximum and minimum surge pressures) shall not exceed one half of the maximum allowable sustained working pressure rating of the pipe.

440 Testing of Water Supply Pipelines

All pressure pipelines shall be hydrostatically tested. Site test pressures shall be 1.5 times the maximum working pressure or allowance pressure plus 5 bar whichever is the smaller measured at the lowest part of the pipeline, unless otherwise specified on the drawings.

The Contractor shall give the Engineer not less than 48 hours’ notice of his intention to carry out a pressure test. Testing shall not commence without the Engineer’s approval. Before a length of pipe is tested, each pipe shall be securely anchored. All thrust and anchor blocks shall have been constructed and, the barrel of each pipe shall be backfilled to the extent necessary to prevent flotation or movement of the pipeline and shall be not less than 600mm.

Normally joints shall be left exposed until pressure testing has been satisfactorily completed. Any need to backfill a pipeline before pressure testing shall not relieve the Contractor of his responsibility to excavate to locate and repair any leaks.

Pressure testing shall be carried out as the work proceeds in such lengths as are convenient but not exceeding 500m. The ends of the length of pipeline under test shall be closed by means of securely anchored caps or blank flanges. Pipeline valves shall not be used for this purpose. All washout valves shall be fitted with blank flanges and the valves opened before the commencement of any pressure test. At each air valve location, a special air release arrangement shall be provided to allow manual release of air during filling operations. Pressure testing shall not be carried out with permanent air valves in place. The pipeline to be tested shall be filled slowly with water in such a manner that all air is expelled. Air vents shall be checked to ensure that no air is trapped at high points.

The pressure in the pipeline shall slowly be raised to the working pressure, the test pump disconnected and the pipeline left charged under pressure with air valves opened for a period of not less than 24 hours to allow air in the pipeline to be expelled and pipe linings and pipe walls of absorbent materials to become saturated. At the end of this period of time air valves shall be closed and the test pump shall be reconnected and the pressure in the pipeline raised to the test pressure and this pressure maintained for a period of 24 hours or such other period as directed by the Engineer.

Throughout this period the pressure in the pipeline shall not be allowed to fall or rise more than 6m head of water above the test pressure and this shall be accomplished by pumping water into or releasing water from the pipeline as required. The volume of water pumped into or released from the pipelines shall be carefully measured. At the end of the test period the pressure in the pipeline shall be adjusted to the test pressure by pumping water into or releasing water from the pipeline as required.

The apparent leakage from the pipeline shall be ascertained from the net volume of water that has been pumped into the pipeline during the test period. The permissible loss shall not exceed 2 litres per metre nominal bore per kilometer length per m head per 24 hours.

During the pressure test exposed joints shall be inspected and any leakage or seeping joints shall be remedied. All signs of leakage shall be remedied whether total apparent leakage from the pipeline under test is less than the apparent allowable leakage or not. Should any length of pipeline fail to pass the pressure test the Contractor shall at his own expense carry out all work necessary to locate and remedy the faults and to retest the pipeline until it satisfactorily passes the test.

A low pressure air test (not exceeding 0.3 bars) may be used as a preliminary joint tightness test prior to backfilling and hydrostatic testing. The water used for pressure testing shall be provided by the contractor and shall be free from impurities and of such a quality which will not pollute or injure the pipeline. The Contractor shall be responsible for obtaining the water, transporting it and for its safe disposal on completion.

441 Cleansing and Sterilizing of Pipelines

After the pipelines have been completed and pressure tested satisfactorily as herein specified the Contractor shall flush out and cleanse the pipelines. Where water is provided by the Employer, the cost of this will be reimbursable under a provisional sum.

Diameters 300 mm and greater:

Pipelines shall be cleansed in sections and this shall be carried out by means of passing through polyurethane foam swabs. The swabs shall be to the approval of the Engineer.

Diameters less than 300 mm:

Pipelines shall be cleansed in sections by flushing with potable water, for a period of time to be decided by the Engineer's Representative.

Cleansing of any section shall be repeated as required by the Engineer's Representative in the event of the initial or subsequent operation not being to his satisfaction. The cost of such water shall be charged to the Contractor.

The Contractor shall supply all necessary equipment for the cleansing and sterilizing operations, including all swabs and swab detectors which shall be handed over to the Employer on completion of the Works.

Swabs shall be passed through pipelines at speeds of between 0.2 and 0.4 metres per second to obtain the best cleaning results with the minimum number of passes. Should it be apparent from the debris collected by the swab that damage to the lining has occurred, the Contractor shall be wholly responsible for repairing the lining to the satisfaction of the Engineer's Representative.

The swabbing operation shall be controlled by an experienced Engineer to ensure that no undue surges in the pipeline, heavy docking of the pig or pressurizing of the pipeline occur causing damage to any of the permanent works. Any damage caused shall be made good by the Contractor to the satisfaction of the Engineer's Representative.

The Contractor shall make all necessary arrangements for the transportation of water from the point of supply from the Employer to the required location, and make all arrangements for the disposal of the water. All disposal methods and locations shall be to the approval of the Engineer's Representative.

When the pipelines have been cleansed to the satisfaction of the Engineer's Representative the Contractor shall introduce at a slow rate of water flow by a portable chlorinator or other approved means of a solution of sterilizing agent in such quantity and of such strengths as will result in the concentration of chlorine throughout the length of the pipelines of not less than 30 parts per million. This sterilizing charge shall be allowed to remain in the pipelines for 24 hours after which time the pipelines shall be thoroughly flushed using the supply water to remove chlorine in excess of that in the supply water.

When this flushing has been satisfactorily completed samples of water will be taken by the Engineer's Representative for bacteriological analysis by the Employer. If any of the results of the analysis are unsatisfactory when compared with those of the control sample of the supply water the sterilizing process shall be repeated until satisfactory results are obtained. On completion of sterilizing and flushing the pipelines shall be left full of supply water.

The Contractor shall be solely responsible for the provision of all labour, materials and chemicals necessary for carrying out the foregoing operations.

The cost of water used for repeated cleansing, sterilizing and flushing pipelines in accordance with this clause of the Specification will be charged to the Contractor and the Contractor shall be responsible for all temporary works and other arrangements in connection with cleansing, sterilizing and flushing the pipelines.

The costs of the initial sampling analysis and preparing reports on the bacteriological quality of the water shall be borne by the Employer but the costs of any subsequent sampling analysis and preparing reports should the initial reports be unsatisfactory shall be borne by the Contractor.

442 Painting

All steel or ductile iron pipes and fittings exposed to view including above ground pipelines shall be painted after making good the external protection with two coats of "Bitumastic Aluminum solution D. 5909" manufactured by Wailes Dove Bitumastic Ltd, Hebburn, Durham, England, or similar approved.

Pipes and fittings in chambers shall be painted with two coats of “Bituros Solution” manufactured by Wailes Dove Bitumastic Ltd, or similar approved. Valves and Surface Boxes shall be similarly painted.

443 Connections to and Diversions to Existing Pipe work

443.1 General

The Contractor shall be responsible for connecting new pipe work and service connections laid under the Contract to existing pipe work, and for blanking-off existing pipe work and service connections. The connection shall be made in a manner to minimize any disruption to supply.

Before blanking-off or making a connection to existing pipe work the Contractor shall notify the Engineer in writing no less than 14 days in advance of the date on which he proposes to carry out the work. After giving such notice the Contractor shall obtain from the responsible Authority agreement on the precise date, times and method that the connection will be made. The connection or blanking-off shall be made at such times of the day or night as stipulated by the Engineer.

The Contractor shall prepare a detailed method statement, programme of the work and a schedule of all plant and materials to be used and shall obtain the approval of the Engineer not less than 72 hours before commencement of the work. The programme shall allow for the immediate re-commissioning on completion of the work.

The Contractor shall be responsible for locating the exact line and level of the existing pipe work and service connections and shall agree with the Engineer and the responsible Authority the precise location of the connection or blanking-off.

443.2 Materials

Before commencing the connection the Contractor shall excavate trial pits as necessary and shall check the outside diameter of the existing pipe work and ensure that the couplings to be used for making connections to the existing pipe work and the materials used for blanking-off existing pipe work are dimensionally suitable.

The Contractor shall ensure that all the materials are on site not less than 24 hours before the commencement of the work.

443.3 Personnel

The Contractor shall ensure that at least one senior member of his field supervisory staff, who is experienced in such operations and fluent in both English and the language of his labourers is on site throughout the duration of the work.

The Contractor shall also ensure that all necessary skilled artisans and an adequate number of labourers for the operation are on site throughout the work.

443.4 Preliminary Work

The Contractor shall execute all works possible before disconnection of the supply including:-

- a. Excavation and supports to the excavation.
- b. Blinding with concrete the immediate working areas, but not less than the whole of the bottom of the excavation.

- c. Putting in all drains, or where this is not possible a sump of adequate size from which a pump may operate.
- d. Casting the floor of any chamber which is later to be constructed around any of the works.
- e. Casting the thrust blocks or any other works which may be required.
- f. Exposing and cleaning pipes in readiness for the work.

443.5 Carrying out the Work

The Contractor shall be responsible for emptying the section of existing pipe work on which the work is to be carried out, by a method agreed with the Authority and approved by the Engineer.

The Contractor shall take all precautions necessary to prevent dirt and other foreign matter entering the pipelines.

The Contractor shall provide at the Site a sufficient quantity of clean water containing approximately 10 parts per million (10mg/l) of chlorine before proceeding with the cutting of the existing pipeline. Each item of pipe work including the joints shall be submerged in the solution for a minimum period of 15 minutes immediately prior to installation.

443. F6 Water Pipes and Chambers to be abandoned

Where existing water pipes are to be replaced with new pipe work the existing pipe work is to be abandoned. Where new works conflict with existing pipe work to be abandoned, abandonment of pipe work shall consist of removal and disposal to a site approved by the Engineer. Water supply pipe work shall not be abandoned until suitable alternative means of supply are in place and ready for connection.

Where chambers are to be abandoned these shall be broken down and disposed of and the void filled and compacted with suitable material approved by the Engineer. Chambers deeper than 1 metre will be broken down to 1 metre below finished ground level and the remaining void filled and compacted with suitable material approved by the Engineer.

SECTION 5. BUILDING AND STRUCTURES

501 Concrete Building Blocks

Concrete building blocks shall be of approved manufacture and shall be formed in a press. The blocks manufactured in Class C30 concrete shall be cured for at least 10 days before use.

Blocks shall be well and evenly formed with true corners and unbroken arises, and shall be carefully handled and stacked.

The Quarry, impermeable blue stone (Not Ndarugu) can also be used.

502 Laying Building Blocks

Joints between blocks shall be filled solid with mortar and shall be of regular thickness of 5 to 10mm. The blocks shall be laid in level courses and bonded so that each vertical joint is midway above the face of the block below, except at junctions and piers where a bond of not less than

100mm shall be provided. The walls shall be raised in lifts not exceeding three metres in height in any one day, and truly vertical. All blocks shall be wetted before being laid.

Joints of exposed work shall be raked out and neatly flush-pointed in the same mortar. The whole of the visible faces of the walls shall be left perfectly clean and all surface mortar and droppings shall be removed before they have set.

Joints in work to be rendered shall be raked out to a depth of 8mm to provide a key for the rendering.

Blockwork shall be tied into adjoining structural members at the same level as blockwork reinforcement using 150mm long butterfly tangs or equivalent fixed and mortared into proprietary vertical strips.

503 Precast Concrete Units Generally

All precast concrete units shall include all fixing plugs and strips to enable screw ties or other fixing devices to be firmly attached. For all precast units to be set in block of masonry walls the plugs and strips shall be so positioned as to provide fixing at course and in no case exceeding 450mm centres.

504 Masonry Using Natural Irregular Stones

Stones shall come from selected quarry layers to the approval of the Engineer. They shall be homogeneous, frost resistant, flawless, free of any cracks or bousins, solid, and of equal grain and shall have all the required quantities to give a regular facing. They shall give out a clear sound when hit by a hammer.

Mortar shall be removed from the external surface of the wall. The Contractor shall prepare a wall sample approved by the Engineer which shall be kept at the construction site until all the masonry is completed.

508 Composition of Mortars

- a. Cement mortar for bonding concrete shall be composed of cement and sand mixed in the proportion of the jointed concrete.
- b. Cement mortar for setting precast concrete or pitching shall be composed of cement and sand mixed in the proportion of 50kg of cement to 0.14m³ of sand, with the addition of an approved plasticizer.
- c. Cement mortar for blockwork in concrete blocks shall be composed of cement and sand mixed in the proportion of 50kg of cement to 0.14m³ of sand.
- d. Sand and Cement for mortars shall be as described in the specification for concrete.

509 Mixing of Mortars

The materials of mortars shall be measured out in their correct proportions and shall first be thoroughly mixed together in a dry state by turning them over upon a clean wooden stage until they are of a homogeneous appearance in consistency and colour. Clean water shall then be added

while the mixture is being turned over until it attains a suitable consistency. Plasticizer shall be added in accordance with the manufacturer's recommendations as approved by the Engineer.

The mortar shall be used immediately after it has been mixed. No mortar which has commenced its first set shall be used, or mixed up again. Mortar shall, where possible in hot weather, be protected from too rapid action by covering with impervious material such as polyethylene film.

Mixing by hand will be allowed only if the Engineer gives specific approval. Mixing by machine using the same sequence of operations described above shall be carried out whenever possible.

510 Cement Rendering

Rendering shall be in a 50 kg: 017-2-.20m³ cement: sand mix but where approval had been given to the use of a plasticizer or other additives these proportions may be modified to the approval of the Engineer.

All surfaces to receive a finishing coat of cement rendering or fine concrete shall be thoroughly prepared and cleaned and the rendering or screeding shall be placed immediately after such surfaces have been thoroughly wetted.

All rendering shall be put to a minimum of two coats, the first being left rough to a minimum of 10 mm thickness, but the second coat shall be trowelled up to a fair faces as soon as possible after it is applied.

All internal rendering shall be finished to an even and polished surface with a float, trowel or other suitable tool, special care being taken to obtain perfectly smooth and glazed faces. It shall not be less than 15mm thickness when finished unless instructed otherwise.

All external rendering shall be brought to an even surface with a wood float following which a tyrolean finish of approved colour shall be applied unless otherwise stated.

All rendering shall be protected from sun and rain by adequate and suitable coverings which shall be supplied and fixed in advance of these conditions arising. The renderings shall be kept damp while setting and protected from drying winds.

511 Tanking to Buried Concrete Surfaces

External concrete surfaces to be tanked shall be coated with a bituminous waterproofing membrane 3mm minimum thick. The tanking shall be dressed into structure as shown in the Drawings and be protected by non-rotting boarding prior to backfilling.

512 Waterproof Rendering

Waterproof rendering slurry shall comprise a 50kg to 125kg cement sand mix with an approved waterproofing admixture such as styrene acrylate copolymer.

The material shall block capillaries and minor shrinkage cracks to prevent water ingress while allowing the passage of water vapour through the structure.

The render shall be applied to a total thickness of not less than 20mm the first coat shall be applied leveled scratched and left to dry for not less than 3 days.

513 Joint Sealing Compound and Sealants

Joint sealing compounds shall be impermeable ductile materials of a type suitable for the conditions of exposure in which they are to be placed, and capable of providing durable, flexible and watertight seal by adhesion to the concrete throughout the range of joint movement.

Hot poured joint sealants shall comply with BS 2499, Ordinary Type A1 sealant.

Cold poured polymer-based joint sealants shall comply with BS 5212: Part 1, Normal Type N sealant.

Two part polysulphide based sealants shall comply with the relevant provisions of BS 4254. Pouring Grade shall be applied to horizontal upward facing joints and Gun Grade to joints of any other aspect or inclination. Other two part polymer based sealants of Gun or Trowel Grade shall comply with the physical and test requirements of BS 4254.

Silicon bases building sealants shall comply with the relevant provisions of BS 5889. Primers for use with joint sealants shall be compatible with, and obtained from the same manufacturers as, the adjacent sealant. Primers shall have no harmful effects on the concrete.

Sealants and primers which will be in contact with water to be used for potable supply shall not impart to water taste, colour, or any effect known to be harmful to health, and shall be resistant to bacterial growth. Sealants and primers which will be in contact with sewage or sewage sludge shall be resistant to biodegradation.

SECTION 6 SAFETY, HEALTH AND ENVIRONMENT

601 Introduction

The prevention of injury and/or illness to the site personnel and the public, damage to the Works and to public and private property, protection of the environment, and compliance with applicable laws, are primary objectives of the Employer. Because of the importance the Employer places on meeting these objectives, selected minimum requirements are outlined in these Safety, Health and Environmental Specifications with which Contractors shall comply while working on this contract. Given that these Specifications cannot cover every eventuality, the Contractor shall be expected to exercise good judgment in all such matters, even though not mentioned in these Specifications, and shall take any and all additional measures, as required or necessary, to meet his responsibility for safety, health and environmental matters during the period of the Contract.

The Employer nor its representatives shall not be held liable for any actions taken by the Contractor that are attributed to following the minimum requirements stated hereinafter. The Contractor shall throughout the execution and completion of the Works and the remedying of any defects therein:

- (a) have full regard for the safety of all persons on the Site and keep the Site and the Works in an orderly state appropriate to the avoidance of danger to any person;

- (b) know and understand all laws governing his activities along with any site requirements and work site hazards. Such information shall be communicated by the Contractor to his personnel and subcontractors;
- (c) take all necessary measures to protect his personnel, the Employer's personnel, other persons, the general public and the environment;
- (d) avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequent of carrying out the Works.

602 Compliance with Specifications

The Contractor shall comply with the requirements of these Safety, Health and Environmental Specifications and all other applicable regulations or requirements under Kenyan laws, laid down by relevant authorities or issued by the Employer or the Engineer concerning safety, health and the environment, in force or introduced or issued from time to time during the period of the Contract.

In so far as these Specifications are applicable, they shall apply to sites and personnel outside the Site associated with the performance of the Contract.

The Specifications equally apply to subcontractors and all other parties engaged by the Contractor and their personnel. The Contractor shall ensure all such parties are fully aware of and comply with the Specifications.

The Contractor shall comply with all notifications and written or verbal instruction regarding safety issued pursuant to these Specifications by the Employer, Engineer or relevant authorities within the time specified in the notification or instruction.

The Contractor shall adopt a positive approach, awareness and responsibility towards safety, health and the environment, and take appropriate action, by:

- (a) ensuring the Specifications are enforced and followed by the Contractor's personnel. Any failure by the Contractor's personnel to follow the Specifications shall be regarded as a failure by the Contractor.
- (b) paying attention to possible injury to unauthorized persons entering the site, particularly children.

Whenever in these Specifications the Contractor is required to provide test certificates for equipment and personnel and to comply with the relevant authorities' requirements and no independent test facilities are available or no relevant authorities exist in Kenya, the Contractor shall provide:

- (a) in lieu of independent test certificates:
 - for equipment – details of the tests that have been carried out by the Contractor and a written statement that the Contractor has satisfied himself that the item of equipment is fit and safe for use;

- for personnel – details of the training and experience of the personnel and a written statement that the Contractor has satisfied himself that they have the required level of competency;
- (b) in lieu of relevant authorities' requirements – details of the Contractor's own rules, regulations, requirements and procedures regarding safety, health and the environment.

If the Engineer is dissatisfied with the details provided by the Contractor, the Contractor shall provide further details or carry out further tests or provide further written statements as may be reasonably required by the Engineer.

When the Engineer has satisfied himself regarding the Contractor's own rules, regulations, requirements and procedures provided in accordance with (b) above, such rules, etc. shall be deemed to form part of these Specifications and to which Clause 3 shall equally apply.

603 Failure to Comply with Specifications

603.1 General

Should the Contractor fail to comply with any of the Specifications or requirements of the Engineer:

- (a) the Engineer may suspend the Works of part of the Works until the Contractor has taken the necessary steps, to the satisfaction of the Engineer, to comply with the Specifications or requirements.
- (b) the Employer may, following written notice to the Contractor, carry out themselves or arrange for another contractor to carry out such measures as they may consider appropriate on behalf of the Contractor. Any such actions by the Employer shall not affect or diminish the Contractor's obligations or responsibilities under the Contract.
- (c) the Engineer may, by written notice of suspension to the Contractor, suspend all payment to the Contractor under the Contract if the Contractor fails to rectify any breach of the Specifications within the period specified by the Engineer, provided that such notice of suspension:
 - (i) shall specify the nature of the failure or failures; and
 - (ii) shall request the Contractor to remedy each such failure within a specified period after receipt by the Contractor of such notice of suspension.

Such suspension of payment shall remain in force until such time as the Contractor has rectified the breach or breaches to the satisfaction of the Engineer. No interest shall be paid on the suspended payments.

Failure to comply with the Specifications or requirements shall be considered a breach of the Contract by the Contractor and may result in termination of the Contract by the Employer. In the event of the Employer taking action based on this Clause, the Contractor shall not be entitled to any additional costs or extension to the Contract Completion Date. All costs incurred by the

Employer pursuant to Sub-Clause 703.1.1 (b) shall be deducted from the amounts otherwise due to the Contractor.

604 General Requirements

604.1 Preamble

All references to safety shall be deemed to include health and the environment.

604.2 Safety Officer

The Contractor shall appoint a competent Safety Officer who shall be responsible for safety, health and the environment. The Safety Officer shall be given sufficient time by the Contractor to carry out his duties; minimum requirements shall be as follows:

Workforce on site of over 250	- full time Safety Officer;
Workforce on Site of 100 – 250	- 50% of Safety Officer's time;
Workforce on site below 100	- as required for the Works but a minimum of 5 hours per week of Safety Officer's time where more than 20 workers.

The Contractor shall provide the Safety Officer with appropriate identification, including a white hard hat with red cross symbol and an identification badge. The appointment of the Safety Officer shall be in writing and copied to the Engineer. The appointment shall include specific instructions to enforce these Specifications and delegated authority to take any action, measure or to issue instruction regarding their enforcement. All persons on Site shall be made aware of the name and authority of the Safety Officer and instructed to comply with any instruction or direction in safety matters, verbal or in writing issued by the Safety Officer.

The Safety Officer shall be provided with a mobile phone or other similar means of communication. The Safety Officer shall be accessible and available at all times including normal working hours.

604.3 Safety Training

The Contractor shall provide safety induction training for all site personnel upon starting on site. The Contractor shall provide safety refresher/reinforcement training at regular intervals for his staff.

604.4 Safety Meetings

The Contractor shall hold regular safety meetings to provide safety instructions and receive feedback from site personnel on safety, health and environmental matters. A weekly safety Meeting shall be chaired by the Safety Officer and minutes shall be taken of the meeting. The meeting/minutes shall be given to the Engineer. The Safety Officer should attend the Contractor's weekly site meetings and "Safety" shall be an item on the agenda.

604.5 Safety Inspections

The Safety Officer shall make regular safety inspection of the work site. The Safety Officer shall prepare a report of each inspection. This report shall include details of all breaches of these Specifications and any other matters or situations relating to safety found during the inspection, instructions issued by the Safety Offices and actions taken by the Contractor. A copy of the Safety Officer's reports shall be given to the Engineer.

604.6 Control of Substances Hazardous to Health

Hazardous materials shall be stored in approved safety containers and handled in a manner specified by the manufacturers and/or prescribed by relevant authorities.

Only properly trained and equipped personnel shall handle hazardous materials.

604.7 Potential Hazards

The Contractor shall inform employees of potential hazards, take the appropriate steps to reduce hazards and be prepared for emergency situations. The Contractor shall make an assessment of every operation involving hazardous substances. The assessment shall be recorded on a Hazardous and Flammable Substances Assessment Method Statement which shall be submitted to the Engineer prior to the delivery and use of the substance on Site.

604.8 Accident Reporting

The Contractor shall report all accidents and dangerous occurrences to the Engineer. The Contractor shall prepare a report on each accident or dangerous occurrence and a copy of the report, together with witness statements and any other relevant information, shall be submitted to the Engineer. A reportable accident or dangerous occurrence shall include any accident to any person on site requiring medical attention or resulting in the loss of working hours or any incident that resulted, or could have resulted, in injury, damage or a danger to the Works, persons, property or the environment.

In the event of an accident or dangerous occurrence, the Contractor shall be responsible for completing all statutory notifications and reports. Copies of all statutory notifications and reports shall be passed to the Engineer.

All accidents and dangerous occurrences shall be recorded in a Site Accident Book. The Site Accident Book shall be available at all times for inspection by the Engineer.

The Contractor shall immediately rectify any situation or condition that could result in injury, damage or a danger to the Works, person, property or the environment. If the situation or condition cannot be corrected immediately, the Contractor shall provide temporary barriers and appropriate warning signs and devices and/or take other appropriate action necessary for the protection of persons, property and the environment.

604.9 Notices, Signs, Etc.

All safety, health, environmental and other notices and signs shall be clearly displayed and written in English. All requirements, instructions, procedures, etc. issued by the Contractor concerning

these Specifications shall be printed in English and displayed and readily available to the Contractor's personnel.

604.10 First Aid and Medical Attention

The Contractor shall have comprehensive First Aid Kit(s) on Site at all times. First Aid Kits shall be conveniently located and clearly identifiable.

The Contractor shall have one employee on site trained in first aid for every 25 employees. Such persons shall be provided with appropriate identification, including a red hard hat with a white "red cross" symbol; and an identification badge.

The Contractor shall make contingency arrangements for calling a Doctor and transporting injured persons to hospital. The telephone numbers of the emergency services and the name, address and telephone number of the Doctor and nearest hospital shall be prominently displayed in the Contractor's site office.

604.11 Employee Qualification and Conduct

The Contractor shall employ only persons who are fit, qualified and skilled in the work to be performed. All persons shall be above the minimum working age. Contractor's personnel shall use the toilet facilities provided by the Contractor.

The Contractor shall ensure:

- (a) that no firearms, weapons, controlled or illegal substances or alcoholic beverages are brought onto the Site and that no personnel under the influence of alcohol or drugs are permitted on Site.
- (b) That all personnel obey warning signs, product or process labels and posted instructions.
- (c) That drivers or operators of vehicles, machinery, plant and equipment follow the rules for safe operations. Drivers shall wear seat belts and obey all signs and posted speed limits.

605 Safety Requirements

605.1 Personal Protective Equipment

The Contractor shall provide personal protective equipment, including hard hats, safety glasses, respirators, gloves, safety shoes, and such other equipment as required, and shall take all measures or actions for the protection and safety of Contractor's personnel.

Non-metallic hard hats shall be worn at all times by all personnel at the worksite with the exception of those areas where the Engineer has indicated it is not necessary to do so. Safety glasses shall meet international standards and be available for use and worn in specified worksite areas.

As a minimum, safety glasses shall be worn for the following types of work: hammering, chipping, welding, grinding, use of electrically powered or pneumatic equipment, insulation handling, spray painting, working with solvents, and other jobs where the potential of an eye injury exists. Face shields and/or goggles shall be worn where possible exposure to hazardous chemicals, cryogenic fluids, acids, caustics or dust exists and where safety glasses may not provide adequate protection. When handling acids, caustics and chemicals with corrosive or toxic properties, suitable protection, such as acid suits or chemical resistant aprons and gloves, shall be worn to prevent accidental contact with the substance.

Personnel shall not be permitted to work whilst wearing personal clothing or footwear likely to be hazardous to themselves or others.

The wearing of safety shoes with steel reinforced toes is recommended for all Contractor's personnel on site. In all cases, Contractor's personnel shall wear substantial work shoes that are commensurate with hazards of the work and the work site area.

Hearing protection, including muffs, plugs or a combination thereof, shall be provided for all personnel operating in areas where the noise level exceeds 90 decibels. Such protections shall also be provided for operators working with equipment exceeding such a level. This may include equipment such as excavators, shovels, jackhammers, saws, drills, grinders and the like are being used.

The Contractor shall encourage employees to wear substantial work gloves whenever practical and safe to do so.

605.2 Fire Protection and Prevention

The Contractor shall comply with fire protection instructions given by the Authorities having jurisdiction in regard to fire protection regulations. The Contractor shall, upon moving on site, provide to the Engineer and the Authorities a fire prevention and evacuation plan. This shall include drawing(s) showing the fire assembly points. The fire prevention and evacuation plan and drawing(s) shall be updated from time to time as the Works progress. The Contractor shall ensure all personnel are fully informed on escape routes and assembly points and any changes thereto.

Fuel storage will not be permitted in construction work areas. Contractors may establish fuel storage tanks in specified areas set aside for the purpose and approved by the Engineer. Storage tanks shall be adequately banded to control spillage. Fire extinguishers shall be provided and installed in a suitable nearby location.

Highly combustible or volatile materials shall be stored separately from other materials and as prescribed by relevant authorities and under no circumstances within buildings or structures forming part of the permanent Works. All such materials shall be protected and not exposed to open flame or other situations which could result in a fire risk.

No combustible material shall be located inside or within 10 metres of a building or structure forming part of the permanent Works. Where units have to be used in these circumstances, they shall be constructed of non-combustible materials and have a half-hour fire rating inside to outside and outside to inside. Non-combustible furniture shall be used where practical.

All temporary accommodation and stores shall be provided with smoke detectors and fire alarms.

Smoking shall be banned in high risk areas.

Expanded polystyrene with or without flame retarding additive, polythene, cardboard and hardwood shall not be used as protection materials. Plywood and chipboard shall only be used as protection on floors. Vertical protection shall be non-combustible. Debris netting and weather protection sheeting shall be fire retardant.

When using cutting or welding torches or other equipment with an open flame, the Contractor shall provide a fire extinguisher close by at all times. All flammable materials shall be cleared from areas of hot works or work locations prior to welding or oxy/gas burning operations. All hot works shall cease half an hour before the end of a work shift to allow for thorough checking for smouldering materials. Where appropriate, areas of hot works are to be soused in water before the shift ends.

An adequate number of fire extinguishers of types suited to the fire risk and the material exposed shall be provided. These shall be placed in accessible, well-marked locations throughout the job site. Contractor's personnel shall be trained in their use. Extinguishers shall be checked monthly for service condition and replaced or recharged, as appropriate after use.

Only approved containers shall be used for storage, transport and dispensing of flammable substances. Portable containers used for transporting or transferring gasoline or other flammable liquids shall be approved safety cans.

Fuel burning engines shall be shut off while being refuelled. Adequate ventilation to prevent an accumulation of flammable vapours shall be provided where solvents or volatile cleaning agents are used.

Flammables shall not be stored under overhead pipelines, cable trays, electrical wires or stairways used for emergency egress. Paints shall be stored and mixed in a room assigned for the purpose. This room shall be kept under lock and key.

Oily waste, rags and other such combustible materials shall be stored in proper metal containers with self-closing lids and removed every night to a safe area or off site. Every precaution shall be taken to prevent spontaneous combustion.

605.3 Electrical Safety

All temporary electrical installations, tools and equipment shall comply with current regulations dealing with on-site electrical installations. The Contractor shall establish a permit-to-work system for work in or in proximity to energized circuits of any voltage. Contractor's personnel shall not commence work on such circuits unless a permit to work has been issued and adequate safety measures have been taken and the work operation has been reviewed and approved by the Engineer.

Only authorized personnel shall be allowed to work or repair electrical installations and equipment. Portable tools and equipment shall be 240 volt, unless otherwise agreed by the Engineer.

When portable or semi-portable equipment operates at voltages in excess of 240 volts, the supply shall be protected by a Residual Current Device (RCD) regardless of any such device fitted to the equipment. The RCD must have a tripping characteristic of 30 milliamps at 30 milliseconds maximum.

All static, electrically powered equipment, including motors, transformers, generators, welders and other machinery, shall be properly earthed, insulated, and/or protected by a ground fault interruption device. In addition, the skin metal buildings and trailers with electric service shall be earthed. Metal steps, when used shall be securely fixed to the trailer.

Lamp holders on festoon lighting shall be moulded to flexible cable and be of the screw in type. Clip on guards shall be fitted to each lamp unit.

All tungsten-halogen lamps shall be fitted with a glass guard to the element. These lamps must be permanently fixed at high level.

Electrical equipment shall be periodically inspected and repaired as necessary by competent persons.

Any work in electrical equipment and systems shall be made safe through locking, tagging, and/or isolation of the equipment before work commences. Prior to the start of the work, the equipment or systems shall be tested to ensure that they have been properly de-energised and isolated.

Electrical repair work on energized systems shall be avoided whenever possible.

Electrical trouble shooting shall be conducted only after getting written approval of the Engineer.

Unauthorized personnel shall not enter enclosures or area containing high voltage equipment such as switchgear, transformers or substations.

605.4 Oxygen/Acetylene/Fuel Gases/Cartridge Tools

Compressed oxygen shall never be used in the place of compressed air. Flash-back (Spar) arrestors shall be fitted to all gas equipment. Liquid petroleum Gas (LPG) cylinders shall not be stored or left in areas below ground level overnight. Cylinders must be stored upright.

The quantity of oxygen, acetylene and LPG cylinders at the point of work shall be restricted to a maximum of one day's supply. Cylinders shall be kept in upright vertical rack containers or be safely secured to a vertical support.

Cartridge tools shall be of the low velocity type. Operators must have received adequate training in the safe use and operation of the tool to be used.

605.5 Scaffolding/Temporary Works

No aluminum tube shall be used, except for proprietary mobile towers, unless otherwise agreed with the Engineer.

Drawings and calculations shall be submitted to the Engineer, prior to commencement of work on the site, for all Temporary Works, including excavations, falsework, tower cranes, hoists, services and scaffolding. Designs shall conform to international standards.

The Engineer will not approve Temporary Work designs but the Contractor shall take account of any comments on such designs made by the Engineer.

The Contractor shall inspect and approve all Temporary Works after erection and before access, loading or use is allowed. Completed and approved Temporary Works shall be tagged with a scaff-tag or similar safety system and the Safe Structure insert displayed. For scaffolding, one tag shall be displayed every 32 m² of face area. A central record system shall be kept on all Temporary Work. Temporary Works shall be inspected weekly and similarly recorded.

All mobile scaffold towers shall be erected in accordance with the manufacturer's instructions and a copy of these shall be submitted to the Engineer prior to any use on site. Additionally, all towers shall be erected complete with access ladder, safety rails and kick boards whatever the height.

The Contractor shall repair or replace, immediately, any scaffold, including accessories, damaged or weakened from any cause.

The Contractor shall ensure that any slippery conditions on scaffolds are eliminated as soon as possible after they occur.

All scaffolds used for storing materials, for brick or block laying, for access to formwork or for any other purpose where materials may be accidentally fall, shall be provided with wire mesh guards of a substantial material, in addition to kick boards.

605.6 Use of Ladders

Manufactured ladders shall meet the applicable safety codes for wood or metal ladders. Metal ladders shall not be used where there is any likelihood of contact with electric cables and equipment. All metal ladders shall be clearly marked: "Caution – Do not use around electrical equipment". Job made ladders shall not be permitted.

Extension or straight ladders shall be equipped with non-skid safety feet, and shall be no more than 12 m in height. The maximum height of a step ladder shall be 2 m. Ladders shall not be used as platforms or scaffold planks.

Ladders rungs and steps shall be kept clean and free of grease and oil.

Extension and straight ladders shall be tied off at the top and/or bottom when in use. Only one person shall be allowed in a ladder at a time.

Defective ladder shall be taken out of service and not used. Ladders shall not be painted and shall be inspected for defects prior to use.

605.7 Elevated Work

The Contractor shall provide all personnel, while working at an elevated position, with adequate protection from falls. Details of such protections shall be submitted to the Engineer.

The Contractor shall carry out daily inspections of all elevated work platforms. Defects shall be corrected prior to use.

605.7.1 Roofing and Sheet Metal Laying

- (a) A Method Statement detailing the procedures to be adopted shall be submitted to and agreed with the Engineer prior to commencement of work on the site.

- (b) Mobile elevating work platforms or the equivalent shall be used to install roofing and sheet materials wherever practicable and a suitable base is available.

605.7.2 Erection of Structures

- (a) A Method Statement detailing the procedures to be adopted shall be submitted to and agreed with the Engineer prior to commencement of work on the site.
- (b) Safety harness and lines shall be provided by the Contractor for use by the erection personnel and worn at all times.
- (c) Mobile elevating work platforms or the equivalent shall be used to erect structures wherever practicable and a suitable base is available.

605.7.3 Mobile Elevating Work Platforms

Operators shall be trained in the safe use of such platforms and hold a current Certificate of Competence.

605.7.4 Hoists

- (a) A copy of the current Test Certificate shall be submitted to the Engineer before any hoist (personnel or material) is brought into operation on the site. Where the range of travel is increased or reduced a copy of the revised Test Certificate shall be submitted.
- (b) Each landing gate shall be fitted with a mechanical or electrical interlock to prevent movement of the hoist when any such gates is in the open position.
- (c) Safety harness must be worn and used by personnel erecting, altering and dismantling hoists.

605.7.5 Suspended Cradles

- (a) Suspended cradles shall be installed, moved and dismantled by a specialist contractor.
- (b) Suspended cradles shall comply with local regulations.
- (c) All powered suspended cradles shall incorporate independent safety lines to overspeed braking devices and independent suspension lines for personal safety harness attachment.

605.8 Use of Temporary Equipment

The safe design of any piece of equipment shall not be exceeded, nor shall the equipment be modified in any manner that alters the original factor of safety or capacity. Mobile equipment shall be fitted with suitable alarm and motion sensing devices, including back-up alarm, when required. The Contractor shall ensure that the installation and use of equipment are in accordance with the safety rules and recommendations laid down by the manufacturer, taking into account the other installations already in place or to be installed in the future.

The contractor shall inspect Equipment prior to its use on the Works and periodically thereafter to ensure it is in safe working order. Special attention shall be given to such items as cables, hoses,

guards, booms, blocks, hooks and safety devices. Equipment found to be defective shall not be used and immediately removed from services, and a warning tag attached.

Natural and synthetic Fibre rope made of material such as manila, nylon, polyester, or polypropylene shall not be used as slings. Only trained, qualified and authorized personnel shall operate equipment. All drivers and operators shall hold a current Certificate of Training Achievement for the equipment being used. A safety observer shall be assigned to watch movements of heavy mobile equipment where hazards may exist to other personnel from the movement if such equipment, or where equipment could hit overhead lines or structures. The observer shall also ensure that people are kept clear of mobile equipment and suspended tools.

When mobile or heavy equipment is travelling onto a public thoroughfare or roadway, a flagman shall ensure that traffic has been stopped prior to such equipment proceeding. While the mobile or heavy equipment is travelling on a public roadway, a trailing escort vehicle with a sign warning of a slow-moving vehicle that is dangerous to pass shall be provided.

605.9 Cranes:

- (a) The Contractor shall give a minimum of 48 hours' notice to the Engineer prior to bringing a crane on site.
- (b) No cranes shall be erected in the site without the prior approval of the Engineer. The Engineer may direct the Contractor as to location where cranes may not be located. The Contractor shall take such directions into account when submitting his proposals for crane location points, base footings, pick up points and swing radius. Compliance with any such direction shall not entitle the Contractor to any extension of the Period of Completion or to any increase of the Contract Price.
- (c) Safety harness shall be worn and used at all times by personnel engaged on the erection, alterations and dismantling of tower cranes.
- (d) The Contractor shall provide a copy of the current Test Certificate (see Sub-Clause 702.5) to the Engineer before any crane (tower or mobile) is brought into operation on the Site.
- (e) All lifting tackle must hold a current Test Certificate. All lifting tackle must be thoroughly examined every 6 months and an inspection report raised.
- (f) All fibrous/web slings shall be destroyed and replaced 6 months after first use.
- (g) All crane drivers/operators shall hold a Certificate of Training Achievement for the class of crane operated.
- (h) All banksman/slingers shall hold a Training Certificate from a recognized training agency .

- (i) The maximum weekly working hours of a crane driver or banksman shall be restricted to 60 hours.
- (j) Under no circumstances shall a crane or load come within 4 m of any energized overhead power line or other critical structure.

605.10 Locking-out, Isolating and Tagging Equipment.

Equipment that could present a hazard to personnel if accidentally activated during the performance of installation, repair, alteration, cleaning, or inspection work shall be made inoperable and free of stored energy and/or material prior to the start of work. Such equipment shall include circuit breakers, compressors, conveyors, elevators, machine tools, pipelines, pumps, valves, and similar equipment.

Where equipment is subject to unexpected external physical movement such as rotating, turning, dropping, falling, rolling, sliding, etc., mechanical and/or structural constraints shall be applied to prevent such movement.

Equipment which has been locked-out, immobilized, or taken out of services for repair or because of a potentially hazardous condition shall be appropriately tagged indicating the reason it has been isolated and/or taken out of service.

Where safety locks are used for locking out or isolating equipment, the lock shall be specially identified and easily recognized as a safety lock.

605.11 Installation of Temporary or Permanent Equipment

During installation and testing the Contractor's specialists Engineer shall be in attendance. All control mechanism panel and wiring diagrams shall be available and printed in English.

605.12 Laser Survey Instruments

Details of the types and use of laser instruments shall be submitted and agreed with the Engineer.

605.13 Working in Confined Spaces

Confined spaces, including tanks, vessels, containers, pits, bins, vaults, tunnels, shafts, trenches, ventilations ducts, or other enclosures where known or potential hazards may exist, shall not be entered without prior inspection by and authorization from the Site Safety Officer and the issuance of a Hazardous Work Permit.

Prior to entering the confined space, the area shall be completely isolated to prevent the entry of any hazardous substances or materials which could cause an oxygen deficient atmosphere. All equipment that could become energized or mobilized shall be physically restrained and tagged. All lines going into the confined space shall be isolated and/or blanked.

Personnel working in a confined space where emergency escape or rescue could be difficult, shall wear a safety harness attached to a lifeline. A qualified attendant(s), trained and knowledgeable in job-relater emergency procedures, shall be present at all times while persons are working within the confined space.

The attendant shall be capable of affecting a rescue, have necessary rescue equipment immediately available, and be equipped with at least the same protective equipments as the person making entry.

All equipment to be used in a confined space shall be inspected to determine its acceptability for use. Where a hazard from electricity may exist, equipment utilized shall be of low voltage type. The atmosphere within the confined space shall be tested to determine if it is safe to enter. Acceptable limits are:

- oxygen: 19.5% lower, 22% higher;
- flammable gas: not to exceed 10% of lower explosion limit;
- toxic contaminants: not to exceed the permissible exposure limit.

Subsequent testing shall be done after each interruption and before re-entering the confined space, as well as at intervals not exceeding 4 hours. Continuous monitoring is preferable and may be necessary in certain situations.

Adequate ventilation shall be provided to ensure the atmosphere is maintained within acceptable limits.

605.14 Demolition

A detailed Method Statement detailing the demolition procedures/techniques to be used shall be submitted to and approved by the Engineer prior to commencement of work on site.

The Method Statement must include full details of measures to be taken to ensure that there are no persons remaining in the building/structure and to distance members of the public and Contractor's personnel from the building/structure prior to demolition.

605.15 Use of Explosives

The Contractor shall not use explosives without the written permission from the Engineer and relevant authorities.

The Contractor shall observe all regulations regarding proper purchasing, transportation, storage, handling and use of explosives.

The Contractor shall ensure that explosives and detonators are stored in separate special building. These secured buildings shall be constructed, located and clearly marked in English:

“DANGER – EXPLOSIVES”

all as approved by the Engineer and relevant authorities. The Contractor shall ensure that all possible precautions are taken against accidental fire or explosion, and ensure that explosives and detonators are kept in a proper and safe condition. The contractor shall ensure that explosives and detonators are always transported in separate vehicles and kept apart until the last possible moment and that metallic tools are not used to open boxes of explosives or detonators.

Blasting Procedure: the contractor shall carry out blasting operations in a manner that will not endanger the safety of persons or property. The Contractor shall, along with other necessary precautions:

- (a) clear all persons from building and the area affected by the blasting. All such persons shall be given adequate notice of the actual time and date of blasting;
- (b) ensure that police and other local authorities are kept fully informed, in advance, of the blasting programme so that they may be present when blasting takes place if they so require;
- (c) erect warning notices around the area affected that blasting operation are in progress;
- (d) carry out a thorough search of buildings and the area affected prior to blasting;
- (e) ensure that blasting is only carried out by experienced shot firers. Priming, charging, stemming and shot firing shall be carried out with greatest regard for safety and in strict accordance with the rules and regulations of the relevant authorities.
- (f) ensure that explosive charges are not excessive, charged boreholes are properly protected and proper precautions are taken for the safety of persons and property.

The Contractor shall maintain an up-to-date inventory of all explosives and explosive devices and shall submit a monthly report to the Engineer, detailing the use of all explosives by date and location.

605.16 Excavation and Trenching

An excavation permit signed by the Engineer must be issued before excavation proceeds in any work location. The contractor shall investigate and identify the location of existing services by study of the drawings, a visual/physical study of the site, sweeping by appropriate detection equipment and where necessary hand excavation of trial holes.

Following this investigation, the Contractor shall submit a written request for an excavation permit to the Engineer.

The Engineer will return the permit signed and dated to indicate:

- services which are to be maintained.
- services which are to be isolated.
- any special precautions to be taken.

A sample Excavation Permit is given in Annex 1 to this Specification. The issue of an Excavation Permit by the Engineer shall not relieve the Contractor of his responsibilities under the Contract.

The side of all excavations and trenches which in the opinion of the Engineer might expose personnel or facilities to danger resulting from shifting earths shall be protected by adequate temporary supports or sloped to the appropriate angle of repose.

All excavations, slopes and temporary supports shall be inspected daily and after each rain, before allowing personnel to enter the excavation.

Excavations 1.3 metres or more in depth and occupied by personnel shall be provided with ladders as a means for entrance and egress. Ladders shall extend not less than 1 metre above the top of the excavation.

The Contractor shall provide adequate barrier protection to all excavations. Barriers shall be readily visible by day of night.

Excavated or other materials shall be stored at least 0.65 metres from the sides of excavations.

605.17 Concrete Reinforcement Starter Bars

The Contractor shall ensure concrete reinforcement starter bars are not a danger to personnel. Where permitted by the Engineer, starter bars shall be bent down. Alternatively, the starter bars shall be protected using either hooked starters, plastic caps, plywood covers or other methods agreed with the Engineer.

606 Environmental and Health Requirements

606.1 Protection of the Environment

The Contractor shall be knowledgeable of and comply with the Environmental Management Plan (EMP) and with all environmental laws, rules and regulations for materials, including hazardous substances or wastes under his control. The contractor shall not dump, release or otherwise discharge or dispose of any such materials without the authorization of the Engineer.

Any release of a hazardous substance to the environment, whether air, water or ground, must be reported to the Engineer immediately. When releases resulting from Contractor action occur, the Contractor shall take proper precautionary measures to counter any known environmental or health hazards associated with such release. These would include remedial procedures such as spill control and containment and notification of the proper authorities.

606.2 Air Pollution

The Contractor, depending on the type and quantity of materials being used, may be required to have an emergency episode plan for any releases to the atmosphere. The Contractor shall also be aware of local ordinances affecting air pollution.

The Contractor shall take all necessary measures to limit pollution from dust and any wind blown materials during the Works, including damping down with water on a regular basis during dry climatic conditions.

The contractor shall ensure that all trucks leaving the Site are properly covered to prevent discharge of dust, rocks, sand, etc.

606.3 Water Pollution

The contractor shall not dispose of waste solvents, petroleum products, toxic chemicals or solutions on the city drainage system or watercourse, and shall not dump or bury garbage on the Site. These types of waste shall be taken to an approved disposal facility regularly, and in accordance with requirements of relevant Authorities. The Contractor shall also be responsible for the control of all run-offs, erosion, etc.

606.4 Solid Waste

606.4.1 General Housekeeping

- (a) The Contractor shall maintain the site and any ancillary areas used and occupied for performance of the Works in a clean, tidy and rubbish-free condition at all times.
- (b) Upon the issue of any Taking-Over Certificate, the Contractor shall clear away and remove from the Works and the Site to which the Taking-Over Certificate relates, all Contractor's Equipment, surplus material, rubbish and Temporary Works of every kind, and leave the said Works and Site in a clean condition to the satisfaction of the Engineer. Provided that the Contractor shall be entitled to retain on Site, until the end of the Defects Liability Period, such materials, Contractor's Equipment and Temporary Works as are required by him for the purpose of fulfilling his obligations during the Defects Notification Period.

606.4.2 Rubbish Removal and Disposal

- (a) The Contractor shall comply with statutory and municipal regulations and requirements for the disposal of rubbish and waste.
- (b) The Contractor shall provide suitable metal containers for the temporary storage of waste.
- (c) The Contractor shall provide suitable metal containers from site as soon as they are full. Rubbish containers shall not be allowed to overflow.
- (d) The Contractor shall provide hard standings for and clear vehicle access to rubbish containers.
- (e) The Contractor shall provide enclosed chutes of wood or metal where materials are dropped more than 7 metres. The area onto which the material is dropped shall be provided with suitable enclosed protection barriers and warning signs of the hazard of falling materials. Waste materials shall not be removed from the lower area until handling of materials above has ceased.
- (f) Domestic and biodegradable waste from offices, canteens and welfare facilities shall be removed daily from the site.
- (g) Toxic and hazardous waste shall be collected separately and be disposed of in accordance with current regulations.

606.4.3 Asbestos Handling and Removal

The Contractor shall comply with all local regulations regarding the handling of asbestos materials. In the absence of local regulations, relevant International Standards shall apply.

606.4.4 Pest Control

The Contractor shall be responsible for the rodent and pest control on the Site. If requested, the contractor shall submit to the Engineer, for approval, a detailed programme of the measures to be taken for the control and eradication of rodents and pests.

606.5 Noise Control

The Contractor shall ensure that the works is conducted in a manner so as to comply with all restrictions of the Authorities having jurisdiction, as they relate to noise.

The Contractor shall, in all cases, adopt the best available plant/and or machinery shall be used. All equipment shall be maintained in good mechanical order and fitted with the appropriate silencers, mufflers or acoustic covers where applicable. Stationary noise sources shall be sited as far away as possible from noise-sensitive areas and, where necessary, acoustic barriers shall be used to shield them. Such barriers may be proprietary types, or may consist of site materials such as bricks or earth mounds as appropriate.

Compressors, percussion tools and vehicles shall be fitted with effective silencers of a type recommended by the manufacturers of the equipment. Pneumatic drills and other noisy appliances shall not be use during days of rest or after normal working hours without the consent of the Engineer.

Areas where noise levels exceed 90 decibels, even on a temporary basis, shall be posted as high noise level areas.

607 Additional Requirements for Work in Public Areas

607.1 General

Those additional requirements shall apply to all works carried out in Public Areas.

Public Areas are defined as areas still used by or accessible to the public. These include public roads and pavements, occupied buildings and areas outside the Contractor's boundary fencing.

All work in Public Areas shall be carried out to minimize disturbance and avoid dangers to the public.

Before commencing work, the Contractor shall ensure that all necessary resources, including labour, plant and materials will be available when required and that the works will proceed without delays and be completed in the shortest possible time. Period of inactivity and slow progress or delays in meeting the agreed programme for the Works, resulting from the Contractor's failure to provide necessary resources or other causes within the control of the Contractor, will not be accepted. In the event of such inactivity, slow progress or delays, the Contractor shall take immediate action to rectify the situation, including all possible acceleration measures to complete the works within the agreed programme.

Details of the actions and acceleration measures shall be submitted to the Engineer. If the Engineer is dissatisfied with the Contractor's proposals, the Contractor shall take such further

actions or measures as required by the Engineer. All costs incurred shall be the responsibility of the Contractor.

607.2 Method Statement

The Contractor shall submit to the Engineer a method statement for each separate area or work in Public Areas. The Method Statement shall include:

- (a) a general description of the Works and methodology of how it will be carried out.
- (b) Details of the measures and temporary works to minimize disturbance and safeguard the public. These shall include temporary diversions, safety barriers, screens, signs, lighting, watchmen and arrangements for control of traffic and pedestrians and advance warning to be given to the public.
- (c) Details of temporary reinstatement and maintenance of same prior to final reinstatement.
- (d) For works involving long lengths of trenches or works to be completed in sections, the lengths or sections of each activity (e.g. up to temporary reinstatement, final reinstatement) to be carried out at any one time.
- (e) Details of the availability of necessary resources (labour, plant, materials, etc.) to complete the work.
- (f) A programme showing start and completion dates and period for all activities of each length or section, including temporary works, and the works overall.
- (g) Such further information as necessary or required by the Engineer.

The Contractor shall not commence work, including temporary works, until after the approval of the Contractor's Method Statement by the Engineer.

Method Statements shall be updated bases on actual progress or as and when required by the Engineer.

607.3 Closure of Roads, Etc.

The closure or partial closure of roads, pavements and other public areas will only be permitted if approved by the Engineer and Relevant Authorities. The Contractor shall detail for each closure the extent of area to be closed, the reasons and duration of the closure, and where appropriate, proposed diversions. A sample Street Closure Permit is given at Annex 2 to this Specification.

607.4 Trench and Other Excavations

The requirements covering trench and other excavations will depend on the location and type of the excavation and the potential risks to the public.

The following guidelines apply particularly to trenches but shall also apply to other types of excavations:

- (a) before commencing work the Contractor shall:
 - notify the Engineer of the location and duration of the work. An excavation permit signed by the Engineer must be issued in accordance with Sub-Clause 705.16 before excavation proceeds in any work location;
 - obtain permission from relevant authorities including the police when required;
 - erect all temporary works such as barriers, warning signs, lighting, etc.;
 - have available adequate materials for temporary supports to sides of excavations and necessary labour, plant and materials to complete the work within the shortest possible time.

- (b) in carrying out the works the Contractor shall, unless otherwise permitted or required by the Engineer:
 - not open more than one excavation within a radius of 250 metres;
 - limit the length of trench excavation open at one time to 150 metres;
 - maintain and alter or adapt all temporary works including supports to sides of excavations;
 - remove all surplus excavated material the same day it is excavated;
 - complete the works, including final reinstatement within ten days;
 - where final reinstatement is not achieved within the required time, to carry out temporary reinstatement;
 - ensure that any temporary reinstatement is maintained at the correct level until final reinstatement is achieved.

The above guidelines shall not relieve the Contractor of his obligations and responsibilities.

607.5 Safety Barriers

Safety barriers shall be provided to the perimeter of work areas and to trench and other types of excavations and to existing openings such as manholes, drawpits and the like. When exposed to the public, safety barriers shall be provided to both sides and ends of trenches and around all sides of openings.

The Contractor shall provide details of the type or types of safety barriers for each excavation for the approval of the Engineer prior to commencing work. No work shall commence until the safety barriers are in place.

The type of safety barrier used shall be appropriate to the particular location and the potential risks to the public. Examples of different types of safety barriers are given below:

- Type 1 - excavated material;
- Type 2 - non-rigid barrier of rope or florescent tape strung between metal rods driven into the ground;

- Type 3 - rigid barrier of timber, steel or concrete. Such barriers could be in the form of horizontal rail(s) or sheet material secured to posts driven or concreted onto the ground.

The following are guidelines on the type of safety barriers that could be used in differing situations. They apply particularly to trenches but also apply to other types of excavation, existing openings onto the perimeter of work areas:

- areas not subject to vehicular traffic - Types 1 or 2;
- roadways (low traffic speed) - Types 1 or 2;
- roadways (high traffic speed or where excavation are greater than 2 m) - Type 3.

The above examples of the types of barriers and the guidelines on situations in which they could be used shall not relieve the Contractor of his obligations and responsibilities.

608 Contractor's Site Check List

A sample Contractor's Site Check List is included in Annex 3 to this Specification. This is included to assist contractors should they wish to introduce such a system as part of their site management procedures. The list is not exhaustive and further items will need to be added by the Contractor.

The list is issued for guidance only, and does not, in any way, revise or limit the requirements covered elsewhere in these Specifications.

11 MISCELLANEOUS

1101 GENERAL

The Contractor is referred to the drawings as to the general character of the works and he shall allow in his rates for any reason of the work being in detached positions, in small quantities, difficulty of access or for any other cause. He should also make due allowance for specialist installations taking place during the currency of this contract.

This section of the specification refers to miscellaneous items. Clauses elsewhere in the specification shall be followed where relevant.

1102 BONDIES TIES

Bonding ties shall be 75mm wide x 250mm long galvanised bitumen - coated expanded metal strip, cast 100mm into concrete surface in contact with block work. The bonding tie used shall be approved by the Engineer.

1103 PRECAST LINTELS

All precast items shall be marked with the date of casting and shall not be built until they have matured for 28 days. Ends of bar reinforcement shall be hooked. The cover for reinforcement shall be 25mm from internal faces and 38mm from external exposed faces. The top of lintels shall be numbered for identification.

Lintels shall have timber or pre-formed inserts cast in for fixing metal windows where required and shall have fair face finish on all surfaces exposed to view and hacked surfaces where plastered.

1104 BLOCKWORK

Building blocks shall be dense concrete blocks complying with the requirements of SRN 804 with faces for plastering and having a compressive strength of 14 N/sq.mm

Blocks shall be obtained from an approved manufacturer and shall be equal to sample blocks previously approved by the Engineer.

Blocks shall be carefully handled and stored on site and protected from the weather at all times.

Surfaces on which blockwork is to be built shall be kept clean. Blocks shall be well wetted before being laid and the tops of walls where blockwork has been left shall be well wetted before recommencing. Blockwork shall be built plumb, true to line and level, with all perpendiculars vertical and in line. Block shall be built in half bond and alternate -courses shall be block bonded at all junctions, no cut block shall be less than half block. Joints in concrete blockwork shall be well filled with gauged mortar and shall not exceed 10mm in width.

1105 DAMP - PROOF COURSE (DPC)

Hessian based metal cored bitumen for- damp-proof course shall be lead cored, complying with SRN 803 weighing not less than 4.4kg per square metre. Damp - proof course shall be bedded horizontally in mortar as for blockwork with 115mm laps in length and full laps at angles.

1106 HARDWOOD

Hardwood for joinery shall be sound, well conditioned and seasoned mvuli complying with the requirements of SRN 816. A sample of each representative section for use in the work shall be previously submitted by the contractor for approval by the Engineer. Moisture content shall be 12 (+ or- 2%)

1107 PLYWOOD

Plywood generally shall comply with SRN 811. That from sources not included in SRN 811 shall be of corresponding grades of veneers and types of bonding. Plywood for flush doors shall be Grade 1- Mvuli veneered.

1108 DOORS

Internal doors shall be hardwood framed solid cored flush doors constructed in accordance with SRN 817, faced both sides with 3mm thick Mvuli veneered plywood and lipped all round with matching hardwood lipping. Moisture content at delivery shall be 12% (+ or - 2%).

1109 FRAMES AND LININGS

Door frames and linings shall be class 1 Mvuli mortice and tenon jointed at angles. Subframes for internal doors shall be Class 1 Mvuli tongued at angles.

1110 ARCHITRAVES AND STOPS

Architraves and stops shall be Class 1 Mvuli matching to the frames and linings.

1111 IRONMONGERY

All ironmongery shall be obtained from a source approved by the Engineer. Samples shall be submitted before ordering and the articles ordered shall match up with the approved samples. Screws of a like metal shall be used for all fittings.

1112 JOINERY

All exposed joiner's work shall have wrought faces. The prices of all joiner's work shall include for slightly rounded arises.

Where the term framing or framed is made use of it shall be understood to mean all halvings, dovetails, tenons and hardwood pins and the best known means of putting the work together.

All framed work shall be put together loosely and stacked under cover where a free current of air can circulate and is not to be wedged and glued until it is required for fixing.

All joinery, when brought on the works, shall be stacked under cover. The Engineer or his representative, shall have full right of access to the joinery works and power to condemn any work not approved and any approval expressed or implied is not to relieve the contractor from his responsibility and liability to make good any shrinkage or other defects that may appear after the work is fixed.

All joinery to be painted shall be knotted and primed.

The Contractor shall provide all materials, labour, framing, fixing, etc., nails, screws and everything necessary for the proper execution and completion of the work.

1113 FIXING JOINERY

Doors shall be hung on one or one and a half pairs of butt hinges to give a maximum even tolerance of 2mm all round.

Sub-frames shall be fixed to blockwork with three fixing clamps per side and one dowel let 50mm into floor and d50mm into foot of each leg. Linings shall be fixed after completion of other finishings by means of screwing and pellating to sub-frames with matching hardwood pellates. Architraves and stops shall be pinned on, heads punched and filled with tinted filler.

1114 FIXING IRONMONGERY

The rates for supplying and fixing ironmongery shall include for all sinking, boring, mortising etc., making good, replacing damaged screws, oiling, adjusting and leaving in good working order and for mastering all keys.

1115 BOLTS AND NUTS

Bolts and nuts shall comply with the relevant requirements for the Standards as set out below:

Black Hexagon Bolts, Screws and Nuts SRN 914

Metal Washers for General Purpose SRN 925

Black Cup and countersunk Head Bolts and Screws with nuts SRN 932

The items shall preferably have coarse metric threads but items with B.S.W. or approved equivalent threads may be used. Bolt lengths shall be sufficient to ensure that nuts are full threaded when tightened in their final position.

1116 STRUCTURAL STEELWORK

The whole of the structural steelwork and testing shall comply with the relevant clauses of SRN 863. The Contractor shall include for the preparation of all shop details from the drawings supplied by the Engineer. All such details shall be approved in writing by the Engineer before the work is put in hand. Every drawing shall show the number and sizes of all rivets and bolts, complete details of welds, type of electrodes, welding procedure, whether the welds are to be made in the shop or elsewhere and any other relevant information. The Contractor shall be responsible for the accuracy of his shop details and for shop fittings and site connections.

The Contractor shall take the dimensions from the structure and he shall verify all dimensions given on the drawings before the work is put in hand.

Any damage to materials on the site due to inadequate precautions being taken during the erection of the steelwork shall be made good to the satisfaction of the Engineer at the Contractor's expense.

The fabrication and erection of the steelwork shall be carried out in accordance with SRN 863.

1117 GALVANISEDWORK

Iron and steel, where galvanized, shall comply with SRN 903, entirely coated with zinc after fabrication by complete immersion in a zinc bath in one operation and all excess carefully removed. The finished surface shall be clean and uniform.

ROADS AND FOOTPATHS.

1154. PREPARATION OF ROAD FORMATION.

After excavation or filling has been completed the road formation shall be shaped to the required contour and compacted with an 8 - 10 tonne roller.

If any soft places develop in the formation during compaction they shall be excavated to such depths as the Engineer may direct, refilled with hard core or other approved granular material, levelled and re-compacted before the sub-base is laid.

1155 MURRAM SUB-BASE.

The murrum sub-base will be constructed only in poor soil conditions where directed by the Engineer. The murrum shall be from an approved source quarried so as to exclude vegetable matter, loam, topsoil or clay. The California Bearing Ratio of the Murrum, as determined for sample compacted to maximum density as defined under SRN 601 and allowed to soak in water for four days, shall not be less than 30. This C.B.R. is a guide to quality only and the compaction in the work will be judged by density.

The murrum sub-base shall be of thickness as shown on drawings or stated in the Bill of Quantities.

The sub-base shall be evenly spread and compacted using 8 - 10 tonne roller for road construction and contractor will be required to maintain the selected material at its optimum moisture content to achieve maximum compaction. The roads and footpaths shall be finished to the grades and levels shown on the drawings.

1156 WATER BOUND MACADAM BASE

The base shall consist of crushed building stone mechanically laid in one or more separate layers, so as to give a total compacted thickness as shown on the drawings, or stated in the Bill of Quantities. The first layer shall be laid to produce a thickness of 75 mm to 150mm after compaction as specified. Where a greater thickness than 150mm of base is specified the material shall be in separate layers each not less than 75mm or than 150mm in thickness after compaction.

The stone shall have the following gradings:

Standard sieve size	% by weight passing
5 in. (125mm) ring	100
3 in. (75mm)	25 - 80
1 . 5 in. (38mm)	0-20
¾ in. (20mm)	0-5

Alternatively a stone base may be placed by hand. If this case the first stones in each layer, which shall be of a cubicle nature, shall be placed to the approximate height of the layer. When an area has been covered in this way a second placing of stones or smaller size shall be positioned by eye in the spaces between these first placed, and wedged home by hammering. A third placing of stone shall follow the second and so on until in the opinion of the Engineer the voids are sufficiently filled to permit compaction.

Thoroughly watering shall be carried out at all stages of compaction. Initial compaction shall be with a light roller. The surface shall be blinded with quarry dust so as to fill the interstices complete and gain rolled, this time using a heavy roller. The base shall then be well watered and brushed and permitted to dry. Further rolling with heavy roller, blinding with quarry dust, watering and brushing shall be carried on until the whole presents a homogeneous surface and no movement is visible under the action of the heavy roller. On completion of the base, and before any surfacing is laid the finished surface shall be maintained free from potholes, ruts and undulations, irregularities, depressions, loose material or other defects, and shall remain true to cross- section, line and level.

1157 ROLLED ASPHALT HOT PROCESS WEARING COURSE

Rolled asphalt wearing course shall be made and laid in accordance with SRN Rolled Asphalt (Hot process) and the thickness after compaction shall be as shown on the drawings or stated in the Bill of Quantities. Except where impracticable the rolled asphalt shall be laid using an approved paver. Where a base course has been used as part of the surfacing, the wearing course shall be laid thereon as soon as practicable, care being taken that the latter is thoroughly clean. In any case the wearing course should be laid within 3 days of the laying of the base course, unless the Engineer allows otherwise, and no construction or other traffic shall be allowed on the basecourse.

1158 BITUMEN MACADAM WEARING COURSE

Bitumen macadam wearing shall be made and laid in accordance with SRN 866 and nominal size of aggregate all as shown on the drawings or stated in the Bill of Quantities. Except where impracticable the bitumen macadam shall be laid using an approved paver. The maximum mixing temperature for Straight run bitumen of penetration 85 - 100 is 155 degrees centigrade. For other penetration bitumen it shall be as determined by the Engineer.

1159 COMPACTION AND SURFACE FINISH

As soon as rolling can be effected without causing undue displacement of the material, and while the material is above the minimum temperature it shall uniformly compacted by an 8 - 10 tonne roller having a width of roll not less than 18 inches.

1160 PREPARATION OF THE BASE FOR SURFACING OR SURFACE DRESSING

Before any binder or coating material is applied to a base the latter shall have been freed from all extraneous material by brushing with mechanical sweepers or stiff brooms.

Macadam or murrum bases shall normally receive a priming coat in accordance with the following clause.

Concrete, bitumen bound or rolled asphalt bases shall normally receive a tack coat in accordance with the following clause.

1161 PRIME COAT AND TACK COAT

When a base is to be sealed before surfacing by means of a prime coat, the surface shall first be prepared in accordance with the preceding clause. Unless otherwise stated in the Bill of Quantities or ordered by the Engineer, the prime coat material shall be bitumen grade M.C.O. at a rate of application of 1.2 - 1.5 litre/s.q.m. It shall be applied with a mechanical bitumen distributor complying with the requirements or SRN 935 Binder Distributors for Road Surface Dressing.

The prime coat shall be cured for 48 hours. This period may be relaxed at discretion of the Engineer who shall be informed and shall give his consent before any surfacing works are commenced.

The Contractor shall not permit traffic to run on a prime coat. Where this is unavoidable to the Engineer shall order an application of medium sand at a rate of 6kg./sq.m. which item shall be measured and paid for separately.

Unless otherwise stated in the Bill of Quantities or ordered by the Engineer, the tack coat material shall be approved bitumen emulsion in accordance with SRN866 Bitumen Road Emulsion containing not less than 55 of the bitumen. It shall be mechanically applied at a rate of 0.38 - 0.43 lit./sq.m. The tack coat shall be allowed to cure to a tacky condition and the Engineer's consent obtained before any surfacing works are commenced. Any ponding which has occurred out to bring the coverage within the limits specified.

The contractor shall not permit traffic under any circumstances to run on a coat.

1162 ROLLING OF SURFACE MATERIALS

The type and weight of the roller to be employed on each courses of surfacing shall be approved beforehand by the Engineer. Notwithstanding, the Engineer may call for a certified weigh bridge ticket in respect of any roller at any time.

Roller wheels shall always be clean and even. An adequate water tank shall be provided together with a fully operating roller sprinkler system. The roller shall be operated by a man fully trained and experienced in rolling technique.

Rolling shall be generally carried out in a longitudinal direction, working from the edge of superlevated carriageway, from the low to the high side. The second pass should be precisely on the path of the first, before the roller shifts transversely. Heavy drive wheels should approach the freshly laid material. Reversing should be carried out slowly and smoothly and the reversing points staggered across the carriageway to avoid any wave effect. Rolling should be continued until all roll marks are eliminated and there is no perceptible movement under the roller wheels. Idle standing on freshly laid material is not permitted.

If the total of surfacing to be compacted exceeds 3,330 sq.m. per day, the contractor shall provide a second roller. In confined areas where normal rolling is not possible, mechanical tamping will be permitted. The tampers must be employed systematically to give a smooth "as - rolled" finish. No traffic will be permitted to use a new carriageway at any stage of construction without the written permission of the Engineer.

Notwithstanding any conditions which the Engineer may stipulate at the time of giving his permission of the Engineer. Notwithstanding any condition the Engineer may stipulate at the time

of giving his permission, the Contractor will be solely responsible for maintaining the new carriageway, keeping the surface clean and for making good at his own expense any damage or wear so caused.

1164 LAYING KERBS, CHANNELS AND EDGING BLOCKS

Kerbs, channels and edging blocks shall be bedded true to line and level in cement mortar in a concrete foundation class 15nO. They shall be haunched with concrete class 15/20. The foundation and haunch shall be laid before the approved sub-base is laid to the dimensions shown on the drawings.

1165. PREPARATION OF FOOTPATH FORMATION.

After the excavated of filling has been completed as specified the footpath formation shall be regulated to an even and uniform surface, and compacted with a roller weighing not less than 2.5 tonnes. If any soft places develop in the formation during compaction they shall be excavated and backfilled with approved granular material, levelled and re-compacted.

1166. PRECAST CONCRETE PAVING

Precast concrete paving slabs shall be to SRN 859 and shall be jointed with 1:3 lime mortar. They shall be laid at a level not exceeding 4mm above the top of the kerb or concrete edging. The joints shall be thoroughly cleaned out and grouted with cement mortar well brushed in and flushed off. No cracked or broken slabs shall be used.

1167. CHASING

Chasing in load - bearing walling for pipes, etc. is to be kept to a minimum size of cut and positions and runs of chases are to approved by the Engineer before any cutting is commenced.

1168. DAMP - PROOF COURSES (DPC)

Damp - proof courses shall be 1000 gauge polythene free from tears and holes and be laid with 150mm minimum laps on and including a levelling screed of cement mortar.

1169. BITUMINOUS FELT ROOFING.

Bituminous felt roofing shall be-carried out complete by an approved specialist sub-Contractor. Felt roofing shall be extended in accordance with SRN 936 and strictly in accordance with the manufacturer's instructions, laps shall be 100mm minimum and falls 100 mm in 3 metres for flat roofs and the minimum specification shall be as follows:

- a) One layer of asphalt saturated felt (weighing 6.8kg per 10 square metres) laid loose to screed or random and lap nailed to the boarding.
- b) One layer of ditto - but weighing 9 kg. Per 10 square metres and bedded to under layer with hot bituminous compound.
- c) One layer of white mineral surfaced roofing felt (weighing not less than 23kg. Per 10 square metres) bedded to under layer with compound as last.

1170 HACKING ETC.

The prices for all pavings and plastering, etc., shall include for hacking concrete surfaces and for raking out joints of walls 12mm deep and for cross scoring undercoats to form a proper key. Plastering on walls generally shall be taken to include flush faces of lintels, beams, etc., in same.

1171 SURFACES

All surfaces to be paved or plastered must be brushed clean and well wetted before each coat is applied. All cement pavings and plaster shall be kept continually damp in the interval between application of coats and for seven days after the application of the final coat.

1172 PRICES FOR PAVING

Prices for paving are to include for adequate covering and protection during the progress of the works to ensure that the floors are handed over in perfect condition on completion.

1173 POLISHED TERRAZO

Polished terrazo shall be laid by an approved sub-Contractor and shall consist of a screed or backing coat and a finishing coat of "snowcrete" and marble chippings (1:2) mixed with "cemantone No. 1" colouring compound in accordance with the manufacturer's instructions in the proportions of 1 kg. Compound to 10kg Cement. Overall thickness is to be as specified.

The finishing coat shall be a minimum of 12mm thick for pavings trowelled to a smooth and even finish and well embed and polished with carborundum.

SECTION VI

DRAWINGS

(To be issued with bid document)

SECTION VII – 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 fulfillment 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 Day works) 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 be corrected by the Employer for any arithmetic errors in computation or summation as follows:

- (a) Where there is a discrepancy between amount in words and figures, the amount in words will govern; and
 - (b) Where there is a discrepancy between the unit rate and the total amount derived from the multiplication of the unit price and the quantity, the unit rate as quoted will govern, unless in the opinion of the Employer, there is an obviously gross misplacement of the decimal point in the unit price, in which event the total amount as quoted will govern and the unit rate will be corrected.
 - (c) If a Tenderer does not accept the correction of errors as outlined above, his Tender will be rejected.
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- 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) “Authorized” “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 of 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 0.2m³ occurring in soft material shall be classified as hard material.
 - (b) Soft material shall be all material other than hard material.

BOQ FOR CONSTRUCTION OF WATER KIOSK AND PIPELINE EXTENSION**BILL NO 1: PRELIMINARIES AND PROVISIONAL ITEMS**

Item No.	Item Description	Unit	Qty	Rate	Amount (Ksh)
	CLASS A : GENERAL ITEMS				
	CONTRACTUAL REQUIREMENTS				
1A1.1	Performance bond.	Sum	1		
1A1.2	Insurance of the works	Sum	1		
1A2	SPECIFIED REQUIREMENTS				
1A2.1	Allow for setting out of the works (water kiosk) including survey equipment	Nr	1		
1A2.2	Allow for setting out of the works (water pipeline) including survey equipment	m	4000		
1A2.3	Allow for testing of materials (provisional)	Sum	1		
1A2.4	Contractors overheads and profits on items 1A2.3	Ksh	30,000		
1A2.5	Allow for testing of materials: pipe, valves and fittings by nationally recognized Agency	Sum	1		
1A2.6	Allow for testing of the Kiosk water supply installation and drainage works	Sum	1		
1A2.7	Allow for pressure testing of the pipelines as follows:				

	DN 63 HDPE Pipeline	m	1400		
	DN 50 HDPE Pipeline	m	2400		
1A2.8	Allow for de-watering of the works	days	60		
1A2.9	Allow for preparation and erection on site of project sign boards	Nr	1		
1A2.91	Allow a provisional sum for transport services to site(s),from site(s) and office provisions for RE and Engineer's staff as instructed by Engineer.	Item	1	2,000,000.00	2,000,000.00
1A3	METHOD - RELATED CHARGES				
1A3.1	Allow for contractors site office	Sum	1		
1A3.2	Allow for contractors site stores	Sum	1		
1A3.3	Allow for local community mobilization and stake holders meeting	Wks	8		
1A3.4	Provision and erection of temporary traffic signs and safety barrier tapes	Sum	1		
1B	Allow provisional sum for Hygiene promotion and coordination	Item	1	687,000.00	687,000.00
BILL NO. 1 TOTAL CARRIED TO SUMMARY PAGE					-

	BILL OF QUANTITIES				
	MEASURED WORKS				
Item No.	Item Description	Unit	Qty	Rate	Amount (Ksh)
BILL 2	CONSTRUCTION OF WATER KIOSK				
	The quantities entered here are for construction of 1 No. Kiosk				
	CLASS B: EARTHWORKS				
2B1	Excavation in topsoil for foundations, depth not exceeding 0.25m	m3	2.0		
2B2.1	Disposal of excavated topsoil by spreading on site as directed by the engineer	m3	2.0		
2B2.2	Foundation filling with approved selected excavated material other than topsoil rock	m3	6.0		
2B2.3	Compacted Murram fill to receive 150mm thick hardcore bed below ground floor slab.	m3	6.0		
2B2.4	150mm thick layer hard core bed,hand packed and compacted below floor slab	m3	3.0		
2B2.5	50mm quarry dust blinding to hard core surface, well rolled and leveled to receive concrete	m2	23.0		
	50mm thick sand layer below precast concrete paving slabs.	m2	5.0		
2B2.6	Anti-termite chemical treatment with "Terminator " or any other and approved agent on binding surface	m2	23.0		

2B 2.7	1000mm gauge polythene sheeting with sides and end laps as described laid on blinded surface.	m2	23.0		
	CLASS C : IN SITU CONCRETE				
	Provision of Concrete				
2C 3.1	Blinding concrete standard mix ST3 to BS 5328 Cement to BS12 or BS146, max aggregate size 40mm	m3	1.0		
2C3.2	Concrete standard mix ST4 to BS 5328, Cement to BS12 OR BS146, max aggregate size 20mm	m3	10.0		
	Placing of concrete				
2C3.3	Blinding mass concrete (standard mix ST3 to BS 5328 Cement to BS12 or BS146, max aggregate size 40mm) 50mm thick layer to strip footing and column bases	m3	1.0		
2C3.4	Concrete standard mix ST4 to BS 5328, Cement to BS12 OR BS146, max aggregate size 20mm in unreinforced 150mm thick external ground floor slab	m3	1.0		
2C3.5	Ditto but in 100mm thick reinforced floor slab	m3	1.0		
2C3.6	Ditto but in Strip reinforced footings 200mm thick	m3	1.3		
2C3.7	Ditto but in reinforced column bases 300mm Thick	m3	1.1		
2C3.8	Ditto but in 150mm thick reinforced roof slab	m3	1.8		
2C3.9	Ditto but in reinforced columns (200mm X 200mm)	m3	1.0		
2C3.91	Ditto but in reinforced beams (200mm X 200mm)	m3	1.1		

2C3.92	Ditto but in reinforced window-sill	m3	0.6		
2C3.93	Ditto but in reinforced fetching bay	m3	1.0		
	CLASS D: CONCRETE ANCILLARIES				
	Formwork				
	Sawn formwork to the elements as follows:				
2D 4.0	Soffits of beam, width 200mm, include for flops	m2	1.0		
2D 4.1	Soffits of roof slab, include for flops	m2	11.0		
2D4.2	Sloping soffits of beam width 200mm	m2	1.0		
2D4.3	Vertical sides of ground floor and roof slab, thickness 100 - 200mm thick	m	18.0		
2D4.4	Vertical sides of roof slab, thickness 150mm	m	13.0		
2D4.5	Vertical sides of strip footings and column footings, thickness 200mm and 300 mm respectively.	m2	9.0		
2D4.6	Vertical sides of beams, floor slab, fetching bay and roof slab (200mm - 400mm Wide)	m2	15.0		
2D4.7	Sides and ends of fetching bay	m2	2.0		
2D4.8	Columns of cross-section 200mmX200mm in the structure. Includes for flops	m	4.0		
2D4.9	Columns of cross-section 200mmX200mm in the superstructure. Includes for flops	m	10.0		
	Reinforcement				

2D4.91	Plain round steel bars to BS4449, 8mm diameter as specified in the drawings. Include for the binding wire.	t	0.1		
2D4.92	Deformed high yield steel bars to BS449, 10MM diameter as specified in the drawings and or directed by the Engineer. Include for the binding wire and stirrups	t	0.3		
2D4.93	Ditto but 12mm bars	t	0.2		
2D4.94	Steel fabric BS 4483, 2-3kg/m2 (no.A98) in floor slab. Allow for 300mm lapping	m2	15.0		
	Concrete accessories				
2D4.95	Textured floor finish externally	m2	6.0		
2D4.96	40mm X 30mm drainage groves in concrete to detail drawings nos. ARC 01 and 08.	m	48.0		
2D4.97	Cement screed on the top surface of roof slab to minimum fall gradient of 1.50	m2	15.0		
2D4.98	Bituminous felt cover on the surface of cement screed on roof slab. Allow for 300mm lapping.	m2	15.0		
2D4.99	Allow for 25mm nominal bore class B G.I pipe through inserts in floor slab, roof slab and window sill	m	2.0		
	CLASS E: PRECAST CONCRETE				
2E5.0	600mmX600mmx50mm precast paving slabs to BS EN 1339 around the external walls (drawing no. ARC01) IN 1:3 Cement morta joints	Nr	16.0		

	CLASS F: PIPEWORK - PIPES				
	Drainage system				
2F6.0	100mm nominal bore upvc pipe class 41 in trench, depth i.e 1.5m	m	6.0		
	CLASS G: PIPEWORK - MANHOLES AND PIPEWORK ANCILLARIES				
2G7.0	1000mmX1000mmX1400mm deep soak pit to detail drawing no. ARC 08. Include for 200mm thick granular fill layer outside the walls	Nr	1.0		
2G7.1	In situ concrete gulley trap to detail drawing no. ARC08	Nr	1.0		
	CLASS H : MISCELLANEOUS METAL WORK				
	Miscellaneous framing				
2H8.0	50x50mmX3mm mild steel angle section trimming to window sill and fetching bay anchored to detail drawing no. ARC 06.The trim section shall be set in place before placement of the concrete	m	22.0		
2H8.1	50mm X 25mm X 2mm RHS steel in 1700mmx2650mm high water tank secuting steel cage to detail drawing no. ARC 10.	m	29.0		
2H8.2	50mm X 100 mm x 3mm mild steel rectangular sections in 2000mm X 2000mm steel tank base platform to detail drawing no. ARC 05.	m	36.0		
2H8.3	100mm X 100mm X 3mm mild steel rectangular sections in 2000mm X 2000mm steel tank base platform to detail drawing no. ARC 05	m	21.0		
	CLASS I: MASONRY				
2I9.1	200mm thick single skin English bonded Ashair masonry wall built of 200mm x 200mm x 300mm	m2	15.0		

2I9.2	Ditto but in superstructure	m2	10.0		
2I9.3	Allow for surface fine tooling, flush pointed vertical joints and recessed horizontal joints.	m2	10.0		
2I9.4	Masonry joint reinforcement with 20X3mm thick hoop iron in every alternate course in substructure	m	53.0		
2I9.5	Masonry joint reinforcement with 20X3mm thick hoop iron in every alternate course in superstructure	m	79.0		
2I9.6	Bituminous damp proof course between floor slab and walls in superstructure. Allow for 300mm overlaps	m	9.0		
2I9.7	Built - in through wall, 25mm nominal bore class B G.I pipes for plumbing works	Nr	1.0		
	CLASS J : PAINTING				
2J10.1	Two of primer paint to vertical surfaces of metal doors and windows.	m2	7.0		
2J10.2	Two coats of primer paint to metal section	m2	26.0		
2J10.3	Three coats of oil paint to vertical surfaces of metal doors and windows	m2	7.0		
2J10.4	Three coats of primer paint to metal sections	m2	26.0		
2J10.5	Three coats of oil paint to timber shelves surfaces, width 350mm	m	20.0		
2J10.6	Two coats of first grade oil paint to plastered internal surfaces of walls	m2	30.0		
2J10.7	Three coats of oil paint to plastered surfaces inclined at an angle exceeding 60 Degrees to the horizontal	m2	11.0		

2J10.8	Three coats of oil paint to soffit surfaces inclined at an angle not exceeding 60 Degrees to the horizontal	m2	21.0		
2J10.9	Two coats of emulsion undercoat to plastered internal surfaces of walls	m2	21.0		
	CLASS K: SIMPLE BUILDING WORKS INCIDENTAL TO CIVIL ENGINEERING				
	Carpentry and Joinery				
2K11.1	350mm wide x 25mm thick timber shelves (drawing nos. ARC1 and ARC2)	m	10.0		
2K11.2	Timber shelves supporting brackets ma x spacing 500mm (drawing no. ARC2)	Nr	18.0		
	Windows, doors and glazing				
2K11.3	Purpose made 25mm thick x 1300mm long x 1200mm high rectangular steel shutter bay window fabricated from standard section consisting of 25mm x 25mm mild steel hollow section, two skin 3mm mild steel sheet welded on the frame to detail drawing ARC 07.	Nr	1.0		
2K11.4	Steel window sub-frame to detail drawing no. ARC 07	Nr	1.0		
2K11.5	25mm thick x 900mm x 2100mm high burglar proof door fabricated from standard sections consisting of 25mm x 25mm mild steel angle section, two skin 3mm mild steel sheets welded on the frame to detail drawing no. ARC 09	Nr	1.0		
2K11.6	60mm x 60mm x 6mm mild steel angle section door frame size 2100mm x 900mm	Nr	1.0		
2K11.7	Heavy duty window hinges opening 180 Degrees to detail drawings ARC 07	Nr	4.0		
2K11.8	Heavy duty door hinges (Ø 10mm)opening 180 Degrees to detail drawings ARC 09	Nr	3.0		

2K11.9	YALE high security padlock (50mm \emptyset).	Nr	2.0		
	Surface finishes, linings and partitions				
2K11.91	25mm thick cement screed floor finish (drawing no. ARC 01)	m2	5.0		
2K11.92	12mm thick 2 coat gauged lime (1:2:9) plaster to internal surface of walls.	m2	21.0		
2K11.93	12mm thick 2 coat gauged lime (1:2:9) plaster to soffit of roof slab and beams.	m	11.0		
2K11.94	12mm thick 2 coat gauged lime (1:2:9) plaster to vertical sides of roof slab and column sides, width not exceeding 300mm.	m	49.0		
2K11.95	12mm thick 2 coat gauged lime (1:2:9) plaster to sides of beams, roof slab and exposed surface of fetching bay (width 300mm-1m).	m	35.0		
2K11.96	Perspex covers and pockets (drawing no. ARC 07)	nr	2.0		
	Piped building services				
	Portable water supply installation to detail drawing nos. ARC 01-06				
2K11.97	25mm diameter G.I Class B pipe to BS 1387, thread joints to BS 21.	M	24.0		
	25mm nominal bore GI Fittings as follows				
2K11.98	Unions	Nr	3.0		
2K11.981	Ebows	Nr	7.0		
2K11.982	Bends	Nr	4.0		
2K11.983	Nipples	Nr	15.0		
2K11.984	Nipples Long thread	Nr	2.0		

2K11.985	Equal tees	Nr	4.0		
2K11.986	Back nuts	Nr	4.0		
2K11.987	Pegler (or equivalent) gate valves	Nr	7.0		
2K11.988	Non Return Valves	Nr	2.0		
2K11.989	Floater valve complete	Nr	1.0		
2K11.9891	Supply and install branded rotationally moulded polyethylene water storage tank of nominal capacity 8,000 litres as supported and secured to detail drawing nos ARC 02,03 and 05. Tank manufacturer to be approved by the Engineer.(For water Kiosk)	No.	1		
	The tank is to be complete with the following;				
	a) 25mm diameter overflow				
	e) 32mm diameter washouts with gate valve				
	g) 25mm diameter outlet with gate valve				
	h) 20mm diameter inlet with high pressure float valve				
	i) Tank connectors for all incoming & outgoing pipes				
2K11.9892	Allow for connection of water Kiosk to prepaid dispenser as instructed by the Engineer.	No.	1		
2K11.9893	Allow for connecting the new kiosk to the water mains complete with 25mm diameter peglar gate valve.	Sum	1.0		
BILL No. 2 - TOTAL CARRIED TO SUMMARY PAGE					

Item No.	Item Description	Unit	Qty	Rate	Amount (Ksh)
	BILL NO. 3 WATER PIPELINE EXTENSION				
	CLASS L : SITE INVESTIGATION				
3L1	Trial Holes as directed by the engineer for the purpose of determining depth to rock stratum. Depth shall be to the rock stratum but not exceeding 1m	Nr	20.0		
	CLASS M : DEMOLITION AND SITE CLEARANCE				
3M2	General site clearance 2.5m wide along the pipeline route.	ha	1.8		
	CLASS M : PIPEWORK - PIPES				
3M3	Provision, Laying and jointing of high density polythene (HDPE) PN 16 pipes to KS-06-149 Part Z 2000 including excavation and backfilling of trenches, depth not exceeding 1.5m. Include for preparation of trench surfaces;upholding sides of the excavation, disposal of excess excavated material, removal of dead services except to the extent that such work is included in classes N,O and P				
3M3.1	Nominal bore 25mm	m	200.0		
3M3.2	Nominal bore 50mm	m	2,400.0		
3M3.3	Nominal bore 63mm	m	1,400.0		
	CLASS N: PIPEWORK - FITTINGS AND VALVES				

	Provision and installation of fittings and valves including excavation and backfilling of trenches, depth not exceeding 1.5m. Include for preparation of trench surfaces; upholding sides of the excavation, disposal of excess excavated material, removal of dead services except to the extent that such work is included in classes M, O and P				
	Epoxy coated mild steel fittings to BS 21				
3N4	Bends				
3N4.1	Nominal bore 50mm x 45 degrees	Nr	15.0		
3N4.2	Nominal bore 37.5mm x 45 degree	Nr	3.0		
3N4.3	Nominal bore 25mm x 45 degrees	Nr	3.0		
3N5	Junctions and Branches - Tees				
3N5.1	DN 50 X 50 X 50 Flanged branched Tee	Nr	10.0		
3N5.2	DN 50X 50 X 37.5 Flanged branched Tee	Nr	10.0		
3N5.3	DN 50 X 50 X25 Flanged branched Tee	Nr	8.0		
3N5.4	DN 37.5 X 37.5 X 25 Flanged branched Tee	Nr	15.0		
3N6	Tapers/reducers				
3N6.1	Nominal bore 50 X 37.5 reducer	Nr	4.0		
3N6.2	Nominal bore 37.5 mm x 25 mm reducer	Nr	5.0		
3N6.3	Nominal bore 50 mm x 25 mm reducer	Nr	15.0		

3N7	Double collars / Couplings				
3N7.1	HDPE pipe nominal bore 63 mm	Nr	14.0		
3N7.2	HDPE pipe nominal bore 50 mm	Nr	24.0		
3N8	Flange adaptors				
3N8.1	Nominal bore 50mm	Nr	15.0		
3N8.2	Nominal bore 37.5 mm	Nr	6.0		
3N9	Saddle clamps				
3N9.1	DN 100 X 50 mm Steel saddle clamp	Nr	5.0		
3N9.2	DN 75 x 50 mm Steel saddle clamp	Nr	6.0		
3N10	Gate valves to BS 5163, PN 16, flanged to BS 4772				
3N10.1	Nominal bore 50mm	Nr	5.0		
3N10.2	Nominal bore 37.5mm	Nr	15.0		
	CLASS O : PIPEWORK - MANHOLES AND PIPEWORK ANCILLARIES				
3O1	Valve chambers	Nr	10.0		
3O1.1	Allow for sewer/drain crossings	Nr	6.0		
3O1.2	Allow for underground telephone and power services crossing	Nr	5.0		
3O1.3	Allow for breaking and temporary and permanent reinstatement of murrum roads	m	80.0		

301.4	Allow for breaking and temporary and permanent reinstatement of murram foot paths	m	1,200.0		
301.5	Allow for reinstatement of drains	m	50.0		
301.6	Marker posts to engineers approval	Nr	40.0		
301.7	Supply and install Prepaid Water Dispenser (PPD)	Nr	20.0		
	CLASS P: PIPEWORK - SUPPORTS AND PROTECTION, ANCILLARIES TO LAYING AND EXCAVATION				
3P1	Excavation in rock various classes (0.135m3/m)	m3	250.0		
3P1.1	Approved granular layer backfill above final surface of trench providing complete fill between pipe and trench walls with 150mm bed cover to the pipe (average 0.213 m3/m)	m	4,000.0		
3P1.2	Allow for concrete thrust blocks n.e 0.1 m3	Nr	10.0		
BILL NO. 3 TOTAL CARRIED TO SUMMARY PAGE					
Item No.	Item Description	Unit	Qty	Rate	Amount (Ksh)
	BILL NO. 4. 10m3 TANK INSTALLATION AT SELECTED HEALTH FACILITIES.				
4Q1	Supply and install branded rotationally moulded polyethylene water storage tank of nominal capacity 10,000 litres as supported and secured to detail drawing nos ARC 02,03 and 05. Tank manufacturer to be approved by the Engineer.(For Selected health facilities)	No.	20		
	The tank is to be complete with the following;				
	a) 25mm diameter overflow				

	e) 32mm diameter washouts with gate valve				
	g) 25mm diameter outlet with gate valve				
	h) 20mm diameter inlet with high pressure float valve				
	i) Tank connectors for all incoming & outgoing pipes				
4Q1.1	Masonry tank base with a concrete slab dimensions (2.8Mx2.8Mx 1M)	Nr	20		
4Q1.2	Allow provisional sum for connecting from the water tank to the health facility	Nr	20		
4Q1.3	Cast insitu concrete sinks at the health facility each measuring 800X400 mm and at a height of 900 mm above ground. The sinks shall be sited and embended against existing walls and in some instances shall be stand alone. Allow for fitting of push taps and 30 mm drain pipes	Nr	120		
	Provision for plumbing and jointing of high density polythene (HDPE) PN 16 pipes to KS-06-149 Part Z 2000 including hacking in natural stone, making good with motar the hacked walls and painting walls to original colours and excavation and bacfilling in some instances, to connect water to sinks in item 4Q1.3 above				
4Q1.4	Nominal bore 25mm including all fitting	m	1,000		
BILL NO. 4 TOTAL CARRIED TO SUMMARY PAGE					

DAY WORKS SCHEDULE					
ITEM	DESCRIPTION	UNIT	QTY	RATE (Kshs)	Amount (Ksh)
1	PLANTS AND EQUIPMENT				
1.1	Welding machine (gasoline powered)	Hr	1		
1.2	Grinding machine	Hr	1		
1.3	Generator set	Hr	1		
1.4	Porker vibrator	Hr	1		
1.5	Concrete mixer	Hr	1		
1.6	Dewatering pump	Hr	1		
1.7	Excavator with bucket	Hr	1		
1.8	Excavator with Hammmer	Hr	1		
1.9	Low bed truck	Hr	1		
1.10	Lorry mounted Crane	Hr	1		
1.11	Compressor	Hr	1		
1.12	Backhoe Excavator	Hr	1		
1.13	Damper	Hr	1		
1.14	Damping truck	Hr	1		
1.15	Single cabin pickup	Hr	1		
1.16	Double cabin pickup	Hr	1		
1.17	7 Ton Lorry	Hr	1		
1.18	18 Ton Lorry	Hr	1		
1.19	Pressure testing machine	Hr	1		
1.20	45 ton compactor	Hr	1		

1.21	5 ton Roller	Hr	1		
1.22	Vehicle mounted lifting crane	Hr	1		
1.23	Water tanker	Hr	1		
2.1	MATERIALS				
	PIPES				
2.2	DN 13 Class 'B' GI pipe	m	1		
2.3	DN 20 Class 'B' GI pipe	m	1		
2.4	DN 25 Class 'B' GI pipe	m	1		
2.5	DN 37 Class 'B' GI pipe	m	1		
2.6	DN 50 GI Class 'B' pipe	m	1		
2.7	DN 63 class 'B' GI pipe	m	1		
2.8	DN 100 class 'B' GI pipe	m	1		
2.9	DN 150 class 'B' GI pipe	m	1		
2.10	DN 200 class 'B' GI pipe	m	1		
2.11	DN 250 class 'B' GI pipe	m	1		
2.12	DN 25 CLASS 'D' UPVC pipe	m	1		
2.13	DN 40 CLASS 'D' UPVC pipe	m	1		
2.14	DN 50 CLASS 'D' UPVC pipe	m	1		
2.15	DN 63 CLASS 'D' UPVC pipe	m	1		
2.16	DN 90 CLASS 'D' UPVC pipe	m	1		
2.17	DN 110 CLASS 'D' UPVC pipe	m	1		
2.18	DN 160 CLASS 'D' UPVC pipe	m	1		
2.19	DN 200 CLASS 'D' UPVC pipe	m	1		

2.20	DN 250 CLASS 'D' UPVC pipe	m	1		
2.21	DN 280 CLASS 'D' UPVC pipe	m	1		
2.22	DN 315 CLASS 'D' UPVC pipe	m	1		
2.23	DN 355 CLASS 'D' UPVC pipe	m	1		
2.24	DN 400 CLASS 'D' UPVC pipe	m	1		
2.25	DN 20 HDPE PIPE(PN 16)	m	1		
2.26	DN 25 HDPE PIPE(PN16)	m	1		
2.27	DN 32 HDPE PIPE(PN 16)	m	1		
2.28	DN 50 HDPE(PN16)	m	1		
2.29	DN 63 HDPE (PN 16)	m	1		
2.30	DN 90 HDPE (PN 16)	m	1		
2.31	DN 110 HDPE (PN 16)	m	1		
2.32	DN 160 HDPE (PN 16)	m	1		
2.33	DN 200 HDPE (PN 16)		1		
2.34	DN 100 externally Epoxy coated and internally cement lined socket and spigot steel pipes.		1		
2.35	DN 150 externally Epoxy coated and internally cement lined socket and spigot steel pipes.		1		
2.36	DN 200 externally Epoxy coated and internally cement lined socket and spigot steel pipes.	m	1		
2.37	DN 225 externally Epoxy coated and internally cement lined socket and spigot steel pipes.	m	1		
2.38	DN 250 externally Epoxy coated and internally cement lined socket and spigot steel pipes.	m	1		
2.39	DN 300 externally Epoxy coated and internally cement lined socket and spigot steel pipes.	m	1		

2.40	DN 350 externally Epoxy coated and internally cement lined socket and spigot steel pipes.	m	1		
2.41	DN 375 externally Epoxy coated and internally cement lined socket and spigot steel pipes.	m	1		
2.42	DN 400 externally Epoxy coated and internally cement lined socket and spigot steel pipes.	m	1		
2.43	DN 450 externally Epoxy coated and internally cement lined socket and spigot steel pipes.	m	1		
2.44	DN 500 externally Epoxy coated and internally cement lined socket and spigot steel pipes.	m	1		
2.45	DN 550 externally Epoxy coated and internally cement lined socket and spigot steel pipes.	m	1		
2.46	DN 600 externally Epoxy coated and internally cement lined socket and spigot steel pipes.	m	1		
2.47	Precast reinforced concrete 1200mmx14000 box culvert	m	1		
2.48	5/8 " Bolts and nuts m16	No	1		
2.49	Bolts ,nuts and washers m20(Include washers)	No	1		
2.50	Bolts,nuts and nuts m22	No	1		
2.51	Bolts ,nuts and washers m25	No	1		
2.52	Red soil	m3	1		
2.53	Gaskets (3mm & 5mm)	Roll			
	COUPLINGS				
2.54	DN 50 step down coupling	No	1		
2.55	DN75 step down coupling	No	1		
2.56	DN 100 step down coupling	No	1		
2.57	DN 150 step down coupling	No	1		

2.58	DN 200 step down coupling	No	1		
2.59	DN 250 step down coupling	No	1		
2.60	DN 300 step down coupling	No	1		
2.61	DN 400 step down coupling	No	1		
2.62	DN 450 step down coupling	No	1		
2.63	DN 500 step down coupling	No	1		
2.64	DN 600 step down coupling	No	1		
2.65	DN 20 Mechanical coupling	No	1		
2.66	DN 25 Mechanical coupling	No	1		
2.67	DN 50 Mechanical coupling	No	1		
2.68	DN 50 Mechanical coupling	No	1		
2.69	DN75 Mechanical coupling	No	1		
2.70	DN 100 Mechanical coupling	No	1		
2.71	DN 150 Mechanical coupling	No	1		
2.72	DN 200 Mechanical coupling	No	1		
2.73	DN 250 Mechanical coupling	No	1		
2.74	DN 300 Mechanical coupling	No	1		
2.75	DN 400 Mechanical coupling	No	1		
2.76	DN 450 Mechanical coupling	No	1		
2.77	DN 500 Mechanical coupling	No	1		
2.78	600 Mechanical coupling	No	1		
	VALVES				
2.79	DN 20 PN 16 gate valve	No	1		

2.80	DN 25 PN 16 gate valve	No	1		
2.81	DN 37 PN 16 gate valve	No	1		
2.82	DN 50 PN 16 gate valve	No	1		
2.83	DN 63 PN 16 gate valve	No	1		
2.84	DN 75 PN 16 gate valve	No	1		
2.85	DN 100 PN 16 gate valve	No	1		
2.86	DN 50 PN 16 sluice valve	No	1		
2.87	DN75 PN 16 sluice valve	No	1		
2.88	DN 100 PN sluice valve	No	1		
2.89	DN 150 PN sluice valve	No	1		
2.90	DN 200 PN sluice valve	No	1		
2.91	DN 250 PN sluice valve	No	1		
2.92	DN 300 PN sluice valve	No	1		
2.93	DN 400 PN 16 sluice valve	No	1		
2.94	DN 450 PN 16 sluice valve	No	1		
2.95	DN 500 PN sluice valve	No	1		
2.96	DN 600 PN 16 sluice valve	No	1		
2.97	DN 75 Double orifice Airvalve	No	1		
2.98	DN 100 Double orifice Airvalve	No	1		
2.99	DN 150 Double orifice Airvalve	No	1		
2.100	DN 50 type single orifice Airvalve	No	1		
2.101	DN 75 type single orifice Airvalve	No	1		
2.102	DN 100 type single orifice Airvalve	No	1		

2.103	DN 150 type single orifice Airvalve	No	1		
2.104	Type 2 fire hydrant	No	1		
2.105	Type 1 fire hydrant	No	1		
2.106	Engaved Marker post	No	1		
2.107	Complete washout setup (Either type)	No	1		
	TAPERS				
	DN 150 x100 Flanged steel taper				
2.108	DN 200 x150 Flanged steel taper	No	1		
2.109	DN 250 x200 Flanged steel taper	No	1		
2.110	DN 300 x250 Flanged steel taper	No	1		
2.111	DN 400 x300 Flanged steel taper	No	1		
2.112	DN 450 x400 Flanged steel taper	No	1		
2.113	DN 500x400mm Flanged steel taper	No	1		
2.114	DN 600 X500 Flanged steel taper	No	1		
	ADAPTORS				
2.115	DN 50 Flange adaptor	No	1		
2.116	DN 75 Flange adaptor	No	1		
2.117	DN 100 Flange adaptor	No	1		
2.118	DN 150 Flange adaptor	No	1		
2.119	DN 200 Flange adaptor	No	1		
2.120	DN 250 Flange adaptor	No	1		
2.121	DN 300 Flange adaptor	No	1		
2.122	DN 350 Flange adaptor	No	1		

2.123	DN 375 Flange adaptor	No	1		
2.124	DN 400 Flange adaptor	No	1		
2.125	DN 450 Flange adaptor	No	1		
2.126	DN 500 Flange adaptor	No	1		
2.127	DN 550 Flange adaptor	No	1		
2.128	DN 600 Flange adaptor	No	1		
	TEES				
2.129	DN 50 Flanged steel tee.	No	1		
2.130	DN75 Flanged steel tee.	No	1		
2.131	DN 100 Flanged steel tee.	No	1		
2.132	DN 150 Flanged steel tee.	No	1		
2.133	DN 200 Flanged steel tee.	No	1		
2.134	DN 250 Flanged steel tee.	No	1		
2.135	DN 300 Flanged steel tee.	No	1		
2.136	DN 400 Flanged steel tee.	No	1		
2.137	DN 450 Flanged steel tee.	No	1		
2.138	DN 500 Flanged steel tee.	No	1		
2.139	DN 600 Flanged steel tee.	No	1		
	SPIGOTS				
2.140	DN 50 Flanged steel spigots.	No	1		
2.141	DN75 Flanged steel spigots	No	1		
2.142	DN 100 Flanged steel spigots.	No	1		
2.143	DN 150 Flanged steel spigots.	No	1		

2.144	DN 200 Flanged steel spigots.	No	1		
2.145	DN 250 Flanged steel spigots.	No	1		
2.146	DN 300 Flanged steel spigots.	No	1		
2.147	DN 400 Flanged steel spigots.	No	1		
2.148	DN 450 Flanged steel spigots.	No	1		
2.149	DN 500 Flanged steel spigots.	No	1		
2.150	DN 600 Flanged steel spigots.	No	1		
	FLANGES				
2.151	DN 50 Steel plain flange.	No	1		
2.152	DN75 Steel plain flange	No	1		
2.153	DN 100 Steel plain flange.	No	1		
2.154	DN 150 Steel plain flange.	No	1		
2.155	DN 200 Steel plain flange.	No	1		
2.156	DN 250 Steel plain flange.	No	1		
2.157	DN 300 Steel plain flange.	No	1		
2.158	DN 400 Steel plain flange.	No	1		
2.159	DN 450 Steel plain flange.	No	1		
2.160	DN 500 Steel plain flange.	No	1		
2.161	DN 600 Steel plain flange.	No	1		
2.162	Ballast	Ton	1		
2.163	River sand	Ton	1		
2.164	Hard core	m ³	1		
2.165	Quarry dust	Ton	1		

2.166	Cabro blocks	m ²	1		
2.167	Hand compactor	No	1		
2.168	Collas	Ltr	1		
2.169	Collas sprayer	No	1		
2.170	Sanding machine	No	1		
2.171	Buitumen mix	m ³	1		
2.172	Murram	Ton	1		
2.173	Portland Cement	Ton	1		
2.174	Grannular materials/Red soil	Ton	1		
2.175	DN 225 spigot and socket concrete pipe.	m	1		
2.176	DN 300 spigot and socket concrete pipe.	m	1		
2.177	DN 375 spigot and socket concrete pipe.	m	1		
2.178	DN 450 spigot and socket concrete pipe.	m	1		
2.179	DN 525 spigot and socket concrete pipe.	m	1		
2.177	Y12 Reinforcement bars	m	1		
2.178	Y10 Reinforcement bars	m	1		
2.179	R 8 Reinforcement bars	m	1		
2.180	150mmx25mm cypress timber	m	1		
2.181	100x25mm cypress timber	m	1		
2.182	25 Ton Heavy duty polyresin manhole access cover	No	1		
2.183	26 Ton Heavy duty recessed, concrete filled cast iron manhole access cover and frame	No	1		
2.184	1050mm Dia preast manhole ring	No	1		

2.185	1200mm Dia precast concrete manhole ring	No	1		
2.186	1050mm Dia precast reinforced manhole top concrete slab	No	1		
2.187	1200 mm Dia precast reinforced manhole top concrete slab	No	2		
2.188	Precast concrete 90 Degrees Drop manhole Bend (All sizes)	No	1		
2.189	Precast concrete Drop manhole Tee	No	1		
2.190	BL Internally cement lined steel Pipes.	m	1		
2.191	225mm Precast concrete sandle connector	No	1		
2.192	225mm Precast concrete wyee junction	No	1		
2.193	Heavy duty ductile iron step iron	No	1		
2.194	Hemp	kg	1		
	LABOUR				
2.195	Site Agent	hr	1		
2.196	Assistant Engineer	hr	1		
2.197	General fore man	hr	1		
2.198	Foreman	hr	1		
2.199	Supervisor	hr	1		
2.200	Graded Artisan	hr	1		
2.201	Ungraded Artisan	hr	1		
3.202	Guard	hr	1		
3.203	Welder	hr	1		
3.204	Driver	hr	1		

3.205	Machine operator	hr	1		
3.206	Mason	hr	1		
3.207	Plumber	hr	1		
3.208	Store keeper	hr	1		
3.209	unskilled labour	hr	1		
3.210	Plant operator	hr	1		
3.211	Site Clerk	hr	1		
3.212	Painter	hr	1		
3.213	Carpenter	hr	1		
3.214	Office assistant	hr	1		

PRICE SCHEDULE

Item No.	Item Description	Amount (Kes)
1	Bill 1 Preliminaries	
2	Bill 2 Construction of 20 no. Water Kiosk each mounted with 1 no. Tank	
3	Bill 3 Water Pipeline extension	
4	Bill 4 20 No. 10m3 Tank installation for Selected Health Facilities	
SUB TOTAL - (MEASURED WORKS)		
ADD 16% VAT		
GRAND TOTAL		
AMOUNT IN WORDS:		

Name of Bidder.....

Physical Address.....

Building.....

Town.....

Name of Authorised Representative of Bidder.....

Signature.....

Date.....

stamp/Company Seal

SECTION VIII – STANDARD FORMS

LIST OF 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
- x) Confidential Business Questionnaire
- xi) Statement of Foreign Currency Requirement
- xii) Schedule of Materials;- Basic Prices
- xiii) Schedule of Labour;- Basic Prices
- xiv) 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) Declaration Form
- xxiii) Request for Review
- xxiv) Rate analysis form
- xxv) Site Visit Certificate

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,

_____ Authorized 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)

S/No	CONDITIONS OF CONTRACT	CLAUSE	AMOUNT
1	Tender Security		Kshs. 500,000.00 from a bank or insurance company approved by PPRA
2	Amount of Performance Security (Unconditional Bank Guarantee)	10.1	10% percent of contract price in the form of Unconditional Guarantee from a bank. Performance security from insurance company shall not be accepted.
3	Program to be submitted	14.1	Not later than 28 days after issuance of Order to Commence
4	Minimum amount of Third Party Insurance	23.2	Kshs.1,500,000
5	Period for commencement, from the Engineer's order to commence	41.1	14 days
6	Time for completion	43.1	2 calendar months
7	Amount of liquidated damages	47.1	Kshs. 10,000 per calendar day after expiry of contract period
8	Limit of liquidated damages	47.1	7.5 % of the contract amount
9	Defect Liability period	49.1	365 calendar days
10	Advance Payment	60.1	Not applicable in this contract
11	Percentage of Retention	60.5	10% of certified value
12	Limit of Retention	60.3	10 % of Contract Price
13	Minimum amount of interim certificates	60.2	10% of the tender sum
14	Time within which payment to be made after Interim Payment Certificate signed by Engineer	60.8	60 calendar days
15	Appointer of Arbitrator	67.3	Chairman of Institution of Engineers of Kenya
16	Notice to Employer and Engineer	68.2	The Employers address is: Managing Director, Nairobi City Water and Sewerage Co. Ltd, P.O. Box 30656 – 00100 <u>NAIROBI</u>
17	Submission of as built drawings		Within 6 months after substantial completion
18	Non-submission of as built drawings		Penalty of ksh. 200,000
19	Revision of program of works		Monthly
20	Penalty for failure to revise program of works		5,000 per day

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] _____ (herein after called “the Employer”) of the one part AND _____ of [or whose registered office is situated at] _____ (herein after called “the Contractor”) of the other part.

WHEREAS THE Employer is desirous that the Contractor executes

_____ (*name and identification number of Contract*) (herein after 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 NCWSC/23/2020 – CONSTRUCTION OF 20no. WATER KIOSKS AND WATER PIPELINE EXTENSION by these presents that WE having our registered office at(hereinafter called “the Bank”), are bound unto **Nairobi City Water and Sewerage Company Ltd** (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 of20.....

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 or 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.

_____	_____
<i>[date]</i>	<i>[signature of the Bank]</i>
_____	_____
<i>[witness]</i>	<i>[seal]</i>

(Amend accordingly if provided by the 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 recognized bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

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

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of Kshs. _____ (amount of Guarantee in figures) Kenya Shillings _____ (amount of Guarantee in words), and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of Kenya Shillings _____ (amount of Guarantee in words) as 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 there under or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this Guarantee, and we hereby waive notice of any change, addition, or modification.

This guarantee shall be valid until the date of issue of the Certificate of Completion (**after the expiry of the defects liability period**)

SIGNATURE AND SEAL OF THE GUARANTOR _____

Name of Bank _____

Address _____

Date _____

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 figures] 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 there under 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*)

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:

	<i>Name in full</i>	<i>Nationality</i>	<i>Citizenship Details</i>	<i>Shares</i>
1.
2.
3.

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			TRANSPORT ATION 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.

SCHEDULE OF LABOUR:- BASIC RATES
(Reference: Clause 70 of Conditions of Contract)

LABOUR CATEGORY	UNIT (MONTH/SHIFT/HOUR)	RATES

Categories to be generally in accordance with those used by the Kenya Building Construction and Engineering and Allied Trades Workers' Union.

DETAILS OF SUB-CONTRACTORS

If the Tenderer wishes to sublet any portions of the Works under any heading, he must give below details of the sub-contractors he intends to employ for each portion.

Failure to comply with this requirement may invalidate the tender.

(1) Portion of Works to be sublet:

.....

(i) Full name of Sub-contractor
and address of head office:

.....

(ii) Sub-contractor's experience
of similar works carried out
in the last 3 years with
Contract value:

.....

.....

(2) Portion of Works to sublet:

(i) Full name of sub-contractor
and address of head office:

.....

.....

(ii) Sub-contractor's experience
of similar works carried out
in the last 3 years with
contract value:

.....

[Signature of Tenderer)

Date

FORM OF WRITTEN POWER-OF-ATTORNEY

The Tenderer consisting of a joint venture shall state here below the name and address of his representative who is authorized to receive on his behalf correspondence in connection with the Tender.

.....
(Name of Tenderer's Representative in block letters)

.....
(Address of Tenderer's Representative)

.....
(Signature of Tenderer's Representative)

KEY PERSONNEL

DESIGNATION	NAME	NATIONALITY	SUMMARY OF QUALIFICATIONS AND EXPERIENCE
Headquarters: 1. Director 2. 3. 4. 5. etc.			
Site Office: 1. Site Superintendent 2. 3. 4. 5. etc.			

I certify that the above information is correct.

.....
(Title)

.....
(Signature)

.....
(Date)

**SCHEDULE OF COMPLETED CIVIL WORKS CARRIED OUT BY THE TENDERER
IN THE LAST EIGHT YEARS**

DESCRIPTION OF WORKS AND CLIENT	TOTAL VALUE OF WORKS (KSHS)	CONTRACT PERIOD (YEARS)	YEAR COMPLETED

I certify that the above Civil Works were successfully carried out and completed by ourselves.

.....
(Title)

.....
(Signature)

.....
(Date)

*Value in Kshs using Central Bank of Kenya mean exchange rate at a reference date 30 days before date of tender opening.

SCHEDULE OF ONGOING PROJECTS

DESCRIPTION OF WORK AND CLIENT	CONTRACT PERIOD	DATE OF COMMENCEMENT	DATE OF COMPLETION	TOTAL VALUE OF WORKS (KSHS.)	PERCENTAGE COMPLETED TO DATE

I certify that the above Civil Works are being carried out by ourselves and that the above information is correct.

.....
(Title)

.....
(Signature)

.....
(Date)

DECLARATION FORM

Date _____

To _____

The tenderer i.e. (name and address) _____
_____ declare the following:

- a) Has not been debarred from participating in public procurement.
- b) Has not been involved in and will not be involved in corrupt and fraudulent practices regarding public procurement.

Title

Signature

Date

(To be signed by authorized representative and officially stamped)

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

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 of20.....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
of20.....

SIGNED
Board Secretary

RATE ANALYSIS FORM

Description of Index		% Range of Weighting on Base Prices
Labour	a	
Plant, Spares, Fuels and Lubricants	b	
Materials	c	
Total		100%

Description		% Weighting
Overheads on Total Base Prices (ie a+b+c)	d	
Profits (on a+b+c+d)	e	
Total		

[Signature of Tenderer)

Date

CERTIFICATE OF BIDDER’S VISIT TO SITE

This is to certify that

being the authorized representative/Agent of M/s.....

Signed.....
(Firm’s Representative)

Date.....

Rubber Stamp

Participated in the organized inspection visit of the site of the works for contract no.
**NCWSC/23/2020 – CONSTRUCTION OF 20NO. WATER KIOSKS AND WATER PIPELINE
EXTENSION.**

Name

Signed.....
(Employer’s Representative)

Date.....

Rubber Stamp

**NOTE: This Form must be completed by Both Parties after the Site Visit / Pre-Bidding Conference.
Original to be attached in the Bid document on Submission.**